Republic of Kenya

Reversing the Trends
The Second National Health Sector Strategic Plan

CLINICAL MANAGEMENT AND
REFERRAL GUIDELINES
Volume III

Clinical Guidelines for Management and Referral of Common Conditions at Levels 4–6: Hospitals

Ministry of Medical Services

Ministry of Public Health & Sanitation

World Health Organization

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Clinical Management and Referral Guidelines – Volume III:
Clinical Guidelines for Management and Referral of Common Conditions at Levels 4–6: Hospitals

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List of Abbreviations

ACT	Artemesinin combination treatment
AIDS	Acquired immune deficiency syndrome
APGAR	Appearance, pulse, grimace, activity, aspiration
ART	Antiretroviral therapy
ATLS	Advanced trauma life support
ARV	Antiretroviral drug
BCC	Behaviour change communication
CBO	Community-based organization
CHEW	Community health extension worker
CHW	Community health worker
CRHS	Child and Reproductive Health Services
CSHP	Comprehensive school health programme
CSOM	Chronic Suppurative Otitis Media
DCT	Diagnostic counselling and testing
DEH	Division of Environmental Health
DEO	District Education Officer
DHMT	District Health Management Team
DLTLD	Division of Leprosy, Tuberculosis and Lung Diseases
DMOH	District Medical Officer of Health
DOMC	Division of Malaria Control
DON	Department of Nursing
DOTS	Directly observed therapy, short course
FP	Family planning
GOK	Government of Kenya
GORD	Gastro-oesophageal reflux disease
GUD	Genital ulcer disease
GYN	Gynaecology
HAART	Highly active anti-retroviral therapy
HAPAC	HIV/AIDS Prevention and Care Project
HFA	Health For All
HIV	Human immunodeficiency virus
HSV	Herpes simplex virus
IEC	Information, education and communication

INH	Isoniazid
ITN	Insecticide treated net
IUCD	Intrauterine contraceptive device
IUFD	Intrauterine foetal death
JRA	Juvenile rheumatoid arthritis
KCCT	Kaolin cephalin clotting time
KEPH	Kenya Essential Package for Health
KMC	Kangaroo mother care
KOH	Potassium hydroxide solution
LBW	Low birth weight
MDGs	Millennium Development Goals
MDR-TB	Multiple drug resistant TB
Merlin	Referral Network Manual
MOA	Ministry of Agriculture
MOEST	Ministry of Education, Science and Technology
MOH	Ministry of Health
MOMS	Ministry of Medical Services
MOPHS	Ministry of Public Health and Sanitation
MOPW	Ministry of Public Works
MOU	Memorandum of understanding
MOWI	Ministry of Water and Irrigation
NASCOP	National AIDS/STD Control Programme
NCD	Non-communicable disease
NGO	Non-government organization
NHSSP II	Second National Health Sector Strategic Plan 2005–2010
OB	Obstetrics
PEP	Post-exposure prophylaxis
PHC	Primary health care
PID	Pelvic inflammatory disease
PLWHA	Person/people living with HIV/AIDS
PMTCT	Prevention of mother to child transmission (of HIV)
POP	Plaster of paris
PSC	Patient support centre
PTI	Prothrombin Time Index
PUD	Pyrexia (fever) of unknown origin
SFP	School feeding programme
SHN	School health and nutrition
SHP	School health programme
STI	Sexually transmitted infections
TAH	Total abdominal hysterectomy
TB	Tuberculosis
TOF	Tracheoesophageal fistula
TT2	Tetanus toxoid
TURP	Transurethral resection of the prostate
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UTI	Urinary tract infection
VCT	Voluntary counselling and testing
WHO	World Health Organization

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Foreword

Following the articulation of the 1994 National Health Policy Framework, the Ministry of Health published the National Drug Policy, the Essential Drug List, and Clinical Guidelines and Referral Strategy. All these are important building blocks of the elaboration of the Kenya Essential Package for Health (KEPH) subsequently mooted in the second National Health Sector Strategic Plan (NHSSP II – 2005–2010). This volume is one of a three-volume set that comprises the latest edition of the Clinical Guidelines.

Intended as neither prescriptive nor restrictive, the guidelines are facilitative, enabling, and foundational. They provide a firm base for the attainment of equity and high standards in health care and the development of rational procurement and use of drugs by all prescribers, dispensers, hospital managers, and patients.

The guidelines are for the use of all clinicians and nurses who have the primary responsibility for diagnosis, management, and referral of outpatients and inpatients. They are also very useful to interns, medical students, clinical officers, pharmacists, and nurses in training – and generally to health professionals working in the clinical setting and especially those in rural health services where it might be the only reference book.

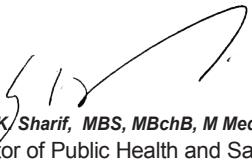
The revision has been widely consultative, incorporating recent advances in disease management and emerging medical challenges of the 21st century. Efforts have been made to include the most recent recommendations of the Ministry of Medical Services (MOMS) and the Ministry of Public Health and Sanitation (MOPHS) with inputs from specialized disease programmes, community health and the World Health Organization (WHO).

On behalf of the Ministry of Medical Services and the Ministry of Public health and Sanitation, many thanks are accorded to WHO, and to all contributors, reviewers, and the editors who have worked so hard to make the third edition of the guidelines a reality. We would like to acknowledge the technical guidance

provided by WHO in compiling these revised clinical and management guidelines, and the financial support for the process from the EC/ACP/WHO partnership USAID-MSH/SPS (Management Sciences for Health/Strengthening Pharmaceutical Systems) on meeting the health targets of the Millennium Development Goals (MDGs).

The regular and consistent use of the guidelines by clinicians, nurses and other health proffessionals countrywide can be expected to improve health care in Kenya and encourage the rational use of available drugs and thus contribute albeit in a modest way towards the realization of Vision 2030 of "creating an enabling environment for the provision of sustainable quality health care that is cost effective and accessible to all Kenyans".

Dr. Francis M. Kimani
Director of Medical Services



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Preface

The clinical guidelines the sector has been utilizing were developed in 2002. Since then, the sector has put in place a strategy to respond to declining trends in health impact observed over the previous decade. This updated edition of the guidelines represents part of that strategy, in particular by taking cognisance of the changes introduced by the Kenya Essential Package for Health (KEPH), with its emphasis on distinct levels of care – including the community – to be provided to defined cohorts of the human life-cycle. The new edition thus addresses key shortcomings in the previous versions that limited the ability of clinicians to provide a comprehensive package of effective health care.

Specifically, the guidelines have been updated in relation to:

- Defining care protocols by level of service delivery, recognizing the fact that the skills and facilities for care differ at the different levels of health care.
- Making available a clear, separate volume for management of conditions at the community level, in recognition of the fact that good health is nurtured – or destroyed – primarily at individual and household levels, rather than at the health facilities.
- Providing greater elaboration of the identification and preparation for referral of clients in case the presenting condition or state doesn't allow for management at the level where the client has presented.
- Updating management protocols to address current existing conditions and potential threats to the health of Kenyans.
- Including a process for monitoring and reviewing the guidelines.

For ease of reference and use, the guidelines are presented in 3 volumes:

- Volume 1: Management Guidelines for Level 1 (Community)
- Volume 2: Management Guidelines for Levels 2 and 3 (Primary Care)
- Volume 3: Management Guidelines for Levels 4–6 (Hospitals)

It is the hope of the sector that these guidelines will serve the users well as a

guide for the appropriate care expected to be delivered at each respective level in the health system, thus facilitating the realization of the Kenya Essential Package for Health at all levels. Any information that could be of use in improving the management protocols is welcome, and can be provided directly to the Office of the Director of Medical Services in the Ministry of Medical Services.

Introduction

Kenya's health sector aims to prevent ill health, and where this cannot be done, to address the medical and social implications of the resulting ill health. Clinical management relates to this by ensuring efficient and effective management of the implications of ill health. It complements the public health services by ensuring that a specified quality of essential medical care is made available as needed, when needed, and in appropriate amounts.

Rationale for Revision of Clinical Guidelines

The sector last issued revised clinical guidelines in 2002. The guidelines defined management approaches for the key conditions that were expected to be afflicting the Kenyan population at that time. The guidelines had a number of weaknesses, however, including the following:

- The health sector lacked a clear, comprehensive, evidence-based approach to service delivery. Such an approach is important as it provides the overall guidance for the services the sector intends to provide, plus the process for delivering the services.
- The mechanism for monitoring and updating the clinical guidelines was not clear. As a result, the new management protocols that have come up since the guidelines were developed have not been incorporated, such as for avian influenza, management of multi-drug resistant tuberculosis (MDR/XDR TB), use of artemesinin combination treatment (ACT) for management of malaria, use of anti-retroviral drugs (ARVs) in HIV management, non-communicable diseases, and injuries/violence management, among others.
- Guidelines for preparation and management of clients for physical referral were not included.

Besides these more or less innate shortcomings, the clinical guidelines predated the approach to service delivery grounded in the framework of 6 life-cycle cohorts and 6 levels of care, as set out in the second National Health Sector

Strategic Plan ((NHSSP II – 2005–2010).[1] Thus they did not take into consideration the new approach that calls for different capacities and different functions at the different service levels in the country. Significantly, there was no guidance on management of services at the community level, and the lack of a referral framework is a drawback that has become more apparent as the care level approach has become institutionalized. These updated guidelines attempt to address these shortcomings. In addition, they are aligned to the comprehensive multilevel service delivery approach defined by the Essential Package for Health (KEPH).[2]

Comprehensive Service Delivery Approach

The review of the 1st National Health Sector Strategic Plan (NHSSP I) in 2004 highlighted, amongst other issues, evidence of stagnating or downward trends in health indicators, especially in the key areas of maternal, newborn, and child health. To respond to this worrying trend, the health sector in Kenya initiated an accelerated reform process to halt, and then reverse, this trend.

The reform process is enshrined in NHSSP II, which states the midterm goal of the health sector as "To reduce health inequalities and reverse the downward trends in health-related outcome and impact indicators". The plan's defined strategic objectives are to:

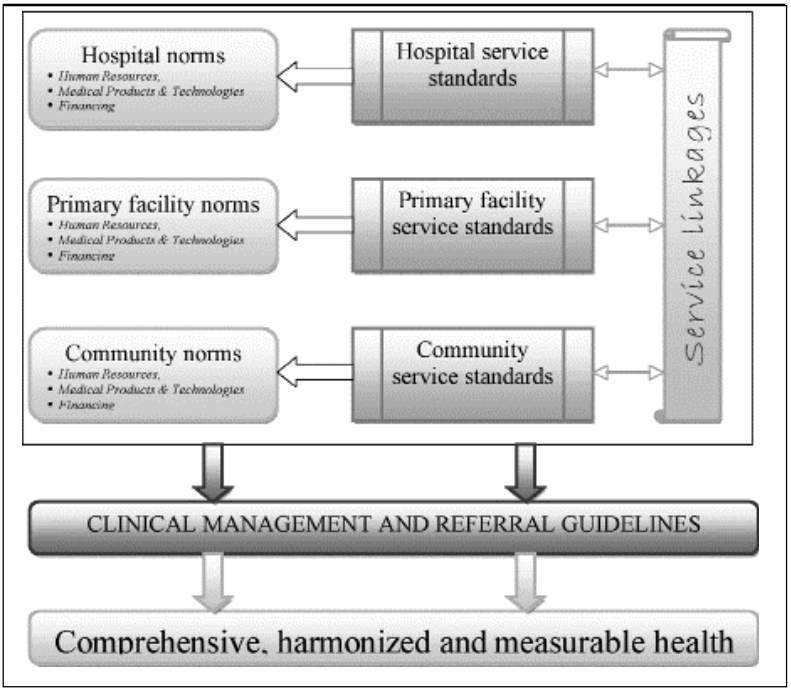
- Increase equitable access to health services;
- Improve the quality and the responsiveness of services in the sector;
- Improve the efficiency and effectiveness of service delivery;
- Foster partnerships in improving health and delivering services; and
- Improve financing of the health sector.

As part of the reform process, the sector elaborated clear operational approaches to enable it to achieve its strategic objectives, as well as health service norms and standards.[3] Investment plans now guide multi-year investment priorities for different key areas of the sector. [4] The comprehensive service delivery approach is one of these operational approaches (refer to Figure A).

A comprehensive service delivery approach is based on provision of guidance – at community, dispensary/health centre, and hospital levels of care – on services to be provided, service standards to be attained, service inputs (human resource,

[1] Ministry of Health, *Reversing the Trends – The Second National Health Sector Strategic Plan of Kenya: NHSSP II – 2005–2010*, Nairobi, Kenya, 2005.
[2] Ministry of Health, *Reversing the Trends: The Second National Health Sector Strategic Plan of Kenya – The Kenya Essential Package for Health,* Nairobi, Kenya, 2007.
[3] Ministry of Health, *Reversing the Trends: The Second National Health Sector Strategic Plan – Norms and Standards for Health Service Delivery in Kenya,* Nairobi, Kenya, 2006.
[4] *Ministry of Medical Services Strategic Plan 2008–2012,* Ministry of Medical Services, Nairobi, Kenya, July 2008; *Ministry of Public Health and Sanitation Strategic Plan 2008–2012,* Ministry of Public Health and Sanitation, Nairobi, Kenya, December 2008.

Figure A: The comprehensive approach to health care service delivery



infrastructure, equipment) to be applied, and cross linkages of services. This comprehensive approach guides not only the investment priorities for service delivery at the administrative level, but also the form and content of clinical management.

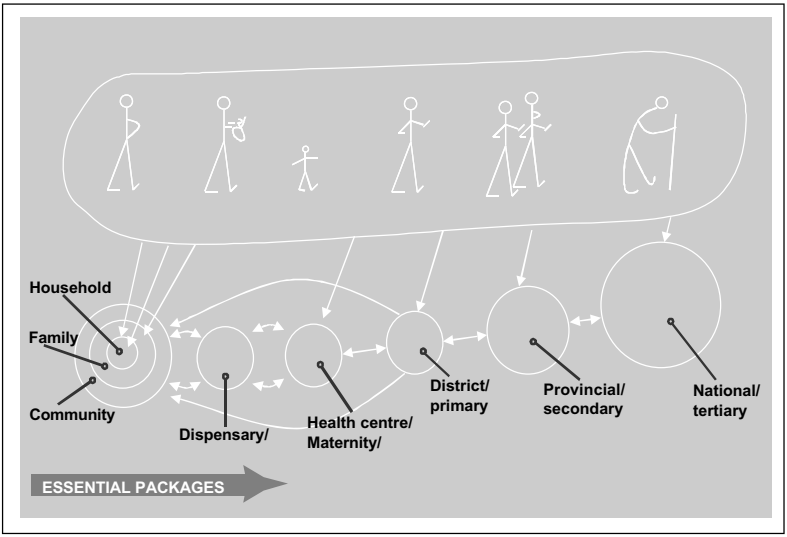
The services to be provided for each level of care are defined in the Kenya KEPH). A particular focus of the package is the community level.[5] The service linkages are defined in the Sector's Referral Strategy. These documents together describe the overall strategic approach for the sector, and are further elaborated.

The Kenya Essential Package for Health

KEPH is a life-cohort based approach to the delivery of health care services. Its main focus is to define the priority services that will ensure a healthy population at 6 distinct levels of the health system – from the community level up to tertiary

[5] Ministry of Health, *Taking the Kenya Essential Package for Health to the Community: A Strategy for the Delivery of Level One Services,* Nairobi, Kenya, 2006.

Figure B: The KEPH system



hospitals – for each of 6 defined life cohorts. As a result, it defines in a comprehensive manner, the services the sector is to prioritize so as to maintain health at all the different stages of life.

The diagram in Figure B illustrates the 6 life-cycle cohorts defined by KEPH: pregnancy and the newborn (up to 2 weeks); early childhood (to 5 years); late childhood (6–12 years); adolescence and youth (13–24 years); adulthood (25–59 years); and the elderly (60+ years). The diagram also illustrates the linkages of the 6 levels of care that KEPH defines:

- Level 1: Community: Village/households/families/individuals
- Level 2: Dispensaries/clinics
- Level 3: Health centres, maternities, nursing homes
- Level 4: Primary hospitals – District and subdistrict hospitals
- Level 5: Secondary hospitals – Provincial hospitals
- Level 6: Tertiary hospitals – National hospitals

The expected services to be provided are described in Table A. The KEPH has the following key characteristics:

- The package puts emphasis on health (rather than disease), on rights (rather than needs), and on community empowerment to exercise their rights.
- It identifies and redefines 6 distinct functional levels of care. The community level is recognized as the first level of care where major decisions are made and interventions are done that have an immediate impact. The focus at the community level is on the promotion of family practices that preserve and promote health.

Table A: KEPH strategic Interventions, by level and life-cycle cohort

Level 1 (Community)	Level 2 (Dispensary/ clinic)	Level 3 (Health centre)	Level 4 (Primary/ district/subdistrict hospital)	Level 5 (Secondary/ provincial hospital)	Level 6 (Tertiary/ national hospital)
Cohort 1: Pregnancy, delivery and newborn (to 2 weeks)					
Equip targeted communities with current knowledge and facilitate appropriate practices and attitudes leading to safe pregnancy and delivery of a healthy newborn	Ensure that health facilities are equipped to provide very basic ANC and refer all deliveries (regardless of risk analysis)	a) Ensure that health centres are equipped to provide basic essential obstetric care b) Enhance health systems support for delivery of quality obstetric and newborn care c) Establish a functional supportive supervision system to ensure quality assurance d) Develop outreach programmes to serve "hard-to-reach" populations	Ensure that facilities are equipped to provide essential comprehensive obstetric care	Ensure that facilities are equipped to provide essential obstetric care	Ensure provision of facilities to adequately manage mothers and newborn referred from lower levels
Cohort 2: Early childhood (0–5 years)					
Equip the community and health care providers with knowledge about the prevention of common childhood diseases and disabilities; and facilitate appropriate practices and attitudes leading to healthy child growth and development	a) Develop an outreach programme to serve "hard-to-reach" populations b) Strengthen the promotion and prevention of common childhood illnesses, impairments, and disabilities c) Strengthen case management and surveillance of common childhood illnesses d) Establish a functional supportive supervision system to ensure quality assurance	a) Strengthen the prevention of common childhood illnesses, impairments, and disabilities b) Strengthen case management & surveillance of common childhood illnesses c) Enhance the health systems support for delivery of quality child health services d) Establish a functional supportive supervision system to ensure quality assurance e) Develop outreach programmes to serve the "hard-to-reach" populations	Ensure availability of facilities to diagnose and appropriately manage sick children	Recognize and appropriately manage a sick child	Ensure provision of facilities to adequately manage children referred from lower levels

Continued

Table A, *continued*

Level 1 (Community)	Level 2 (Dispensary/ clinic)	Level 3 (Health centre)	Level 4 (Primary/ district/subdistrict hospital)	Level 5 (Secondary/ provincial hospital)	Level 6 (Tertiary/ national hospital)
Cohort 3: Late childhood 6–12 years)					
Equip the child with relevant knowledge and skills that promote healthy lifestyle, including psycho-social development	a) Develop an outreach programme to serve hard-to-reach populations b) Strengthen the promotion and prevention of common illnesses, impairments, and disabilities in late childhood c) Strengthen the case management and surveillance of common late childhood illnesses d) Establish a functional supportive supervision system to ensure quality assurance	Facilitate and support caregivers and community in the provision of a safe environment for child survival, growth, and development	a) Ensure that the health team is able to recognize and appropriately manage a sick child and where necessary refer b) Facilitate rehabilitative care for disabilities, and integration of children with disabilities (CWDs)	Strengthen provincial hospitals to diagnose and manage complicated childhood medical and surgical conditions	Ensure provision of facilities to adequately manage children referred from lower levels
Cohort 4: Adolescence and youth (13–24 years)					
Equip the youth with knowledge and life skills, and facilitate creation of a supportive environment to enhance adoption of healthy lifestyles for themselves and the community	Create an enabling environment for young people that discourages harmful practices, encourages psycho-social development, and prevents disease and injuries	Create an enabling environment for young people that discourages harmful practices and prevents disease and injuries	a) Ensure availability and access to quality youth-friendly services to encourage appropriate care seeking amongst the youth b) Ensure provision of rehabilitative services for substance abusers	a) Ensure provision of comprehensive rehabilitative services for youth drug abusers b) Ensure access to quality youth-friendly referral services for management of complicated medical and surgical conditions	Ensure provision of facilities to adequately manage youth referred from lower levels

Continued

Table A, *continued*

Level 1 (Community)	Level 2 (Dispensary/ clinic)	Level 3 (Health centre)	Level 4 (Primary/ district/subdistrict hospital)	Level 5 (Secondary/ provincial hospital)	Level 6 (Tertiary/ national hospital)
Cohort 5: Adulthood (25–59 years)					
Equip adults with knowledge and skills to facilitate creation of a supportive environment to enhance adoption of healthy lifestyles for themselves and the village	Provide information on and encourage utilization of recommended services for disease/injury prevention and facilitate creation of supportive environment to enhance adoption of healthy lifestyle.	Equip health facilities with staff who are able to conduct general medical and reproductive care assessment, disease/injury prevention and refer complicated cases to the district hospital	Ensure accessibility to quality curative services for adults with acute and chronic conditions	Ensure access to quality services for the diagnosis and management of complicated medical and surgical conditions	Ensure provision of facilities to adequately manage seriously ill adults referred from lower levels
Cohort 6: Elderly (60+ years)					
Equip the elderly persons, the community and health care providers with relevant knowledge on common old age diseases, impairments and disabilities in old age; and how to improve quality of life and enhance longevity	a) Provide information on and encourage utilization of recommended services for disease/injury prevention b) Refer difficult cases to the health centre	a) Provide information on and encourage utilization of recommended services for disease/injury prevention b) Refer cases to district hospital	a) Ensure early recognition and appropriate management of acute and chronic illnesses/ injury as per recommended guidelines b) Provide appropriate comprehensive and special rehabilitation to older persons with chronic illnesses and disabilities at all levels	Ensure provision of facilities for the diagnosis and management of severe illnesses in old age	Ensure provision of facilities to adequately manage seriously ill older persons referred from lower levels

- Its overall thrust is on revitalizing health promotion and preventive care at the first 3 KEPH levels.
- It defines health needs at each level of human development – from birth to old age – and identifies comprehensive and cost-effective interventions required at each stage of the human life cycle.
- It recognizes the packages of health care services per level of care to be rendered by both public and private health service providers.

KEPH is expected to improve the quality of services at levels 1–4 so that clients have confidence in these levels of care, thus resulting in increased client utilization of the lower level health facilities. KEPH is also expected to improve the networking of providers and facilities at the different levels of the health system thereby ensuring continuity of care for those who need the services provided at the higher levels of the system.

Sector Norms and Standards

Norms and standards defined to guide the provision of KEPH services are a statement of the human resource, infrastructure, equipment, and financing inputs necessary to ensure efficient and effective delivery of health care services to the population in Kenya. Service delivery standards relate to the expectations of each level of care with regard to service delivery and the types of human resources needed to provide these expectations. Service delivery norms define the quantities of these resource inputs needed to efficiently, effectively, and sustainably offer the service delivery package. These norms and standards are defined on the basis of the following principles:

- ***Units of service delivery:*** The focus is on the function, as opposed to the physical level, as the function may also be provided by a higher level facility.
- ***Equity in access and utilization:*** All inhabitants of the country and its respective districts have equal right not only to access health services, but also to use them equally for equal need.
- ***Relevance and acceptability:*** Health care needs to be rooted in the cultural and social reality of the communities and to include user satisfaction in the health care delivery equation.
- ***Continuity of care:*** Care should be viewed in a continuum, from the start of the illness or the risk episode until its resolution irrespective of the level at which care is sought. This means that a functional referral and counter-referral system should exist to make sure that services are availed.
- ***Integration of care:*** Every contact is used to ensure that a comprehensive set of defined services is made available.
- ***A comprehensive/holistic approach:*** Health services need to consider all the dimensions of the persons and their environment, and maintain a permanent interaction and dialogue with clients.

- ***The involvement of individuals, households, and communities:*** Involvement is expressed in people taking up responsibility for their own health; it provides them with a sense of ownership of all they undertake relating to their health.

Referral Strategy

The categorization of KEPH into the 6 levels of care is primarily meant to rationalize the delivery of health services within the health system, for efficiency in the use of existing resources. The implication of this, however, is that the health service delivery unit a client may have direct access to may not be able to adequately manage their health care needs. The referral system is intended to address this shortcoming. A referral system is defined as a mechanism to enable clients' health needs be comprehensively managed using resources beyond those available where they access care. It is based on the premise that while capacity for health service delivery has to be rationalized around different levels of care, the services received by clients should not be determined only by the services available where they access care, but rather by the full scope of care the health system is able to provide in the country.

An effective referral chain, therefore, provides the linkages needed across the different levels of the health system – from level 1 (community) to level 6 (national hospitals). These linkages ensure that a given health care need of a client can be addressed irrespective of the level of the health system at which the client first physically accesses care. The referral system can thus be likened to an "elevator/lift" in a multistory building: facilitating forwards and backwards management of clients across different floors (levels of care).

The referral strategy thus guides the sector on building an effective referral system that responds to the needs of rural and poor populations, thereby contributing to the realization of Vision 2030, and the Millennium Development Goals (MDGs)

Process of Elaborating the Clinical Management Guidelines

This revision of the clinical management guidelines has been carried out in an extensive 3-year consultative process over 2006–2008. The process has been coordinated by the Government's top management in the Ministries in Health, through the offices of the technical directors – Director of Medical Services and Director of Public Health and Sanitation.

Technical coordination of the revisions was structured around the key disciplines of Medicine, Surgery, Obstetrics/Gynaecology, and Paediatrics. A lead technical

specialist from each of these areas was in charge of coordinating the internal consultation process in each of these areas. In addition, pharmacy specialists were involved to review and guide the definition of the medicines and medical products included in the management protocols, ensuring that the management protocols are harmonized with the Essential Medicines List.

Four stakeholder consultations were held over the 3 years, to ensure that the management protocols being defined were in line with the overall policy direction from the programme and Ministry levels, and that their implementation is feasible. These involved management and technical specialists in each of the respective areas, from the public and non public sectors.

Description of the Revised Clinical Management Guidelines

In line with the process described above, this new addition of the clinical management guidelines is based on the latest orientation for each condition expected to afflict the population in Kenya. These are both for conditions in existence, plus conditions that are recognized as threats to the population.

Management descriptions are comprehensive, based on the expected capacity at each level of care. Descriptions of each condition are set out in terms of how it presents, physical and laboratory investigations for diagnosis, and the appropriate management, including when referral is to be made.

The referral management includes:
- Identifying signs during client management that indicate referral should be considered.
- Preparing the client for referral.
- Arranging the required logistics for referral at the referring and receiving facility, plus during transport.
- Ensuring the receipt and emergency management of the client who has been referred.
- Managing the referred client by the referring facility when they return.

For relevance, alignment with the service delivery approach, and ease of use, the guidelines are presented in 3 volumes representing the major levels of care:
- Volume I: Clinical Management and Referral Guidelines for Community Care – Corresponding to level 1 of the health care system
- Volume II: Clinical Management and Referral Guidelines for Primary Care – Corresponding to levels 2 and 3 of the health care system
- Volume II: Clinical Management and Referral Guidelines for Hospital Care – Corresponding to levels 4–6 of the health care system

The Process of Physical Referral

Critical Inputs to Have at the Facility to Expedite Referral

Input category	Type of input	Description of needs	
		Description	Number
Equipment	Emergency tray Emergency room 4x4 ambulance Motorized bicycle		
Staff			
Supplies		Referral forms	3-month supply

Referral Instruments

1. Preparation of a client for referral
1.1 Referral for a pregnant mother
1.2 Referral of a child with a medical problem
1.3 Referral for a child with a surgical problem
1.4 Referral for an adolescent, adult, or elderly patient for a medical problem
1.5 Referral for an adolescent, adult, or elderly patient for a surgical problem

2. Handling of a client during referral
2.1 Referral for a pregnant mother
2.2 Referral of a child with a medical problem
2.3 Referral for a child with a surgical problem
2.4 Referral for an adolescent, adult, or elderly patient for a medical problem
2.5 Referral for an adolescent, adult, or elderly patient for a surgical problem

3. Receipt and emergency management of a client who has been referred
3.1 Referral for a pregnant mother
3.2 Referral of a child with a medical problem
3.3 Referral for a child with a surgical problem
3.4 Referral for an adolescent, adult or elderly patient for a medical problem
3.5 Referral for an adolescent, adult or elderly patient for a surgical problem

4. Follow up of a client who has been referred back
4.1 Referral for a pregnant mother
4.2 Referral of a child with a medical problem
4.3 Referral for a child with a surgical problem
4.4 Referral for an adolescent, adult, or elderly patient for a medical problem
4.5 Referral for an adolescent, adult, or elderly patient for a surgical problem

PART I
Internal Medicine and Related Disciplines

IN THIS SECTION:

1. Acute Injuries, Trauma, and Selected Emergencies

1.1 Anaphylaxis

Occurs as allergic reaction to allergens facilitated by mediators in a sensitized individual. Allergens may be drugs, food, sera, stings, and intravascular contrast media.

Clinical Features
Include pruritus, urticaria, respiratory distress (due to laryngeal oedema, bronchospasm), and hypotension.

Management
- Avoid offending agents.
- Address airway, blood pressure and cardiac status.
- Adrenaline 0.2–0.5mg IM repeated every 10–15 minutes for 3 doses.
- Nebulized with bronchodilators, e.g., salbutamol and ipratropium bromide 0.5mg ***OR*** aminophylline 6mg/kg IV over 20 minutes if there is wheezing and nebulization not possible.
- Antihistamine:
  - Chlorpheniramine 10mg IV slowly. IM/SC then continued 10mg 8 hourly for 24–48 hours (children 0.1mg/kg)
  - 100mg IV is of secondary value but useful to prevent delayed recurrences
- Patients with mild to moderate reaction, e.g., urticaria or mild bronchospasm, should be observed for at least 6 hours because attacks may recur after full recovery.
- Nebulized oxygen ***OR*** bronchodilators, e.g., salbutamol.

Admission
Severe reactions, e.g., hypotension, severe bronchospasm (especially with orally ingested antigens). Severe reactions require intravenous fluid replacement with normal saline and close monitoring especially of BP and urinary output.

1.2 Cardiac Arrest

This is due to asystole, ventricular fibrillation, and cardiovascular collapse in extreme arterial hypotension. There is absence of heart sounds and of carotid and femoral pulses. There may be associated apnoea and cyanosis.

☛ ***Cessation of circulation requires immediate treatment.***

Optimal chances of survival are achieved with initiation of cardiopulmonary resuscitation within 4 minutes of the arrest, and when advanced cardiac life support including intubation, intravenous medications, and defibrillation is initiated within 8 minutes.

Management

☛ ***Airway:***

- Clear airway immediately.
- Aspirate vomitus and secretions or remove with fingers or handkerchief.

☛ ***Ventilation: Inflate lungs with air or oxygen by:***

Mouth-to-mouth ***OR***
Mouth-to-nose insufflation ***OR***
By bag and mask devices (ensure thoracoabdominal motion).

☛ ***Circulation:***

- **Cardiac massage:** Carry out external cardiac massage (compressions) by applying appropriate pressure over the sternum. One breath should be interposed between every 4 to 5 cardiac compressions.
- **Defibrillation:** Use standard defibrillators delivering 200–360 J and biphasic defibrillators delivering 150–200 J.

Drugs

- Intravenous adrenaline 1mg bolus, repeated every 3 to 5 minutes, ***OR***
- Vassopressin 40 IU by intravenous push, or amiodarone 300mg in 20–30ml normal saline.
- Thorough investigation and treatment of the underlying cause should be undertaken.

Admit

- Defibrillation:
  - Standard defibrillators delivering 200–360 J.
  - Biphasic defibrillators delivering 150–200 J.
  - Intravenous epinephrine 1mg push, repeated every 3 to 5 minutes, ***OR*** vassopressin 40 IU by intravenous push, ***OR*** amiodarone 300mg in 20–30ml normal saline.
- Thorough investigation and treatment of the underlying cause should be undertaken.

1.3 Shock

This is circulatory insufficiency and becomes irreversible if not promptly corrected.

1.3.1 HYPOVOLAEMIC SHOCK

This is due to loss of intravascular fluid volume. It results from blood and/or fluid loss and is due to decreased circulating blood volume leading to decreased diastolic filling pressure and volumes.

Causes

- Haemorrhage
- Severe burns:
  - Rapid plasma loss from damaged tissues when over 25% BSA is burnt
  - Endotoxaemia makes matters worse

- Dehydration
- Vomiting and diarrhoea (cholera and enterocolitis)
- Septicaemia
- Intestinal obstruction (mechanical or paralytic ileus)

Clinical Features
The patient becomes cold, clammy, drowsy, and tachypnoeic. There is cold sweat and restlessness, and blood pressure may become unrecordable. The skin is pale and cold with collapsed peripheral veins, with a tachycardia. The urinary output is an indicator of renal blood flow, and will fall significantly. Temperature is subnormal (less than 35°C).

Investigations
- Hb and PCV
- Urea and electrolytes
- Blood sugar
- Group and cross-match blood
- Blood gas analysis if possible
- Blood cultures

Management
Once shock is suspected, the medical staff taking care of the patient should initiate appropriate and coordinated emergency management:
- Treat the primary problem, e.g., control haemorrhage, endotoxaemia, etc.
- Secure a large intravenous line; do a cut-down if there is no accessible peripheral line.
- Central venous pressure line is preferable if available.
- Start infusion of isotonic saline (normal saline), or run 2 litres fast in an adult.
- Group and cross-match blood before you give plasma expanders (dextran 70, etc.).
- Transfuse in cases of blood loss, burns due to shock.

If shock is due to vomiting or diarrhoea, replace continuing fluid loss:
  - ***Adults:*** 1 litre 6 hourly Hartmann's solution or even normal saline.
  - ***Continue with IV fluids*** until shock is reversed and cause treated.
- Closely monitor vital signs.
- Monitor urinary output.
- Give broad spectrum bactericidal antibiotics if septic shock is suspected.
- Continue maintenance until shock is reversed and the cause is reversed.
- Undertake surgical intervention as soon as patient is stable (i.e., laparatomy for intestinal obstruction) and broad spectrum antibiotics for sepsis and burns.

1.3.2 SEPTIC SHOCK

Clinical Features
Due to systemic sepsis resulting in hypotension or multiple organ failure. Initially "warm shock": increased heart rate; diaphoresis; warm skin. Later "cold shock": decreased cardiac output; cool vasoconstricted skin.

Complications
- Pulmonary oedema
- Renal failure
- Disseminated intravascular coagulopathy (DIC)

Investigations and Diagnosis at Levels 4–6
- Hb, WBC, platelets
- Urea and electrolytes, creatinine
- Blood sugar
- Culture and sensitivity (blood and body fluids)

Management – General
Resuscitate with normal saline or dextran 70. Large volumes may be required but watch for heart failure. An CVP line is useful at levels 4 and above. In addition:
- Monitor pulse and BP hourly.
- Catheterize and monitor urine output hourly – if less than 20ml/hour after adequate fluid replacement then give frusemide 80mg IV STAT.
- Give oxygen via face mask.
- Determine and definitively treat cause.

Management – Pharmacological
- Start empirically on:
  - Ceftriaxone 1 gm IV once daily ***OR*** benzyl penicillin 4 mega units IV every 6 hours and gentamicin 80mg 12 hourly with adequate fluid replacement and close monitoring of urea and electrolytes.
  - Metronidazole 500mg IV 8 hourly; hydrocortisone 200mg 8 hourly for 24–48 hours.
  - Vasopressor (dobutamine, dopamine and adrenaline) as and where indicated.
- Commence oral medication once the required course of IV antibiotics is completed. Choice of antibiotics depends on the source of infection and culture and sensitivity results.
- Commence resuscitation measures immediately the patient is seen.
- Refer from level 4 to levels 5 and 6 if complicated, especially if urinary output starts falling, serum urea, creatinine and potassium start rising, or if there is evidence of any other organ failure despite attention to adequate hydration with brisk electrolyte balancing, and antimicrobial administration.

☛ ***Always anticipate the onset of disseminated intravascular coagulopathy.***

1.4 Stings and Bites

1.4.1 BEE STING

Bee sting causes sharp pain followed by intense itching. Signs subside within a few hours. In hypersensitive individuals, anaphylaxis may occur (see Section 1.1, anaphylaxis). Some patients may experience delayed reactions usually after 0–14 days.

1.4.2 BITE BY A SUSPECTED RABID ANIMAL (RABIES)

Any mammalian animal may carry rabies. Saliva from a rabid animal contains large numbers of the rabies virus, which is inoculated through a bite or any laceration or break in the skin.

Symptoms

Incubation period is 1–2 months. Initial symptoms include malaise, fever, headache while local symptoms at site of bite include itching and paraesthesia. Full blown illness manifests with encephalitis, which may be demonstrated by agitation or dumbness. There is also hydrophobia, which is a characteristic manifestation of the form of the disease with agitation, while paralytic manifestation of rabies is often missed.

Diagnosis

Based on high index of suspicion accompanied by clear history of stray animal bite or other physical findings and documentation of hydrophobia. Demonstration of basal ganglial lesions on MRI scans and autopsy findings help confirm the diagnosis.

Management

Immediate local care:

- Irrigate thoroughly with copious amounts of saline solution.
- Cleanse with a soap solution.
- Debride the wound(s).
- Administer antibiotic.
- Administer tetanus toxoid.
- Infiltrate the wound with rabies immunoglobulin.

Indication for anti-rabies vaccine:

- Bites from wild animals.
- Bites from UNPROVOKED domestic animal.
- Bites from a sick looking domestic animal, whether immunized or not.
- Severe injury (multiple or deep puncture wounds) or any bites on the head, face, neck, hands, or fingers.
- Laboratory findings of Negri bodies in the brain of the involved animal.
- Persons at high risk of exposure.

Immunization

- Pre-exposure prophylaxis should be offered to persons at high risk of exposure such as laboratory staff working with rabies virus, animal handlers and wildlife officers.
  - Three full intramuscular doses of 1ml on days 0, 7, and 28 should be given in the deltoid area.
  - Post exposure prophylaxis of previously vaccinated persons: local treatment should always be given. Post exposure prophylaxis should consist of 2 booster doses either intradermally or intramuscularly on days 0 and 3 if they have received vaccination within the last 3 years. Otherwise full course of rabies vaccine.

- Post exposure prophylaxis:
  - Passive immunization: Human rabies immunoglobulin is given as a dose of 20 IU/kg of body weight infiltrated around the wound and 20 IU/kg given IM in gluteal region followed by a course of rabies vaccine.
  - Intradermal schedule: 1 dose (0.1ml) should be given at each of two sites, either the forearm or the upper arm, on days 0, 3, and 7 and one dose at one site on days 30 and 90.
  - Intramuscular schedule: 1 dose (1ml) should be administered on days 0, 3, 7, 14 and 28. All IM injections should be given into the deltoid region or in small children into the anterolateral area of the thigh muscle.

1.5 Poisoning

Can be acute or chronic. Acute poisoning is often life threatening and should always be treated as an emergency even if the immediate threat to life does not appear real. Refer to Table 5.1 for treatment summary.

Clinical Monitoring
- Blood pressure measurement
- Urine output (1–2ml/kg/hour) catheterize
- Nasogastric suction in abdominal conditions
- Blood glucose levels
- Hb or PCV daily and correct appropriately

Treat renal complications appropriately, and more importantly treat the cause of the hypovolaemia to pre-empt these complications. Remember to consult in this very dire emergency.

Prevention
Public education about farm or household chemicals known to cause accidental, para-suicidal, or suicidal poisoning.

2. AIDS and Sexually Transmitted Infections

2.1 HIV/AIDS

HIV infection is caused by one of two related retroviruses, HIV-1 and HIV-2, resulting in a wide range of clinical manifestations. Transmission requires contact with body fluids containing infected cells or plasma. The virus progressively destroys the body's immune functions leading to opportunistic infections and tumours. It is these opportunistic infections and tumours that give the manifestations of this disease.

Table 1.1: Clinical features and treatment of common acute poisonings

Substance	Clinical features	Recommended action
1. Household agents and industrial chemicals		
Kerosene (paraffin)	Nausea, vomiting, cough, pulmonary irritation, difficulty in breathing; headaches, loss of consciousness	• Remove contaminated clothing; wash exposed skin with water and soap.Activated charcoalMaintain airways and respiratory support • DO NOT INDUCE VOMITING or perform gastric lavage
Carbon monoxide, e.g., car exhaust, charcoal jiko	Headache, dizziness, confusion, slurred speech, convulsions, coma; symptoms vary with percentage of carboxyhaemoglobin	• 100% oxygen • Hyperbaric oxygen
Corrosives,e.g., acids, alkalis, hydrogen peroxide	Excruciating pain in the mouth, the pharynx, epigastric area; dysphagia, vomiting and haematemesis; later develops laryngeal oedema and obstruc-tion, oesophageal perforation; long-term: Stenosis of oesophagus	• Liberal water or milk orally • Analgesic injection to relieve pain • DO NOT INDUCE VOMITINGDO NOT PERFORM LAVAGE
Methanol	Intoxication, drowsiness, muscle weakness, blurred vision, photophobia, papilloedema blindness, coma, cerebral oedema, cardio-respiratory depression, seizures,DEATH	• IV sodium bicarbonate • 10% Ethanol in 5–10% dextrose as oral or IV infusion • Loading dose 0.7g/kg over 1 hour. Maintain at 0.1–0.2g/kg/hour up to ethanol level of 100mg/dl
2. Pharmaceuticals		
Paracetamol	Nausea, vomiting, altered mental status, abdominal pain, evidence of liver failure (elevated transaminases)	• Gastric lavage within 1 hour • Activated charcoal • Antidotal therapy with N-acetylcysteine for up to 72 hours
Chloroquin	Convulsions, cardiac arrhythmia, cardiac arrest	• Gastric lavage • IV diazepam for convulsions • Refer if in coma
Digoxin	Arrhythmias, ventricular fibrillation, anorexia,nausea, vomiting,confusion, amblyopia	• Discontinue drug,administer potassium • Treat arrthymias with lidocaine ***OR*** phenytoin • Antidigoxin FAB fragments
Iron tablets, e.g., FeSO4, vitamins with iron	Vomiting, abdominal pain, pallor, cyanosis, diarrhoea, shock	• Emesis • Gastric lavage • Desferrioxamine 1g IV 15/kg/hour max 80mg in 24 hours
Opiates, narcotics (drugs of abuse)	Drowsiness, pinpoint pupils, shallow respiration, spasticity, respiratory failure	• Do not give emetics • Gastric lavage • Activated charcoal • Naloxone 5µg/kg IV to awaken and improve respiration • IV fluids to support circulation

Continued

Table 1.1, *continued*

Isoniazid	CNS stimulation, seizures,coma	• Emesis, gastric lavage • Diazepam • Pyridoxine (1mg for 1mg ingested up to 200mg) • Sodium bicarbonate for acidosis
Warfarin	Generalized bleeding, with intracranial haemorrhage being most serious	• Vitamin K 10mg IV STAT + OD for 5 days • Transfuse fresh blood
3. Pesticides		
Organo-phosphates, e.g., diazinon, dimethoate	Headaches, weakness, vomiting, colicky abdominal pain,profuse cold sweating, hypersalivation, muscular twitching, fasciculations, diarrhoea, tenesmus, convulsions, dyspnoea with bronchoconstriction,meiosis, bilateral crepitations	• Decontaminate (see above). • Remove contaminated clothing; wash exposed skin with water and soap. DO NOT INDUCE VOMITING • IV atropine 2–4mg STAT, repeat after 10–20 min until full atropinization (pulse 100–120, dilated pupils) and maintain on SC atropine 4–6 hours x 24–48 hours. • Pralidoxime (PAM) 1–2g (children 30mg/kg) STAT, repeat 4 hourly, 12–24 hours depending on response
Rodenticides, e.g., zinc phosphide	Severe abdominal pain, nausea, vomiting and diarrhoea; strong garlic smell; severe respiratory distress; myocardial injury	Supportive: • Maintain airways • Assist ventilation • Observe for pulmonary oedema
Rodenticide (anticoagulant based)	Generalized bleeding, with intracranial haemorrhage being most serious	• Vit. K 10mg IV STAT • Transfuse fresh blood
Acaricides, e.g., Amitraz	Weakness, difficulty breathing, convulsions, coma.	• Remove contaminatedclothing; wash exposed skin with water and soap. DO NOT INDUCE VOMITING • IV sodium bicarbonate
Herbicides, e.g., Paraquat	Oral/pharyngeal inflammation, later multi-organ failure within hours or days depending on dose. Later interstitialpulmonary oedema and fibrosis. Multi-organ failure or pulmonary oedema invariably leads to death!	• Lethal dose as low as 10ml • Gastric lavage with 50–100g activated charcoal 4 hourly until patient improves
Organochlorines, e.g., DDT, aldrin, dieldrin	Excitement, tremors, convulsions with respiratory failure due to convulsions	• IV diazepam for convulsions • Gastric lavage if within 1 hour • Survivors beyond 48 hours almost invariably recover
4. Others		
Lead: e.g., lead salts, solder, toys, paints, and painted surfaces	Thirst, abdominal pain, vomiting, diarrhoea, encephalopathy following ingestion of suspicious substance	• Eliminate source of poisoning Chelation with Dimercaprol (BAL) Inj 4mg/kg and combined with calcium sodium editate (EDTA) with close monitoring for renal functionDMSA

Continued

Table 1.1, *continued*

		(oral succimer)Treatment over longperiods (months toyears)
Mercury	Acute: gastroenteritis,vomiting, nephritis, anuria, delayed GI motility Chronic: gingivitis, mental disturbances, neurodeficits, pneumonitis	• Gastric lavage • Activated charcoal • Penicillamine • Haemodialysis for renal failure • Look out for GIT perforation • Lungs: supportive care

2.1.1 HIV/AIDS IN KENYA

After the first case of AIDS in Kenya was recorded in 1984, HIV infection spread very rapidly in the country and the magnitude and impact of HIV/AIDS is a major public health and development challenge. By 2007, an estimated 1.2 million Kenyans were HIV infected, with the countrywide prevalence at 5.1%. Manifestations of HIV infection vary from asymptomatic carrier states to severe debilitating and fatal disorders related to defective cell-mediated immunity.

2.1.2 HIV TRANSMISSION AND PREVENTION

Transmission requires contact with body fluids containing infected cells or plasma. HIV is present in blood, semen, vaginal secretions, breast milk, saliva, CSF and wound exudates. HIV is not transmitted by casual contact or even by the close nonsexual body contact that occurs at work, at school, or at home. Refer to Table 2.1 for a summary of transmission and prevention modes for HIV infection.

Table 2.1: Modes of transmission and preventive measures for HIV infection

Mode of transmission	Preventive measures
Sexual intercourse: vaginal intercourse (majority of cases), anal or oral sex	Practice abstinence Avoid risky sex practices like casual and multiple partners Use condoms Treat STIs promptly and effectively (STIs increase risk of HIV transmission)
Mother to baby: In utero, during childbirth, breastfeeding (30–40% transmission rate)	Advise counselling and testing Give ARV (nevirapine) to both mother and infant
Blood transfusion	Ensure that all blood is screened before transfusionArrange autologous transfusions where possible
Contaminated instruments: Needles, skin piercing instruments	Ensure that sterile needles are used at all times Ensure that instruments for ear piercing, circumcision, tattooing, etc., are sterile.For needle drug addicts, do not share needles

2.1.3 CLINICAL MANIFESTATIONS

These vary from asymptomatic carrier states to severe debilitating and fatal disorders related to defective cell-mediated immunity. AIDS (acquired immune deficiency syndrome) is the end stage of the spectrum of disease and is characterized by life threatening opportunistic infections and neoplasms. The manifestations of HIV infection are many and present in all disciplines of medicine. Some of these are:

SKIN

Dermatological manifestations are probably the commonest. The diseases may be infective (bacterial, fungal, viral), reactive (eczema, hypersensitivities), or neoplastic. The most common ones are:

- Herpes zoster (shingles): This presents as vesicles and bullae distributed along multiple dermatomes. Of young adults with Herpes zoster, an estimated 80% are positive for HIV infection. Herpes zoster occurs very early in the course of HIV infection. This provides an opportunity to provide intensive counselling to those affected by this disease. The lesions usually heal and may leave a scar. Post herpetic neuralgia is a common complication.
- Seborrhoeic dermatitis: This is an eczematous skin condition usually affecting the scalp, central face (especially the naso-labial fold and eyebrows) and flexures of the limbs. The affected areas are erythematous and have greasy scales. Treatment is by use of steroids and tar preparations.
- Molluscum contagiosum: This presents as umbilicated papules, usually around the genitals. They exude a whitish material (molluscum bodies) when pressed or cut.
- HIV-associated pruritis.
- Chronic herpes simplex virus (HSV) ulcers.
- Kaposi's sarcoma: This is a neoplasm of the vascular-forming cells. It presents as bluish black nodules or plaques on the skin or mucous membranes. It may also involve the lymphatics and other organs including the GIT and lungs. Involvement of the hard palate is a poor prognostic sign.
- Psoriasis: Multiple inheritance disease. A chronic recurrent disease characterized by well-circumscribed silvery scaling papules and plaques of varying sizes. Condition exacerbated by HIV infection, obesity, stress, sunlight, and drugs (systemic steroids, alcohol, chloroquine).

Management

Chemotherapy is the mainstay of management for Kaposi's sarcoma. Drugs commonly used are:

- For localized and flat lesions, use Vincristine 1.4mg/m^2 monthly.
- For more extensive lesions, give combinations of Vincristine 1.4mg/m^2, Bleomycin 10 IU/m^2, and doxorubicin (25mg/m^2) monthly. Paclitaxel is a 2nd line; give either singly or in combination with doxorubicin. Refer to oncologists.

In addition:

- Administer anti-retroviral therapy (ART) at the same time.
- Apply radiotherapy or local ablative therapies localized disease.

- Treat dermatological conditions according to specific areas in the guidelines.
- Use antiseptic soaps or saline baths.
- Apply topical acyclovir cream or give systemic acyclovir tablets, at a dose of 500mg PO 5 hourly for 10 days.
- Give antibiotics for secondary bacterial infections
- For Kaposi's sarcoma management, refer to to oncologistFor chronic Herpes simplex or HSV ulcers, use antiseptic soaps or saline baths and topical acyclovir cream or systemic acyclovir tabs, 800mg PO 5 hourly for 10 days. Antibiotics for secondary bacterial infections.

GASTROINTESTINAL TRACT

Candidiasis

Caused by yeast or fungus. Candida albicans is the commonest agent. Usually a normal inhabitant of mucosal surfaces but overgrows with increasing immune deficiency.

Presentation

Appears as white, milk-like, removable plaques on the oral mucosa. Oral thrush is a white coating on hard or soft palate and tongue; causes dysphagia if oesophagus involved; occurs in late disease.

Management

- Nystatin 100,000 units 4 times daily after food for 7 days.
- Ketoconazole 200mg or 400mg OD for 7 days.
- Fluconazole 200mg OD for 7 days.
- Diarrhoea of more than 1 month's duration is often caused by shigella, salmonella, or amoeba; can also be caused by HIV itself (slim or wasting disease).

RESPIRATORY SYSTEM

- Cough of more than one month's duration, with or without shortness of breath caused by lower respiratory tract infection.
- Pulmonary tuberculosis (PTB) cases have increased since the advent of the HIV/AIDS epidemic. The risk of reactions to anti-TB therapy is higher in HIV-positive patients. Thiacetazone (in Thiazina) is to be avoided (see 7.3.3, TB).
- Pneumocystis carinii pneumonia is less frequent than in the western world.

NEUROLOGICAL SYSTEM

- Headaches (progressively worsening).
- Mental deterioration.
- Seizures.
- Meningitis including cryptococcal meningitis.
- CMV encephalitis.
- Sensory disturbances.

GYNAECOLOGICAL

Acute and chronic pelvic inflammatory disease (PID); bad obstetric history.

OPTHALMIC
HIV related infections or manifestations like cytomegalovirus retinitis, toxoplasmosis infections of the eye, Herpes zoster affecting the ophthalmic nerve, Kaposi's sarcoma involving the conjunctivae.

General Features
- Fever, constant or recurrent.
- Unexplained weight loss of >10% of body weight.
- Chronic malaise or fatigue.
- Enlarged lymph nodes at 2 or more extra-inguinal sites for more than 3 months.

Investigations
- Rapid tests: 2 parallel tests with 2 different kits. A third kit can be used as tie breaker. Alternatively use a double ELISA.
- Estimation of viral load: PCR test for viral load in plasma.
- Test for immunocompetence: CD4/CD8 T-lymphocyte count and total lymphocyte count.
- Not specific to HIV/AIDS: These depend on the presentation of the individual case, e.g.:
  - Diarrhoea: Stool for ova and cysts and C&S, endoscopy, and biopsy
  - Cough: Chest x-ray, sputum for AFB (acid fast bacilli) microscopy, culture and sensitivity. KOH (potassium hydroxide solution)
  - Fever: Malaria parasites, blood cultures, septic screen.

☛ ***Investigations should be ordered as clinical features indicate, since most HIV related diseases are treatable.***

☛ Routine screening for HIV should be encouraged through VCTs and DCT/ PITC to help people know their serostatus. This is useful because ARV therapy is now widely available. It is also hoped that people who know that they are HIV infected will take care not to transmit the infection to others. Testing is also done in health care facilities if there is strong clinical indication for HIV infection or AIDS. These individuals should also be counselled and informed consent obtained before testing unless it is under emergency situations.

2.1.4 HIV TESTING AND PATIENT EDUCATION
- Pre-test and post-test counselling:
  - HIV test should not be done without first counselling the patient, unless under emergency situations. This approach makes it easier to communicate the results and the patient/client is better suited to cope with the news. -The results should be held in confidence.
  - Both positive and negative results must be communicated in person by a health care provider. Post test counselling should be done prior to disclosure of results.
- Everyone should know:

- How HIV is transmitted (see Table 2.1 above)
- How one can avoid getting infected (see Table 2.1)
- That HIV cannot be transmitted by shaking hands or touching people with AIDS; sneezing or coughing; eating food, drinking water or sharing utensils; from infected insect bites; from using contaminated toilets or latrines.

◆ HIV-negative patients/clients need to know:
- That one can be in the window period (i.e., time between infection with HIV and development of detectable antibodies).
- That a negative result does not mean that he/she cannot acquire HIV if exposed.

◆ HIV-positive patients need to know the following:
- They can transmit the infection to their sexual partner(s), baby in utero (if the patient is pregnant).
- Their health can deteriorate faster if they acquire other infections, including STIs.
- Their health can deteriorate faster if they have some lifestyles like excessive intake of alcohol, smoking, poor nutrition, and multiple sexual partners.
- Condoms, as generally used, are roughly 70–80% effective in preventing acquisition and transmission of HIV and other STIs. Proper education on condom use can increase the effectiveness of the condom to 90%.
- Pregnancy hastens the progression of disease and up to 40% of babies born to HIV infected mothers will acquire the infection. Contraceptive advice should be given. IUCDs (Coil) are known to predispose to PIDs and hence are discouraged.

2.1.5 STAGING OF HIV/AIDS

The World Health Organization (WHO) has developed a guide to the progression of HIV and AIDS through the various stages of the disease, as summarized in Table 2.2.

Table 2.2: WHO classification of HIV and AIDS clinical stages– Adults and adolescents

Clinical Stage I – Asymptomatic
- Persistent generalized lymphadenopathy

Clinical Stage II – Early (mild disease)
- Weight loss <10% body weight
- Minor skin infections
- Herpes zoster
- Recurrent upper respiratory infections

Clinical Stage III – Intermediate (moderate)
ú Weight loss >10% body weight, chronic diarrhoea, fever, oral candida, TB, severe bacterial infections

Clinical Stage IV – Late (severe disease)
- HIV wasting syndrome, CMV, Pneumocystis carinii pneumonia, toxoplasmosis
- Kaposi's sarcoma, HIV encephalopathy

2.1.6 MANAGEMENT OF HIV/AIDS

General Management

- Recommend a well balanced diet, good rest, and exercise.
- Discourage excessive alcohol drinking and smoking.
- Pay prompt attention to any health problem.
- Provide social support by counselling patients/clients, to enable them to cope with the condition. With the patient's consent, invovle other family members and use their, or the community's, social support system. Home-based care stems from understanding among the patient, the family/relatives, and the health workers.

Pharmacological Management

The main aim of anti-retroviral therapy (ART) is to suppress the viral load, achieve reconstruction of the immune system and hence improve quality of life. Refer to Table 2.3 for a summary of Kenya's standardized regimes for anti-retroviral drugs (ARVs) for adults and adolescents.

Table 2.3: ARV standardized regimes In Kenya (adults and adolescents)

1st line:	D4T or AZT+ 3TC + NVP or EFV For pregnant women and those likely to get pregnant give D4T + 3TC + NVP
2nd line:	ddI + ABC + lopinavir with ritonavir (kaletra) (needs refrigeration), alternatively – nelfinavir ***OR*** TDF + ABC + Lopinavir/ritonavir (kaletra)

Principles of Treatment

- Ensure patient compliance through counselling and follow up.
- Use combination therapy of 3–4 drugs.
- Nutritional support is an important component of management.
- Antiretroviral treatment: So far no drug or herb has been shown to eliminate the virus from the body. Some drugs have been shown to slow the multiplication of the virus and thus improve quality of life and delay the progression of the disease.
- These drugs include:
  - Nucleoside analogues (reverse transcriptase inhibitors), e.g., zidovudine.
  - Non-nucleoside reverse transcriptase inhibitors, e.g., nevirapine.
  - Protease inhibitors, e.g., indinavir.
  - Fusion inhibitors.

Those to Be Given ARV Therapy

- If CD4 testing is not available:
  - All patients with WHO Stages III and IV disease.
  - Patients with WHO Stage II with total lymphocyte counts <1,200/mm^3.
- If CD4 testing is available:
  - WHO Stage I or II HIV disease if CD4 <200/mm^3.
  - WHO Stage III disease if CD4 <350.
  - Who Stage IV disease, irrespective of the CD4 cell count.

- For asymptomatic patients with CD4 <350, observe and monitor their CD4 count. Initiate ART before CD4 count falls below 200 cells/mm^3, i.e., at CD4 between 200 and 250/mm^3. Refer to Table 2.2 for standardized ARV regimes in Kenya.
- Even though total lymphocyte count correlates poorly with the CD4 cell counts in asymptomatic persons, it is a useful marker of prognosis and survival in symptomatic patients and it can therefore be used where and when CD4 assessment is not possible.

Laboratory Monitoring of HIV Patients on Treatment

The following laboratory monitoring should be done for patients with HIV on pharmacological treatment:

- Haemomgram
- Liver function tests
- Serum amylase
- Renal function tests
- Blood and urine sugar
- Lipid profile
- CD4 lymphocytes estimation
- Viral load estimation

When to Change Drugs

ARV drugs being used to treat patients with HIV should be changed under the following circumstances:

- When there is treatment failure.
- In the presence of unacceptable drug toxicity
- When there is drug intolerance by the patient.
- When there is non-adherence to drug administration requirements.
- When there is suboptimal treatment regime.
- When there are opportunistic infections and other manifestations.

Management of Opportunistic Infections

- Opportunistic infections respond to conventional treatment although they may require a longer treatment period or a higher dose than is necessary for HIV negative patients. Although the management of the specific infections is covered in the relevant chapters, a few of the conditions are discussed briefly below:
- Pneumonia: Most pneumonia is due to Streptococcal infections. Use crystalline penicillin (or ampicillin) or a combination of cotrimoxazole and gentamincin in unresponsive cases.
- Diarrhoea: Correct dehydration. Specific therapy depends on the causative organism. Combination of cotrimoxazole and metronidazole is often helpful or chloramphenicol may be combined with metronidazole in an alternative treatment.
- Oropharyngeal candidiasis: Apply 1% gentian violet paint TDS or nystatin oral drops or cream, ***OR*** miconazole oral gel BD or tabs ketoonazole 3–6mg/kg/day in 2 doses for 7 days, ***OR*** fluconazole 200mg STAT then 100mg OD for 2 weeks.

- Boils/furuncles: Cloxacillin 500mg QID for 14 days ***OR*** erythromycin 500mg QID for 14 days ***OR*** topic bactroban.
- Cryptococcal meningitis: Amphotericin B, 0.7–1mg/kg daily ***OR*** fluconazole 400mg daily for 6–10 weeks then 200mg OD for life.
- Pneumocystis carinii pneumonia (PCP): Tabs prednisone 60mg daily and taper off over 3 weeks in addition to cotrimoxazole (TMP/SMX) IV 15mg TMP/kg/day IV 6 or 8 hourly for 21 days or double strength cotrimoxazole 2 tablets 8 hourly for 21 days in addition to oral dapsone 100mg OD daily for 21 days.
- Toxoplasmosis: Pyrethamine 25–100mg PO OD + folic acid 10–20mg QID + either sulphadiazine 1–1.5mg 8hourly ***OR*** clindnamycin 600–1,200mg 8 hourly ***OR*** azithromycin 1,200–1,500mg every 24 hours

CTX is safe after second trimester and azithromycin is safe in pregnancy since it is similar to erythromycin.

The Role of Admission for Patients on Management of HIV

- Admission is preferred under the following circumstances:
  - For investigations, if diagnosis is uncertain and if such investigations are not possible in an outpatient setting.
  - There are opportunistic infections that cannot be effectively treated in an outpatient setting.
- Admission is discouraged under the following circumstances:
  - For terminally ill patients: Whenever possible, home- and community-based care is preferred for such patients, as the hospital offers little benefit. Efforts should be made to support the family in caring for the terminally ill patient.

Treatment in Tuberculosis Patients

- ***Avoid ARVs in intensive phase: D4T + 3TC and EFV (800mg per day).***

- ***NB: Protease inhibitors are contraindicated when rifampicin is used.***

2.1.7 PREVENTION OF MOTHER TO CHILD TRANSMISSION

HIV can be passed from an infected mother to her baby before birth, during delivery and or while breastfeeding. Studies show that 23–42% of babies born in developing countries are infected with HIV. Prevention of the transmission can be reduced further by using ARVs. For further details, refer to Part II, Section 28.10.1, prevention of mother to child transmission of HIV/AIDS.

2.1.8 PREVENTION OF HIV TRANSMISSION IN HEALTH FACILITIES

HIV does not spread through casual contact, hence patients with HIV infection may be nursed in open wards. Eating utensils need not be handled in a special way. However, health workers who handle HIV-contaminated blood or certain body fluids are at risk.

Precautions in the health facility include:

- Wear gloves and take care in all situations involving direct exposure to blood and other body fluids, e.g., wound dressings, surgery and other invasive procedures, vaginal deliveries, collection of laboratory specimens, handling soiled bedding.
- Decontaminate surfaces that have been soiled by blood or other body fluids with sodium hypochlorite 0.25% (e.g., Jik).
- Soak instruments in glutaraldehyde solution.
- Wash hands and other contaminated parts of the body with soap and water.
- Soak in bleach (e.g., Jik), for 30 minutes, all soiled bed linen and clothing before general washing.

☛ ***After accidental contaminated needle prick injury, the following needs to be done:***

Immediate measures:

- Skin:
  - Decontaminate skin by washing thoroughly with soap.
  - Squeeze wound and let blood flow freely.
  - Apply iodine, methylated spirit, betadine, or other virucidal agents.
- Eye:
  - Rinse ***thoroughly*** with sterile saline, eye irrigant, and clean water splash.
- Mouth/nose:
  - Clean water rinse, flush.
  - Use oral disinfectants.
- Post exposure care:
  - Allay anxiety.
  - Discuss safer sex/third party risks.
  - Advise/conduct HIV pre- and post-test counselling.
- Testing:
  - Conduct baseline HIV screening at injury.
  - Repeat 6 weeks, 3 months, and 6 months.
  - Give post HIV exposure prophylaxis (Table 2.4).

Table 2.4: Post HIV exposure prophylaxis

Low risk:	AZT/3TC within 72 hours for 28 days
High risk:	AZT/3TC/indinavir within 72 hours for 28 days

☛ ***Most opportunistic infections in HIV/AIDS are treatable. Patients respond well and are able to resume work.***

2.2 Sexually Transmitted Infections (STIs)

These are communicable diseases that are usually transmitted through sexual contact between man and woman (heterosexual), between man and man

(homosexual) or between woman and woman (lesbian). Other forms of transmission include vertically from mother to child in utero, during birth, or soon after birth; transfusion of contaminated blood; or via contaminated needles, syringes, specula, gloves, and skin piercing and cutting instruments. Injecting drug addicts who share needles are a high risk group. Clinical manifestations of these conditions depend on the offending organism and are numerous.

☛ **Accurate diagnosis and effective treatment of STI is an essential and cost-effective HIV/AIDS prevention strategy.**

Management

- Give full course of appropriate drug therapy (see Table 2.5).
- Treat complications.
- Follow up the patient.
- Provide health education and counselling.
- Manage the sexual contacts, including contact tracing, diagnosis, treatment, health education, and counselling.
- Manage complications accordingly.

☛ **Follow the 4 C's of STI management.**

Patient Education

- Avoid multiple or anonymous partners, prostitutes, or any other person with multiple sex partners
- Use condoms correctly, e.g., avoid oil-based lubricants, use a new condom for every sex act.
- Avoid alcohol or drug abuse, which may lead to irresponsible sexual behaviour.

THE 4 C's OF STI MANAGEMENT
Each and every treatment of STI must include the 4 C's:

- Compliance with the full drug course & follow-up
- Counselling on safer sexual behaviour
- Condoms: Ensure proper use
- Contact tracing, partner treatment and notification

2.2.1 GONORRHOEA AND URETHRAL DISCHARGE

Clinical Features

Discharge in anterior urethra with dysuria or urethra) discomfort. Caused by gonococcal infection in 90% of cases. The remaining 10% are non-gonococcal infections (NGIs) and are mainly due to Chlamydia trachomatis and to a less extent trichomonas or Herpes simplex. In 5–10%, there is a mixture of gonorrhoea and NGI. In addition, infection of the glans (balanitis) or prepuce (posthitis) by Candida albicans can lead to discharge.

- ***Gonorrhoea:*** Abundant pus-like discharge, incubation period 3–10 days.
- ***NGI:*** Mucoid or serous discharge, scanty, usually seen in morning, incubation 10–14 days.

Investigations

- Diagnosis in male is usually clinical but if confirmation is required a urethral smear is done.

Table 2.5: Treatment of selected STIs, including GUD

Diagnosis	First line treatment	Second line treatment
Chancroid Adults	Trimethoprim 160mg/sulphamethoxazole 800mg 4 tablets once a day x 2 days ***OR*** cotrimoxazole (comprising 80mg trimethoprim/400mg of sulphamethoxazole) 8 tablets daily x 2 days. Buboes, if present, should be aspirated and not incised and drained	Erythromycin 500mg orally QDS x 7 days ***OR*** ceftriaxone 250mg IM STAT ***OR*** ciprofloxacin 500mg BD x 3 days
Pregnancy/allergy	Erythromycin 500mg orally QDS x 7 days ***OR*** Ceftriaxone 250mg IM STAT ***OR*** Ciprofloxacin 500mg BD x 3 days	
Early syphilis	Early syphilis (less than 1 year duration) Benzathine penicillin 2.4 MU weekly x 2 weeks. *OR* Procaine penicillin (PP) 600,000 units IM OD x 10 days	
	In penicillin allergy use: Tetracycline capsules 500mg QDS x 15 days *OR* Erythromycin 500mg QDS x 15 days. *OR* Doxycycline 100mg OD x 15 days	
Late syphilis (more than 1 year)	Procaine penicillin (PAM) 600,000 units IM OD x 14 days ***OR*** Benzathine penicillin 2.4 MU weekly x 4 to 5 doses	
In pregnancy	Use either one of the penicillin preparations or erythromycin (see above). If erythromycin is used, the neonate should be treated soon after birth.	
Congenital syphilis	Aqueous crystalline penicillin G 25,000 units/kg IM, twice a day for a minimum of 10 days *OR* Aqueous procaine penicillin G 50,000 units/kg/day IM OD for a minimum of 10 days	
Herpes genitalis	Lesions should be kept clean by washing the affected sites with soap and water and careful drying. Acyclovir 200mg orally 5 times daily for 7–10 days only reduces the symptoms and their duration and does not prevent recurrences. It is expensive.	
Lymphogranuloma venereum	Tetracycline 500mg QDS x 14 days ***OR*** Erythromycin 500mg QDS x 14 days ***OR*** Doxycycline capsules 100mg BD x 14 days ***OR*** Sulphamethoxazole 1g orally BD x 14 days	
Granuloma inguinale	Tetracycline capsules 500mg QDS x 10 days ***OR*** Erythromycin 500mg QDS x 10 days ***OR*** Cotrimoxazole 2 tablets twice daily x 10 days ***OR*** Streptomycin 750mg daily x 10 days	

- Gram stain showing pus cells and intracellular Gram-negative diplococci is 95% accurate.
- Refer to flow chart in Figure 2.1

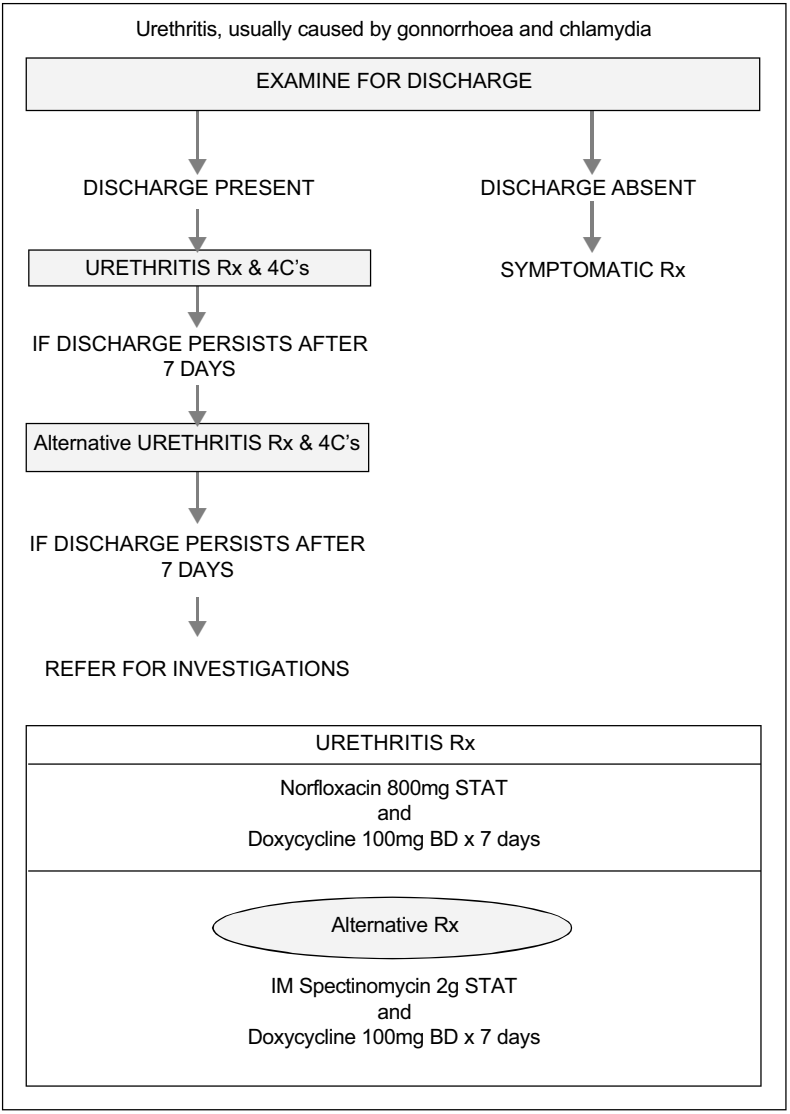
Management

- Refer to flow chart in Figure 2.1

2.2.2 GENITAL DISCHARGE IN THE FEMALE

Causes of vaginal discharge include Candida vulvovaginitis (monilia or thrush), trichomonas vaginitis, and bacterial vaginosis. Endocervical discharge can be caused by gonorrhoea, chlamydia trachomatis, and mycoplasma hominis. Refer to diagnostic chart in Figure 2.2.

Figure 2.1: Flow chart for urethritis



CANDIDA VULVOVAGINITIS (MONILIA OR THRUSH)

Common infection of the vulva and vagina caused by a fungus called Candida albicans. It is not always transmitted by sexual intercourse. Predisposing factors are diabetes mellitus, systemic antibiotics, pregnancy, hormonal oral or injectable contraceptives and decreased host immunity.

Clinical Features

Vaginal discharge is creamy and thick (curd like). Associated with itching, burning and soreness during micturition and sexual intercourse. There is erythema, excoriation and fissures. Diagnosis is mainly clinical.

Investigations

Wet mount is prepared by putting a drop of the discharge onto a glass slide and adding a drop of saline or 10% potassium hydroxide (KOH) and covering with a cover slip. Examine under low-power microscope. Candida albicans is identified by pseudohyphae and spores.

Management

- Give clotrimazole pessaries 200mg OD for 3 days and clotrimazole cream.
- Give fluconazole 200mg STAT.
- Treat partner with fluconazole 200mg STAT and cotrimazole cream also.

Prevention

People who get recurrent infection should be given concurrent prophylactic treatment whenever broad-spectrum antibiotics are prescribed.

TRICHOMONAS VAGINITIS

It is a common cause of vaginal discharge. Caused by Trichomonas vaginalis, a flagellated protozoan, and is mainly sexually transmitted

Clinical Features

Symptoms depend on the severity of the infection and include a frothy, greenish-yellow, foul-smelling discharge. Other features are vaginal soreness, dyspareunia and post-coital spotting. Infection usually involves the vulva, vagina, and cervix and may appear reddish and swollen. Diagnosis is mainly clinical.

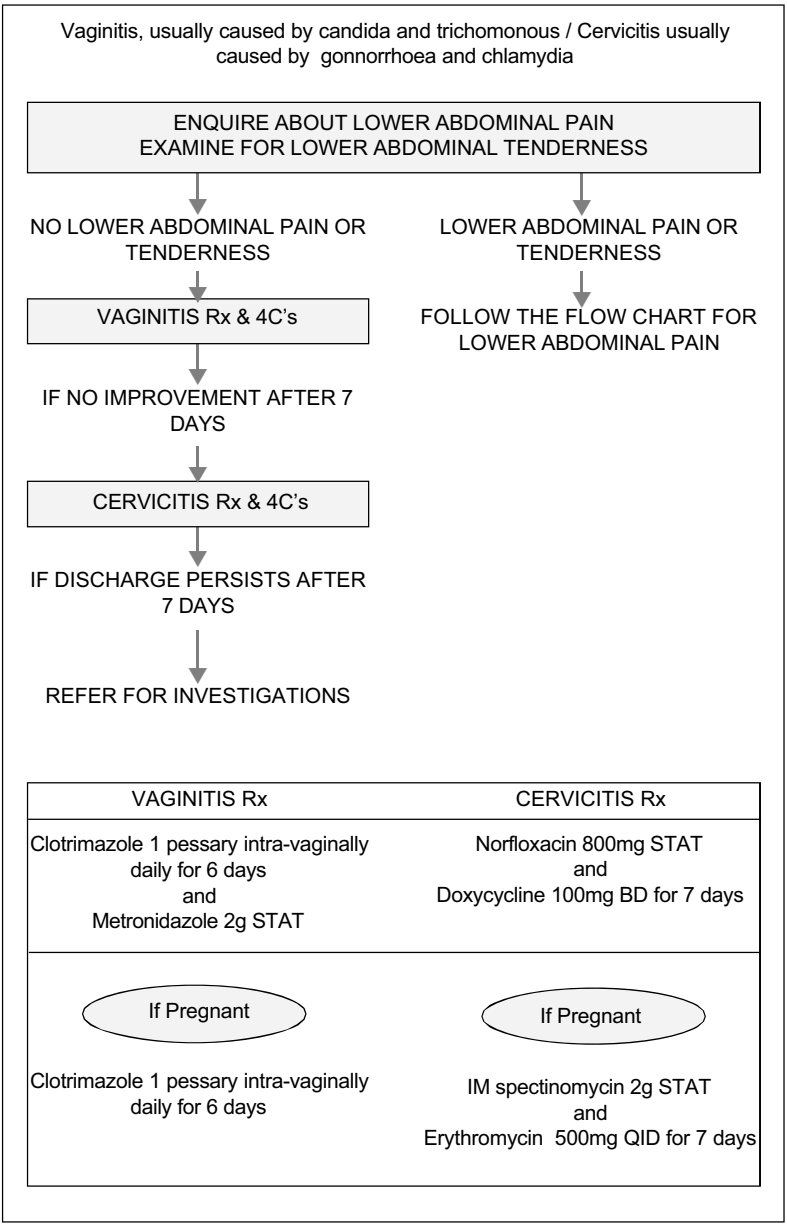
Investigations

- Wet mount preparation demonstrates flagellated protozoa.
- Trichomonas may also be noted on urine microscopy or pap smear.

Management

- Metronidazole 400mg TDS for 7 days. The same dose for the male partner. (Alcohol consumption to be avoided during treatment with metronidazole.)
- Drug to be avoided during first trimester of pregnancy. If possible withhold treatment until third month of pregnancy.

Figure 2.2: Flow chart for vaginitis



BACTERIAL VAGINOSIS

Usually associated with Gardnerella vaginalis.

Clinical Features

Vaginal discharge greyish-white in nature with a characteristic fishy odour that increases in intensity after sexual intercourse. Not usually associated with soreness, irritation, pruritus burning sensation, or dyspareunia. Diagnosis is usually clinical.

Investigations

- Wet mount preparation, which will show vaginal epithelial cells with adherent clusters of Gram-negative bacilli or coccobacilli (Clue Cells).
- Whiff-test in which a drop of discharge is mixed with a drop of KOH, which gives a characteristic fishy odour.

Management

- Treat both the patient and the male partner.
- Give metronidazole 400mg TDS for 7 days (avoid alcohol).
- Counsel on taking plenty of fluids.

CERVICITIS

About one third of all women presenting with vaginal discharge have cervicitis. The commonest causes of endocervicitis are gonorrhoea, chlamydia, trichomonas, and herpes simplex virus.

Clinical Features

Cloudy-yellow vaginal discharge that is non-irritating, non-odorous, and mucoid. There may also be inter-menstrual or post-coital spotting or both. There may also be dyspareunia or pelvic discomfort or both. Cervical mucosa appears inflamed with focal haemorrhages. Cervix is friable and bleeds easily on touch. Vesicular herpetic lesions will be found on vulva, vagina, and cervix. Abdominal and bimanual pelvic examination should be done to rule out pelvic inflammatory disease (PID).

Investigations

- Wet mount preparation: Look for pus cells, trichomonas, and yeasts.
- Gram-stain of the discharge of endocervical swab (Neisseria gonorrhoea: shows Gram-negative intracellular diplococci).
- Culture for gonorrhoea or chlamydia if available.
- Pap smear after treatment.

Management

- See Figure 2.2, vaginal discharge flow chart.
- Norfloxacin 800mg STAT then 400mg BD for 7 days Ceftriaxone 250mg.
- Doxycycline 100mg BD.
- Metronidazole 2g STAT.

2.2.3 DYSURIA IN THE FEMALE

Can result from urinary tract infection, vaginitis, or cervicitis. See relevant sections of manual for clinical features, investigations, and management. Gonorrhoea should be considered for patients at high risk for STIs.

2.2.4 LOWER ABDOMINAL PAIN IN THE FEMALE

Clinical Features

Often due to pelvic inflammatory disease (PID – see Part IV, Section 57.9). Must be differentiated from urinary tract infection, ectopic pregnancy, threatened abortion, appendicitis, and other causes of acute abdomen.

☛ ***An abdominal and pelvic examination must be done on all cases of lower abdominal pain in women.***

Management

- See flow chart (Figure 2.3) and relevant sections of manual.

2.2.5 GENITAL ULCER DISEASE

This condition can present with a variety of features and have a variety of probable causes, from primary syphilis chancre to Herpes to Granuloma inguinale. A thorough physical examination is required.

Clinical Features

Refer to Table 2.6 for a summary of the various presentations of this condition, along with the probable causes and diagnoses.

Management

See Table 2.5 (above) and the flow chart in Figure 2.4.

2.2.6 BUBOES OR SWOLLEN INGUINAL GLANDS

Buboes are enlarged lymph nodes in the groin. They may be associated with an ulcer in the genital area or on the lower limbs. Refer to genital ulcer disease.

Clinical Features

- Lymphogranuloma venerium: Several nodes matted together on one or both sides, usually without suppuration.
- Chancroid tender fluctuant bubo that suppurates, leaving an undermined inguinal ulcer that should be aspirated before suppuration.

Investigations

Serology for syphilis should always be performed.

2.2.7 GENITAL WARTS

Clinical Features

- Condyloma acuminatum (Human papilloma virus): Cauliflower-like warts. May be single or multiple on the vulva, vagina, perineal area, penis, urethra and

sub-prepucial. Vaginal discharge, pain, and bleeding on coitus or touch may occur.

- Molluscum contagiosum (Pox group virus): Umbilicated multiple papules with whitish, cheesy material being expressed when squeezed. Secondary infection and spread to other sites may occur.

☛ *Secondary syphilis should be ruled out when evaluating genital venereal warts.*

Management

- Carefully apply podophyllin 25% in tincture of benzoin to each wart, protecting the normal surrounding skin with petroleum jelly. Wash off the podophyllin thoroughly 1–4 hours later.
- Repeat 1–2 times weekly. If there is no regression after 4 applications, use alternative treatment given below or refer:
  - Alternative treatments: Podophyllotoxin 0.5% electrosurgery, cryotherapy, 5-Fluorouracil, surgical removal, silver nitrate pencil application.
  - In pregnancy: Podophyllin should not be used during pregnancy, not in vaginal, cervical, internal urethral, anal, or oral warts. Alternative regimens may be used, except 5-Fluorouracil and podophyllotoxin.

Table 2.6: Genital ulcer disease features, probable causes, and diagnosis

Clinical features	Probable diagnosis & cause
▪ Single, painless, relatively clean ulcers without pus ▪ Incubation period up to 3 weeks ▪ Painless lymphadenopathy	**Primary syphilis chancre** T. pallidum
▪ Multiple, soft, deep, tender ulcers with profuse pus ▪ Incubation period 1 week ▪ Very painful lymphadenopathy, which can be fluctuant ▪ Disfiguration of the genitalia ▪ Secondary infection	**Chancroid** H. ducreyi
▪ Multiple shallow and tender ulcers ▪ May start as vesicles grouped together. Itchy ▪ Incubation period 1 week ▪ Tender lymphadenopathy, may be recurrent, rarely suppurative	**Herpes genitalis** H. simplex
▪ Single, small and transient ulcers ▪ Incubation period 1–2 weeks ▪ Lymphadenopathy; several glands may be matted together ▪ Fistula and stricture formation	**Lymphogranuloma venerium (LGV)** C. trachomatis
▪ Large, beefy ulcers ▪ Variable incubation period ▪ None or rarely lymphadenopathy	**Granuloma inguinale** Calymmatobacterium granulomatis (Donovan bacilli)

Figure 2.3: Flow chart for abdominal pain/Pelvic inflammatory disease (PID)

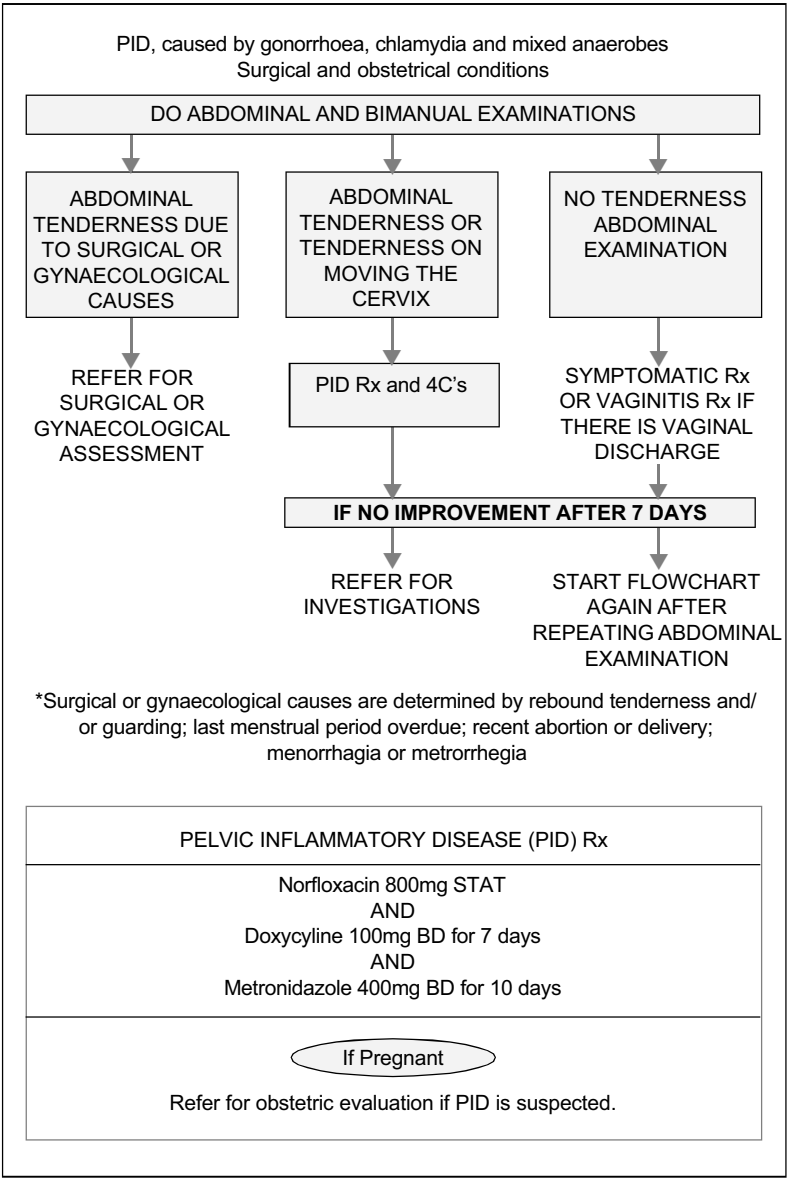
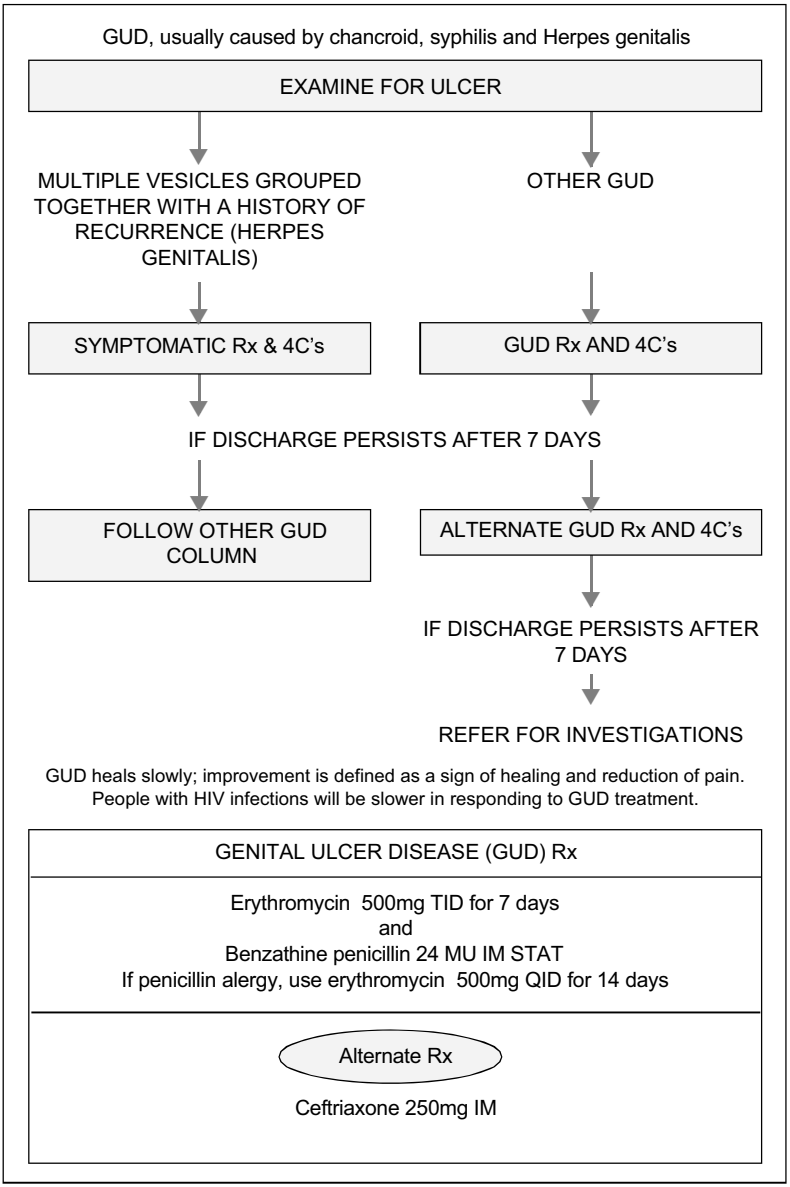


Figure 2.4: Flow chart for genital ulcer disease (GUD)



3. Cardiovascular Diseases

These are the diseases and disorders of the heart and blood vessels. They include rheumatic heart disease, coronary heart diseases, hypertension, and deep venous thrombosis (DVT), among others.

3.1 Deep Vein Thrombosis

The commonest site for DVT is the calf of the lower limbs followed by the pelvis (See also Section 58.16.2, DVT in pregnancy.)

Clinical Features
There is pain usually of sudden onset with warmth on palpation and local swelling with tenderness, and an extremity diameter of 2cm or more greater than the opposite limb from some fixed point. In DVT related to pregnancy and its complications as risk factors, the left lower limb is involved in over 80% of cases. Diagnosis is mainly clinical.

Investigations
- Whole blood clotting time
- Prothrombin time index (PTI0), International Normalized Ratio (INR)
- Activated partial thromboplastin time (APTT)
- Doppler ultrasound scan
- Confirmatory tests (venography)

Management – General
- Control pain.
- Promote venous drainage:
  - Bed rest
  - Elevation of involved limb
  - Place the foot of the bed in a slightly elevated position (Trendelenburg's)
- Apply warm packs around involved limb.
- Encourage limited extension and flexion of involved limb.
- Encourage early ambulation as soon as pain and inflammation have begun to resolve.

Management – Pharmacological
- Unfractionated Heparin – 80 IU/kg by bolus intravenous injection then 18 IU/kg/hour best by continuous intravenous infusion for 2–5 days. Adjust dose to achieve a PTT that is 1.5 to 2.0 times the control.
- Low molecular weight heparin (enoxaparin sodium 1mg/kg 12 hourly subcutaneously or dalteparin 200 IU/kg /day subcutaneously).
- Warfarin therapy is started on the first day with 10mg OD for 2 days and subsequent doses are adjusted until the INR is 2 to 3 times the control for two consecutive days, then discontinue heparin. The required dose varies between 2mg and 15mg OD.
  - For calf vein thrombosis, warfarin is given for 6 weeks.
  - For proximal vein thrombosis, warfarin is given for 3–6 months.

☛ **Warfarin interacts with aspirin, alcohol, other non-steroidal anti-inflammatory drugs, erythromycin, metronidazole, sulfonamides, tetracyclines, omeprazole, etc. All enhance warfarin's activity, therefore closely monitor the patient's PTI.**

- Watch out for the following complications:
  - Recurrent thrombosis
  - Pulmonary embolism
- If present, start heparin 6,000 IU as a STAT dose; aim at 24,000–30,000 IU in the first 24 hours by continuous infusion. The rest will be guided by an APTT, which should be 2 times the control. Where available low molecular weight heparins (deltaperine and enoxaperine). Deltaperaine (clexane) the dose is 80mg/day SC for those <60kg twice a day. For the elderly the dose should not exceed 40mg/day.
  - Depending on the risk of or established pulmonary embolism, further treatment may include:
    - Thrombolytic therapy
    - Thrombectomy
    - Inferior venacaval filters

Prophylaxis
- Recommended where DVT is likely to occur, e.g., hip operations and prolonged immobilization. Heparin 5,000 units/SC BD until the condition is treated.
- Care of chronic complications
- Clexane 40mg/day SC can be given

3.2 Heart Failure

Heart failure occurs when the heart is unable to supply output that is sufficient for the metabolic needs of the tissues, in face of adequate venous return. Common causes of heart failure are hypertension, valvular heart disease, ischaemic heart disease, anaemia, and pulmonary thromboembolism.

Clinical Features
Tachycardia, gallop rhythm, raised JVP, dependent oedema, tender hepatomegaly, orthopnoea, fatigue, exercise intolerance, and basal crepitations. Common precipitating factors of heart failure in cardiac patients must be considered in treatment of acutely ill patients: poor compliance with drug therapy; increased metabolic demands, e.g., pregnancy, anaemia; progression of underlying disease, e.g., recurrent myocardial infarction, uncontrolled hypertension; cardiac arrhythmias; pulmonary embolism; infective endocarditis; infection, e.g., pneumonia.

Investigations
- ***Chest x-ray:*** May show cardiac enlargement as well as evidence of other cardiac or pulmonary lesions

- Haemogram – To rule out anaemia, infection
- Urea and electrolytes
- Electrocardiogram (ECG)
- Echocardiogram

Management – General
- Restrict physical activities.
- Order bed rest in cardiac position.
- Give oxygen by mask for cyanosed patients.
- Restrict salt intake, control fluid intake, and measure urine output.
- Measurement weight daily.

Management – Pharmacological
- Frusemide 40–160mg PO OD; use higher doses in patients who were already on it.
- Digoxin 0.125–0.25mg PO OD, useful in atrial fibrillation. Loading dose for digoxin may be given to patients who are not on digoxin beginning with 0.25–0.5mg PO QDS up to a total of 1.0–1.5mg and then put on maintenance.
- Potassium supplements: Advise patient to eat fruits, e.g., bananas or oranges.
- Prophylactic anticoagulation: Heparin 2,500 units SC BD in those patients who are on strict bed rest and marked cardiomegaly.
- Treat underlying causative factor such as hypertension and anaemia.
- If patients fail to respond to above measures consider angiotensin converting enzyme inhibitors, e.g., captopril 6.25–12.5mg PO TDS. Enalapril 2.5–10mg PO OD/BD.

3.3 Acute Myocardial Infarction (AMI)

AMI is caused by the complete or partial occlusion of a coronary artery and requires prompt hospitalization and extensive care management.

Clinical Features
Chest pain: Severe, retrosternal/epigastric crushing or burning or discomfort. Discomfort radiates to neck and down the inner part of the left arm lasting at least 20 minutes to 7 hours. Occurs at rest and is associated with pallor, sweating, arrhythmias, pulmonary oedema, and hypotension. May also occur with physical activity.

Management
- Support and maintain vital functions.
- Give cardio-pulmonary resuscitation (CPR).
- Administer 100% oxygen.
- Alleviate pain and anxiety: Morphine 10–15mg IM ***OR*** IV 1mg per minute max.
  - 10mg (morphine must be diluted with normal saline or water for injection) ***OR*** pethidine 50–100mg IV/IM.
- Reduce further damage to heart muscle by administering aspirin 150mg PO STAT plus glycerin trinitrate sublingual 0.5mg every 5–10 minutes to a maximum of 5 tablets.

- Continue treatment in transit, if referral to higher levels of 5 and 6 for:
  - Defibrillation if ventricular fibrillation present.
  - Recanalization therapy (thrombolyis or primary angioplasty)
  - Consider further available investigations:
  - Electrocardiogram
  - Serum cardiac markers – Troponins I and T
  - Creatinine kinase (CK) – MB and isoforms
  - Myoglobin and other non-specific markers
  - Imaging – Echocardiogram
  - Nuclear imaging

3.4 Acute Rheumatic Fever

This is an acute, systemic connective tissue disease related to an immune reaction to untreated group A beta haemolytic streptococcus infection of the upper respiratory tract in children. The major complication of this disease is cardiac involvement, which can eventually lead to severe heart valve damage. This is the commonest cause of heart disease in Kenyan children. The initial attack of acute rheumatic fever occurs in most cases between the ages of 3 and 15 years.

Clinical Features

- Major criteria: Migrating polyarthritis, carditis (signs of cardiac failure, persistent tachycardia, pericardial rub, or heart murmurs), Sydenham's chorea, erythema marginatum, and subcutaneous nodules.
- Minor criteria: Past history of rheumatic fever, raised ESR, fever, arthralgia.
- Diagnosis: 2 major and 1 minor or 1 major and 2 minor manifestations.

Investigations

- Anti-streptolysin-0-titre (ASOT) – titre of 1:300
- Throat swab for B-haemolytic Streptococci group A for C&S
- ESR
- Chest x-ray – features of cardiomegaly
- Electrocardiography
- Echocardiography

Management

- Eradicate streptococcal infection from the throat:
  - Amoxicillin 250–500mg (children 25–50mg/kg in divided doses) TDS for 10 days
  - If allergic to penicillin or amoxicillin, erythromycin 12.5mg/kg QDS for 10 days
- Control fever and inflammation: Aspirin: 75–100mg/kg/day in 4–6 divided doses. Treatment continued until fever and joint inflammation are controlled and then gradually reduced over a 2-week period.
- Treat failure if present (see Section 3.2, on heart failure).
- Treat chorea if present with haloperidol 25mcg/kg (0.025mg/kg) TDS.
- Admit for strict bed rest until symptoms resolve.

Prevention
- Avoid overcrowding.
- Early treatment of streptococcal sore throat with benzathine penicillin 1.2 mega units STAT dose ***OR*** Phenoxymethyl penicillin 125–250mg TDS for 10 days.

Prophylaxis
- If there has been previous acute rheumatic fever without carditis, give benzathine penicillin 1.2 mega units monthly for 5 years or up to the age of 18 years, whichever is longer. ***OR***
- Erythromycin 125–250mg BD for 5 years for those sensitive to penicillin.
- If there has been previous acute rheumatic fever with carditis give benzathine penicillin 1.2 mega units ***OR*** Erythromycin 125–250mg BD for those sensitive to penicillin for life.
- For patient education:
  - Emphasize need for follow up for prophylaxis.
  - Advise that rheumatic heart disease is a known complication.

3.5 Rheumatic Valvular Heart Disease

This is a complication of rheumatic fever. The main site of pathology is on the valves. There may be mitral stenosis, mixed mitral valve disease (both stenosis and incompetence), mitral incompetence, aortic stenosis and incompetence. Dyspnoea, palpitations, or heart murmurs may occur depending on the valvular lesion. Patients may be asymptomatic and may be discovered to have the lesion during routine examination or during periods of increased demand such as pregnancy or anaemia. Patients may also present with congestive cardiac failure.

Investigations
- Chest x-ray
- Electrocardiogram
- Echocardiogram
- Cardiac catheterization

Management
- Treat underlying complication, e.g., heart failure, pulmonary oedema.
- Continuous prophylaxis against recurrent rheumatic fever is indicated.
- Infective endocarditis prophylaxis is indicated.

Prophylaxis
- For rheumatic fever: All patients with a history of rheumatic fever should be given prophylaxis for recurrences, for life, with benzathine penicillin 1.2 mega units IM monthly,
  OR amoxycyllin 125–250mg PO BD
  OR erythromycin 125–250mg PO BD
- For infective endocarditis prophylaxis: In addition to rheumatic fever prophylaxis, the following should be done:

- Before dental procedures patients should be given amoxicillin 3.0g PO 2 hours before procedure and 1.5g PO 6 hours after the initial dose.
- If allergic to penicillin they should be given erythromycin 1g PO 2 hours before procedure then half the dose 6 hours after the initial dose.
- For lower gastrointestinal and genitourinary procedures patients should be given amoxicillin 2g IM 30 minutes before procedure and 6 hours after the initial dose + gentamicin 1.5mg/kg IM 30 minutes before procedure and 8 hours after the initial dose.

Patient Education
- Emphasize need for follow up.
- Advise female patients on contraception.

Complications
- Congestive cardiac failure
- Pulmonary oedema
- Bacterial endocarditis

3.6 Hypertension

Hypertension is diagnosed when blood pressure (BP) reading is greater than 140/90 mmHg on 3 separate readings.

Clinical Features
Majority of patients are asymptomatic. Occasionally patients may present with early morning occipital headaches, dizziness, or complication of hypertension, e.g., renal failure, stroke, and heart failure. Majority of patients have essential hypertension. Refer to Table 3.1 for classifications of hypertension.

Table 3.1: Hypertension classification according to the 7th report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 7)

	Systolic (mmHg)		Diastolic (mmHg)
Normal	<120	and	<80
Prehypertension	120–139	or	80–89
Stage 1 hypertension	140–159		90–99
Stage 2 hypertension	>160–		>100

Note: Hypertension classification is based on the average of >2 readings taken at each of 2 or more visits after initial screenings.

Investigations
- Urea and creatinine lipid profile
- Chest x-ray; cardiomegaly
- ECG
- Investigations directed at other perceived organ abnormalities that may result in hypertension, like kidneys, adrenals, thyroid, pituitary

Management – General

- Aim to reduce diastolic BP to 90mmHg; individualize treatment depending on age. Not all patients with hypertension need drug treatment. The non-pharmacological management includes:
  - Weight reduction in obese patients
  - Low salt diet
  - Advising patients to give up smoking
  - Regular dynamic exercises
  - Low fat diet
- Manage high normal blood pressure (refer to Table 3.2) by a non-pharmacological approach that includes:
  - Lifestyle modification that includes regular exercise, low salt diet, and low fat diet

Table 3.2: Blood pressure ranges

	Systolic (mmHg)		Diastolic (mmHg)
Optimal	<120	and	<80
Normal	<130	and	<85
High-normal	130–139	or	85–89
Stage 1 hypertension (mild)	140–159		90–99
Stage 2 hypertension (moderate)	160–179		100–109
Stage 3 hypertension (severe)	≥180		≥110

Pharmacological Management

Refer to Table 3.3 for a summary of care by the severity of the condition. Table 3.4 presents the drugs and their daily doses for treating hypertension. Note that the choice of drug combinations is no longer important; presently, one combines multiple drugs from different classes starting at very low doses, and where indicated consider lipid lowering treatment in combination with antihypertensives to achieve a blood pressure of below 140/90mmHg.

- For stage 1 hypertension (Table 3.4), the initial treatment is non-pharmacological. If no response after 4–6 months, use monotherapy.
- For stage 2 hypertension (Table 3.4), initiate non-pharmacological treatment and in addition give hydrochlorothiazide 25–50mg PO once daily. If no response within 4–6 weeks, add atenolol 50mg PO gradually increasing the dose up to 100mg daily, depending on patient's response and since BP response is often delayed with atenolol at least 6–8 weeks should elapse before changing the therapeutic regime. If no response, consider other combinations

Table 3.3: Treatment for various levels of severity of hypertension

Severity of hypertension	Drugs recommended for use
Stage 1 hypertension	Monotherapy preferably HCTZ*; for diabetics preferably enalapril
Stage 2 hypertension	Combination therapy, e.g., HCTZ* + beta blocker or ACEI

* HCTZ = hydrochlorothiazide; bendrofl umethiazide, frusemide, or other appropriate diuretics may be substituted.

Table 3.4: Drugs used in treatment of hypertension and their daily doses

Drugs	Daily dosages	Drugs	Daily dosages
i) Diuretics		**vi) Calcium channel blockers**	
Thiazide diuretics	6.25–25mg	Amlodipine	2.5–10mg
- Hydrochloro-thiazide (HCTZ)	6.25–25mg	Nifedipine XL	2.5–10mg
		Felodipine	2.5–20mg
- Chlorthalidone	1.25–5mg	Nicardipine SR	30–120mg
Idapamide	1.25–5mg	Diltiazem CD	120–540mg
Metalazone	2.5–5mg	Verapamil HS	120–480mg
ii) Loop diuretics		**vii) ACEIs**	
Frusemide	1.25–5mg	Captopril	25–150mg
Bumetamide	0.5–2mg	Enalapril	2.5–40mg
Ethacrynic acid	25–100mg	Lisinopril	10–80mg
Torsemide	2.5–20mg	Ramipril	2.5–20mg
		Losartan	25–100mg
iii) Potassium sparing diuretic		Valsartan	80–320mg
Amiloride	5–20mg		
Triamtrene	2.5–10mg	**viii) α-blockers**	
Spironolactoneo	125–200mg	Prazosin	1–40mg (2–3 divided doses)
		Phenoxybenzamine	20–120mg (2 doses)
iv) β-blockers			
Acebutolol	200–800mg	**ix) Sympatholytic agents**	
Atenolol	25–100mg	Clonidine	0.2–1.2mg
Metoprolol	50–200mg	Methyldopa	250–1,000mg
Nadolol	20–320mg	Reserpine	0.05–0.25mg
Pindolol	10–60mg		
Propranolol	40–160mg	**x) Direct vasodilators**	
Timolol	20–60mg	Hydralazine	25–200mg
		Minoxidil	2.5–100mg
v) β/α-blockers			
Labetolol	200–1,200mg		
Carvedilol	6.25–50mg		

Beta-blockers are contraindicated in COPD and asthma.
If patient fails to respond to the regimens above consider the following:

- Inadequate patient compliance.
- Inadequate doses.
- Drug antagonism, e.g., ephedrine raises blood pressure.
- Secondary forms of hypertension, e.g., pheochromocytoma.

3.7 Hypertensive Crisis

Sudden or sustained diastolic blood pressure of more than 120mm Hg with papilloedema, progressive decrease in renal function, and evidence of neurological dysfunction. Blood pressure should be controlled within 1 hour in order to prevent permanent damage and hypertensive emergencies. In both, the aim of treatment is to achieve diastolic BP of 100–110mm Hg. However, rapid decrease of BP should be avoided to reduce the risk of cerebral hypoperfusion.

Management
There are two approaches to choose from in managing this condition, Approach A and Approach B, as shown in Table 3.5.

Table 3.5: The approach in managing hypertensive crisis

Approach A	Approach B
Frusemide 40 IV + Hydralazine 10mg IV every 15 minutes until desired effect or 50mg has been administered. The total dose may be repeated IM or IV after 6 hours***OR*** sodium nitroprusside 0.25–10 ug/kg/minute IV infusion	Nifedipine 20mg PO repeated after 1 hour

- Following initial control of BP, switch to multiple oral therapy (hydrochlorothiazide + atenolol + hydralazine ***OR*** nifedipine ***OR*** methyldopa ***OR*** captopril).
- Admit those patients with severe hypertension or with hypertension crisis.
- Complications include congestive heart failure and renal failure. Refer to sections 3.2, heart failure, and 15.4, renal failure, for management guidelines.

Patient Education
Untreated hypertension has a high mortality rate due to: renal failure, stroke, coronary artery disease, and heart failure.

3.8 Pulmonary Oedema

This is an acute medical emergency due to an increase in pulmonary capillary venous pressure leading to fluid in the alveoli usually due to acute left ventricular failure.

Clinical Features
Breathlessness, sweating, cyanosis, frothy blood tinged sputum, respiratory distress, rhonchi and crepitations.

Investigations
Chest x-ray reveals loss of distinct vascular margins, Kerley B lines and diffuse haziness of lung fields.

Management – Pharmacological
This must be immediate:
- Prop up patient in bed.
- Give 100% oxygen 3.5–5L/min.
- Start IV frusemide 40mg initial, repeat with higher dose every 20–30 minutes to 200mg maximum total dose. [see annex b for paediatric doses].

If not already on digoxin, digitalize except if due to myocardial infarction (see sections 3.2, heart failure, and 3.3, acute myocardial infarction).

- Give IV aminophylline 250–500mg slowly.
- Start on oral medication as soon as possible.

☛ ***Watch for respiratory depression.***

- Admit for
  - Management of all patients with pulmonary oedema.
  - Investigative procedures for underlying causes.
  - Management of underlying causes like hypertension.

4. Central Nervous System

4.1 Headache

Headaches are due to activation of the primary afferent fibres that enervate cephalic blood vessels, chiefly meningeal or cerebral blood vessels. Headache is commonly secondary to some other cause, though a great percentage have no identified cause and are referred to as primary headache disorders. Examples of the latter are migranous headaches, cluster headaches, and tension headaches. In these cases, history and physical examination are usually adequate to arrive at the diagnosis.

Treatment

- Can be non pharmacological and pharmacological. The former includes behaviour and lifestyle modification such as:
  - Avoiding certain foods known to trigger migraine headaches.
  - Adopting consistent sleeping patterns.
  - Minimizing environmental stress.
  - Pharmacological treatment may involve administration of:
  - Analgesics like paracetamol.
  - Nonsteroidal anti-inflammatory drugs, ergotamine, and valproic acid for migraine.
  - Oxygen inhalation or sumatripan and ergotamine tartrate for cluster headaches.
  - Nonsteroidal anti-inflammatory drugs and tricyclic antidepressants such as amitriptyline for tension headaches.
- Secondary headaches are treated with analgesics plus treatment of the primary cause.

4.2 Seizure Disorders

Epilepsy is a clinical syndrome characterized by the presence of recurrent seizures. Seizures are result of excessive electric impulse discharge of cerebral neurones.

4.2.1 CLASSIFICATION AND TREATMENT OF SEIZURES

Seizures are classified as partial and generalized, as in the following:

Partial seizures:

- Simple partial seizures; can be motor, sensory and sensory-motor (consciousness not impaired).
- Complex partial seizures; starting with an aura (later impairment of consciousness) and often accompanied by automatic behaviour.
- Partial seizures becoming progressive (Jacksonian seizures) or generalized.

Generalized seizures

Initially generalized:

- Absence seizures
- Tonic seizures
- Myoclonic seizures
- Tonic-clonic seizures
- Clonic seizures
- Atonic seizures

Clinical Features

Meticulous history from patient and reliable witness is critical in diagnosing a seizure disorder. Ask about the prodromal phase, aura and the type, duration, frequency, and the age at onset of seizures. Details about the post ictal phase are important. Ask about precipitating factors, for example alcohol use.

Investigations

- Thorough physical examination including fundoscopy in newly diagnosed cases
- Skull x-ray: All cases for possible radiolucent focal lesion, raised intracranial pressure
- Full haemogram
- Malaria parasites (MPs) especially in children
- Blood sugar, urea, and electrolytes in cases where metabolic conditions are considered as a cause of a seizure disorder
- Electroencephalogram
- CT scan
- MRI scan

Management

First Aid

- During an epileptic attack:
  - Placed patient should be on the left lateral position with head turned to the same side.
  - Remove or loosen tight fitting clothing around the neck.
  - Remove dentures.
  - DO NOT attempt to insert any instrument into the mouth to avoid tongue biting as this may have already happened.

- Do not allow patient to be surrounded by too many eager observers.
- Allow seizure to complete its course without physically attempting to hold down the patient. However, remove patient from danger, e.g., fire.

◆ After an attack:
- Investigate patient as outlined above and started on therapy.

General Management
- ◆ Treat underlying diagnosed condition if possible, e.g., hypoglycaemia, meningitis.
- ◆ Establish firm diagnosis before starting therapy.
- ◆ For most patients, start on therapy as outpatients.
- ◆ Start therapy if patient has had 2 or more seizures within 1 year.
- ◆ Advise patient that treatment is usually life-long. Therapy may be discontinued after a seizure-free period of at least 2 years. Reduce dose gradually over many months. Sudden discontinuation of drugs may precipitate status epilepticus. Complex partial seizures will require lifelong drugs.

Pharmacological Management
- ◆ Start therapy with one drug, usually phenobarbitone. Increase at regular intervals until seizures are controlled or side effects appear. If side effects appear and seizures are still not controlled, introduce other drugs and taper off the first drug. Refer to Table 4.1 for a summary of the administration of the drugs of choice for the different types of seizures.

☛ **Drugs used at maximum recommended dose should be withdrawn if seizures are not controlled.**

- ◆ Admit if underlying metabolic cause is suspected or raised intracranial pressure is present.

Patient Education
- ◆ Avoid becoming drunk, especially drinking sprees during weekends.
- ◆ Eat at regular intervals.
- ◆ Stress, physical or mental may precipitate a fit, thus manage stress.
- ◆ Avoid sleep deprivation.
- ◆ Never swim alone and all precautions should be taken when swimming.
- ◆ Avoid operating heavy or sharp edged machinery.
- ◆ To prevent burns, protective shield should be made around “jikos” (braziers).

4.2.2 STATUS EPILEPTICUS

This is a succession of seizures in which the patient does not regain consciousness between attacks. It could be due to partial, complex partial, absence, tonic-clonic, or clonic. Only the last 2 are life threatening.

Clinical Features

Patient is not able to talk, the tonic phase is not clear and the patient appears in continuous clonic phase, the short tonic phases being difficult to see. May be in respiratory embarrassment with cyanosis or may be hypoglycaemic.

Table 4.1: Pharmacological management of common seizures

a.) Drugs of choice

Partial	First drug	Other drugs
Simple	Phenytoin	Carbamazepine, valproic acid, gabapentin
Complex	Carbamazepine	Phenytoin, valproate, gabapentin, zonisamide
Secondarily generalized	phenytoin	Lamotrigine, valproate, carbamazepine
Generalized	First drug	Other drugs
Absence	Ethosuximide	Valproic acid, clonazepam, valproate, lamotrigine,
Tonic-clonic, clonic	Phenobarbitone	Carbamazepine, phenytoin, lamotrigine,
Tonic	As above	As above
Atonic	As above	As above
Myoclonic	Clonazepam	Nitrazepam, valproic acid, phenobarbitone, carbamazepine,

b.) Drug dosage and frequency

Drug	Dose	Frequency
Phenobarbitone	60–240mg	Once daily
Phenytoin	50–400mg	Once daily
Carbamazepine	400–1,400mg	In 2–3 divided doses
Sodium valproate	600–2,400mg	In 3 divided doses
Ethosuximide	20–40mg/kg/day	In 2 divided doses
Clonazepam	1–12mg	Once daily

Management

Supportive

Place patient by the side (lateral position). Do NOT attempt to put anything into the patient's mouth to stop the biting of the tongue. You are likely to cause more damage.

Pharmacological

- Give IV (not IM) diazepam 10mg STAT then infuse IV phenytoin 15–20mg/kg at a rate not exceeding 50mg/minute (for adults). Maintenance dose of 100mg 8 hourly. To be administered in normal saline. If no response use IV phenobarbitone. Maintenance 300–500mg/day, preferably oral.
- Phenobarbitone second line after phenytoin. Loading dose of phenobarbitone 20mg/kg IV at a rate of 50–75mg/minute. If no response repeat at 5–10mg/kg. Maintenance 1–5mg/kg/day PO.
- Rectal diazepam 10–20mg may be as effective as intravenous diazepam.
- Use rectal solution at 0.5mg/kg.

☛ **Phenobarbitone should only be used where respiratory support is available.**

4.3 Ischaemic Stroke

Stroke is a group of diseases that are of abrupt onset and cause neurological damage. The majority result from interrupted supply of blood to the brain (ischaemic), while about 10–15% arise from haemorrhage into the brain

substance or its surrounding spaces (haemorrhagic). Ischaemic stroke commonly arises from mural thrombi forming at the site of atherosclerotic lesions, blocking blood flow. Alternatively, ulceration or rupture of an atherosclerotic plaque may lead to the formation of a clot and distal embolization, or still, haemorrhage into an atherosclerotic plaque may obstruct the artery. Commonly, emboli arise from the left side of the heart, from mural thrombi, vegetations from infected heart valves, or arrhythmias. Paradoxical emboli can arise from venous circulation and access cerebral circulation through right to left cardiac shunts.

Clinical Features
Rapid onset of neuronal malfunction referable to the area of the brain for which blood supply is disrupted.

Diagnosis
From history and physical examination.

Investigations
- CT scan
- Cerebral angiography

Management
- Thrombolytic therapy useful if initiated within 3 hours of onset of symptoms.
- Drugs are intravenous tissue plasminogen activator (tPA), streptokinase, and intra-arterial recombinant prourokinase (rproUK).

4.4 Haemorrhagic Stroke

Hypertension and vascular malformations are the commonest causes of haemorrhagic stroke, both subarachnoid and intracerebral haemorrhages, both of which are associated with very high mortality.

Clinical Features
Intense headache of sudden onset, commonly associated with elevated blood pressure. In half of patients there is transient alteration of the level of consciousness, commonly going into coma. If there is subarachnoid bleed there are features of meningism including stiff neck and a positive Kernig's sign.

Diagnosis
History and physical examination usually suggest the diagnosis.

Investigations
- CT scan performed within 24 hours of onset of symptoms.
- Lumbar puncture.
- Cerebral angiogram

Management
Management depends on the cause of the haemorrhage. Control of blood pressure controls hypertensive haemorrhage. For A-V malformations treatment options include surgical resection, embolization of the feeding arteries and radiation-induced thrombosis.

5. Endocrine System

5.1 Diabetes Mellitus

Diabetes mellitus is recognized by chronic elevation of glucose in the blood (hyperglycaemia).

5.1.1 CLASSIFICATION

- Type 1 (Insulin dependent diabetes mellitus): Usually occurs in children and young adults and is associated with ketoacidosis. These patients are insulinopenic and require insulin to sustain life.
- Type 2 (Non-insulin dependent diabetes mellitus): Usually afflicts adults, a large number of whom are obese, and tend to have elevated blood pressure (metabolic syndrome).

Presentation
Commonest symptoms are polyuria, polydipsia, polyphagia and weakness. Wasting tends to occur in type 1 diabetes while obesity may predominate in type 2. Sequelae of target organ damage in the kidneys, blood vessels, heart, nerves, the eyes, may be the main manifestations.

Investigations
- Blood glucose:
  - Fasting venous blood glucose more than 7.8 mmol/L on more than one occasion
  - Random blood glucose more than 11.1 mmol/L in symptomatic patients
- Urinalysis - for protein, sugar, ketones

5.1.2 MANAGEMENT

Aim of management is to:
- Abolish symptoms of diabetes.
- Correct hyperglycaemia, glycosuria.
- Prevent and manage complications.

General Management
- Modification of the diet is important in both types 1 and 2. Consult nutritionist as dietary modification must be individualized.
  - Type 1 diabetes mellitus patients experience weight loss and will gain weight with therapy. Aim for caloric intake of 35 Kcal/kg body weight to maintain ideal body weight.

- Type 2 diabetes mellitus patients are often obese, and such patients caloric restriction of 15–20 Kcal/kg body weight is recommended. Exercise is important because modest weight reduction in obese diabetic patients leads to improved glycaemic control.

- Food composition
  - Carbohydrate 50–60% in complex form, e.g., rice, beans, peas, etc.
  - Protein 10–20%. Vegetable protein source include soya beans, lentils and beans.
  - Fat 25–30%. Fibre in diet can prolong absorption of sugar. Fibre containing foods include beans, legumes and bran.
  - Artificial sweeteners, e.g., saccharin and aspartate, are helpful in maintaining a palatable diet.
  - Strict adherence to meals schedule is important.
- Type 2 diabetes mellitus
  - Manage as outpatient preferably in the diabetic clinic or medical clinic.
  - Consult nutritionist for dietary modification.

Management – Pharmacological

Oral hypoglycaemics:

- First generation sulfonylureas:
  - Chlorpropamide 125–500mg PO OD max 500mg/day should be started if response to dietary modification is inadequate (nocturia, blood sugar more than 14 mmol/L). Dose adjustment should be gradual (weekly) to avoid hypoglycaemia.
  - Tolbutamide 500–3,000mg/day in 2–3 divided doses
  - Tolazamide 100–1,000mg/day in 1–2 divided doses
- Second generation sulfonylureas:
  - Glibenclamide
  - Glipizide 5–40mg/day in 1–2 divided doses
  - Glimepiride 1–8mg/day in one dose
- Biguanides:
  - Metformin 500–2,550mg/day in 2–3 divided doses
  - Glyburide 250–2,000mg/day in 2 divided doses
- Alpha-glucosidase inhibitors:
  - Acarbose 75–300mg/day in 3 divided doses
  - Miglitol 75–300mg/day in 3 divided doses
- Thiazolidinediones:
  - Pioglitazone 15–45mg/day in 1 dose
  - Rosiglitazone 4–8mg/day in 1–2 doses

Insulin is indicated in Type 2 DM if:

- Oral hypoglycaemic drugs are not effective, e.g., persistent polyuria, hyperglycaemia
- Ketonuria occurs
- Infection occurs
- Other complications, e.g., renal failure are present
- Patients undergoing surgery.

Admit patient for insulin therapy:

- Teach the patient how to measure insulin, the technique of injection, care of syringe, and recognition and management of hypoglycaemia. Start patient on soluble insulin 10–16 units subcutaneously half an hour before meals TDS. The severity of hyperglycaemia will aid in selection of the dose. Maintain plasma glucose in the range of 8.3–13.4mmol/L in the hospital to avoid hyperglycaemia at home. Optimum control at home is blood sugar less than 10mmol/L and more than 4mmol/L.
- Plasma glucose should be monitored before meals and at bed time. Gradual adjustment of insulin dosage by 5 units are essential when blood glucose are near the desired range. When blood glucose level is between 8.3 and 11.0 mmol/L, change to an intermediate acting insulin. The dose of intermediate acting insulin is two-thirds of the total daily soluble insulin requirement. Alternative strategy is to base control on 2 doses of intermediate acting insulin two-thirds in the morning and one-third before supper.

5.1.3 TYPE 1 DIABETES MELLITUS

Usually presents with diabetic keto-acidosis (DKA). Patients with type 2 DM can also present with DKA, especially in situations of stress such as infection or neglect of therapy. Clinical features include intense polydipsia, abdominal pain, vomiting, dehydration, acidotic breathing, or coma.

Investigations

- Urinalysis should reveal ketonuria and glycosuria.
- Blood sugar should show hyperglycaemia.

Management

DKA is a medical emergency and should be treated as such. Not all patients with DKA are in coma. For management of DKA see below.

Most patients with Type 1 diabetes mellitus need hospitalization and are best managed with divided doses of intermediate acting insulin two-thirds lente am and one-third lente pm. Alternative therapy is to combine soluble insulin with intermediate acting insulin. Note: Animal insulin is in the process of being replaced by human insulin.

Admit the patient:

- **Fluid replacement:**
  - Initiate fluid replacement with normal saline then change to 5% dextrose alternating with N/S when blood sugar is between 12.0 and 14.5 mmol/L. If severely dehydrated, continue normal saline and 5% dextrose together. Continue intravenous fluids until fluid losses have been corrected and ketonuria has disappeared.
- **Insulin therapy:**
  - Initial: 10 units IV + 10 units IM STAT, then 6–10 units every hour until blood sugar is 14mmol/L, then change to soluble insulin 8–16 subcutaneously 4–6 hourly. Change to soluble insulin subcutaneously TDS when patient is taking orally.

- **Potassium replacement:** Hypokaelemia is a common feature. Confirmation should be through ECG and electrolytes. If present supplement as indicated in Table 5.1.
  - Deficit: 300–600 mmol. Potassium replacement should commence immediately after the first dose of insulin and 1 litre of fluids. Potassium can safely be given at the rate of 10–20mEq/hour (10ml of 15% -KCL = 20 mEq K) in an infusion.

Never give potassium as a bolus.

- Rectal diazepam 10–20mg may be as effective as intravenous diazepam.
- Use rectal solution at 0.5mg/kg.

Table 5.1: Potassium replacement therapy

Serum potassium (mmol/L)	Potassium supplements mmol/L of fluid
<3	40
3–4	30
4–5	20
5–6	10
6	None

- **Acidosis:**
  - If PH is <7.2 and serum potassium is >4mmol/L, give NaHCO3 8.5% (diluted to 4.2%). Use the following formula: Base excess x 0.3 x body mass (kg). Give 25% over 1 hour and reassess (1ml NaHCO3 8.5% = 1mmol HCO3).
  - Use NaHCO3 with caution.
- **Antibiotics:** Precipitating factor is usually an infection. Treat with broad spectrum bactericidal antibiotic while awaiting results of cultures where applicable.
- **Anticoagulation:** Heparin 2,500 units SC BD to prevent DVT. Low molecular weight heparins such as enoxaparin and deltaperin can also be used.

Monitoring

- 2 hourly plasma potassium (since potassium infusion is being given).
- Hourly blood sugar estimations are mandatory in the first few hours (use glucose oxidase reagent strips).
- Urine output; if no urine after 3 hours catheterize patient.
- Nasogastric suction should be done in comatose patients to prevent aspiration.
- Oral intake is initiated after ketoacidosis has been corrected
- Careful monitoring of patients especially the elderly or those with renal or cardiac impairment.

☛ **Hypoglycaemia should be considered in all diabetic patients who present with altered consciousness or coma. Take blood for glucose and give 20ml of 50% dextrose immediately. All diabetics with complications such as diabetic foot should be admitted.**

Patient Education
- Teach patients how to avoid foot injury. Hospital occupational therapist should advise patients on foot care.
- Patients with any injury, however minor, should seek medical advice.
- Patients should eat regularly.
- Patients should carry sweets or glucose and chew them if they experience any symptoms of hypoglycaemia.
- Patients should always carry "Diabetic Alert" card with them.
- Patients should join any branch of the Kenya Diabetic Association for support and continuing education.

Psychosocial Support
Patients with diabetes undergo a lot of stress. There is need for psychosocial support, both for the patient and for the caregivers.

5.1.4 COMPLICATIONS

Hypoglycaemia
- Blood glucose lower than 4mmol/L.

Management
General Management
- Give sugar-containing soft drinks, snacks or sweets
- Monitor blood sugar every 15 minutes until blood glucose is 6–8mmol/L

Pharmacological Management
- IV 50% dextrose bolus 25–50ml (children 1–2ml/kg).
- IM/IV/SC glucagon: <30kg – 0.5mg STAT dose; ≥30kg – 1mg STAT dose.

Give 5 or 10% dextrose fluid as a continuous infusion for normal maintenance of fluid requirements for age (refer to Section 6.1 on diarrhoeal diseases for guidance on fluid replacement).

5.2 Diseases of Pituitary Gland and Adrenals

Pituitary gland disorders can be either pituitary hyperfunction or hypofunction. These are reflected in the disorders of adrenals, thyroid and ovarian functions.

5.2.1 THYROID DISEASES

GOITRE

Enlargement of thyroid gland.

Classification
- Simple goitre can be diffuse or nodular. Usually caused by lack of iodine or defects in synthesis of thyroxine hormone.
- Toxic goitre may be diffuse or nodular. Produces excess thyroxine (T3, T4) and manifests with signs and symptoms of thyrotoxicosis.

- Neoplastic goitre can be benign or malignant.
- Thyroiditis, e.g., Hashimoto's disease.
- Infection related goitres: These are rare goitres and may be caused by tuberculosis or syphilis.

Clinical Features
Most patients are asymptomatic. Pressure symptoms consist of engorged neck veins, dysphagia, stridor, hoarseness. In hyperthyroid patients, signs and symptoms include weight loss, diarrhoea, heat intolerance, sweating, tachycardia, heart failure, tremors, eyelid lag, exophthalmos, and menstrual disorders.

Investigations
X-ray neck, thoracic inlet
Thyroid function tests (levels T3, T4, TSH, etc.) in thyrotoxicosis
Fine needle aspirate and cytology
Ultrasound of thyroid gland

Management
- Goitre – Reassure patient:
  - Smooth non-toxic colloid goitres: Thyroxine 50–150 micrograms OD for 6 months. If no change stop drugs and follow up.
  - Toxic goitre: Usually managed conservatively with anti-thyroid drugs (carbimazole, methimazole), propranolol, and diazepam.
- Thyrotoxicosis
  - Aim of treatment is to restore the euthyroid state. Use the pulse rate and thyroid function tests if available to monitor progress
  - Anti-thyroid drugs: Carbimazole 15–20mg TDS for 3 to 4 weeks thereafter reduce the dose to maintain euthyroid state, this ranges from 5–30mg daily. Propranolol 60–240mg in 3 divided doses.
  - In place of carbimazole, propylthiouracil can be administered at doses not exceeding 300mg/day and given in divided doses at 6–8 hourly intervals. Methimazole may also be given instead, administered at doses of 20–30mg once daily. The dose may be increased to 30–40mg daily after 2 weeks then tapered after euthyroid status has been realized. Maintenance dose is 2.5–5mg daily for 12–24 months.
  - Radioactive iodine ablation – Indicated in patients in whom anti-thyroid drugs have failed to achieve euthyroid state within 12–24 months. For women it is preferred in those who have completed childbirth. In both sexes it is preferable in those aged 35 years and above.
- Indications for surgery:
  - Toxic goitre.
  - Failure to control symptoms despite adequate treatment with drugs.

5.2.2 ADRENOCORTICAL DISORDERS

These can be either underproduction or overproduction of glucocorticoids or mineralocorticoids, leading to hypofunction or hyperfunction status.

GLUCOCORTICOID EXCESS (CUSHING'S SYNDROME/DISEASE)

Arises from a pituitary adenoma production of excessive amounts of ACTH, which results in excess cortisol production. Cushings syndrome can also arise from exogenous administration of glucocorticoids or endogenous excess production of cortisol by adrenal glands or ectopic production of ACTH such as by bronchogenic carcinoma.

Clinical Features

Clinical features include weight gain, moon face, hypertension, skin striae, hursutism, acne, easy bruisability, hyperpigmentation, glucose intolerance, plethora, proximal muscle weakness, menstrual dysfunction, osteopaenia, hypokalaemia, and metabolic alkalosis.

Investigations

- Urinary free cortisol levels
- Plasmacortisol and ACTH levels
- ACTH stimulation test
- Dexamethasone suppression test
- Abdominal imaging
- Pituitary imaging
- Urea and electrolyte assay

Management

- Identify the pituitary adenoma and institute surgical removal.
- Drug management with bromocriptine.
- Adrenal adenomectomy for adrenocortical carcinoma or adenoma.
- Chemotherapy.
- For advanced adrenocortical carcinoma medical ablation using o,p-dichlorodiphenyldichloroethane at 6–10g/day.

ADRENAL INSUFFICIENCY

Commonly caused by infections like TB, HIV, autoimmune conditions, and neoplasms. Patients commonly present with features of weakness, weight loss, diarrhoea, vomiting, hypotension, darkening of skin palms, and recent scars.

Investigations

- Plasma cortisol and ACTH
- Identify underlying cause
- Serum aldosterone

Management

- Management depends on the underlying cause except in Addison's diseases, where lifelong cortisteroid repayment is required.
- Mineralocorticoid replacement is by fludrocortisone 100µg per day while glucocorticoid replacement is by prednisolone 5mg daily or cortisone acetate 20–37.5mg daily. In acute phase Addisonian crisis, IV saline and

hydrocortisone administration while monitoring BP, pulse, and urine output. Revert to maintenance once out of the crisis.

☛ **Patients with adrenocortical insufficiency should wear tags or carry cards.**

6. Gastrointestinal Conditions

6.1 Diarrhoeal Diseases

Diarrhoea is defined as the occurrence of at least 3 loose or watery stools in a day.

Classification
There are three categories of diarrhoeal diseases:
- ***Dehydration:*** This is the major cause of death from diarrhoea. Management is aimed primarily at evaluation, prevention, and treatment of dehydration.
- ***Dysentery:*** This is bloody diarrhoea.
- ***Persistent diarrhoea:*** This is diarrhoea that lasts for 14 days or more.

Clinical Evaluation of Dehydration
Refer to Table 6.1 for a summary of the signs of dehydration, whether severe, moderate, or mild.

6.1.1 REHYDRATION PROTOCOL

In using the protocol summarized in Table 6.2, bear in mind:
- The volumes indicated are guidelines only.
- Rehydration must be evaluated in terms of clinical signs, not in terms of volume of fluids given.
- If necessary, the volumes given below can be increased or else the initial high rate of administration can be maintained until there is clinical improvement.
- Periorbital oedema is a sign of fluid overload in infants or hypernatreamia in those on ORS.
- Maintenance therapy should begin as soon as signs of dehydration have resolved, but not before.

6.1.2 FLUID MAINTENANCE THERAPY

- Fluid to be given after correction of dehydration.
- Adapt rehydration treatment to the clinical status of the patient.

Note the following:
- Other liquids such as plain water, rice water, uji, mala, etc., can also be given.
- ORS should constitute about two-thirds of the fluid intake until diarrhoea ceases.
- Thirst is the best guide for maintenance fluid therapy in older children and adults. Let them drink as much ORS (and other liquids) as they desire.

- Give fresh fruit or mashed bananas to provide potassium.
- Return to health worker if no improvement in 3 days or if patient develops the following: many watery stools, very poor drinking, repeated vomiting, fever, marked thirst, and/or blood in stool. Also if the caregiver is not happy with the condition.

Table 6.1: Clinical signs of dehydration

Clinical feature	Mild dehydration	Moderate dehydration (2 signs present)	Severe dehydration (≥2 signs present)
General appearance: Older children and adults	Thirsty, alert	Thirsty, alert	Generally conscious, anxious, cold extremities, clammy, cyanosis, wrinkled skin of fingers, muscle cramps, dizzy if standing
Pulse	Normal	Rapid	Rapid, thready, sometimes absent
Respiration	Normal	Deep, sometimes rapid	Deep and rapid
Systolic BP	Normal	Normal	Low, sometimes unmeasurable
Skin elasticity	Normal: fold of pinched skin disappears at once	Decreased	Fold disappears very slowly (>2 seconds)
Eyes	Normal	Sunken	Severely sunken
Tears	Present	Absent	Absent
Mucous membranes (test mouth with a clean finger)	Moist	Dry	Very dry
Urine output	Normal	Reduced, urine dark	Anuria, empty bladder
% of body weight loss	1–5%	6–9%	10% or plus
Estimated fluid deficit	10–50ml/kg	60–90ml/kg	100ml/kg

Table 6.2: Rehydration protocol

Degree of dehydration	Age	Type of liquid	Volume to give	Rate
Mild	All	ORS	50ml/kg	In 4 hours
Moderate	All	ORS	100ml/kg	In 4 hours
Severe	Older children and adults	Hartmann's solution, Ringer's lactate	110ml/kg	In 4 hours: at first as rapidly as possible until a radial pulse is palpable

NOTES: (a) Initially, adults can usually ingest up to 750ml of ORS/hour, and older children 300ml/hour. (b) If Ringer's lactate or Hartmann's solution are not available, use:

- Half-strength Darrow's solution
- Normal saline with sodium bicarbonate and potassium chloride added
- Normal saline diluted to half-strength with 5% glucose (dextrose)

☛ **None of these solutions is as effective as Ringer's lactate or Hartmann's solution.**

6.1.3 MAINTAINING NUTRITION

It has been shown that there is no physiological reason for discontinuing food during bouts of diarrhoea and that continued nutrition is beneficial. Continued feeding should be encouraged.

6.1.4 PHARMACOLOGICAL MANAGEMENT

Note that 50–60% of acute gastroenteritis is viral. Also note the following:

- Always treat the fever and consider other diseases associated with diarrhoea (e.g., malaria, otitis media, pneumonia).
- Antimicrobial drugs should be used only as follows:
  - Antibiotics only for dysentery and suspected cholera with severe dehydration.
  - Antiprotozoal drugs (e.g., metronidazole) for suspected amoebiasis only after antibiotic treatment of bloody diarrhoea has failed or faeces shows trophozoites of E. histolytica.
  - Antiparasite drugs for giardiasis when diarrhoea has lasted over 14 days and cysts or trophozoites of giardia are seen in faeces.
- Antibiotics for specific intestinal infections are listed in Table 6.3.

Table 6.3: Antibiotics used in the treatment of diarrhoea

Infection	Management
Cholera: Very profuse watery diarrhoea (rice-water stools), frequent vomiting	**Doxycycline:** 100mg BD x 7 days ***OR*** **Erythromycin:** 250mg QDS x 5 days
Shigella dysentery: Blood & mucus in stools, cramps, tenesmus, fever	**Cotrimoxazole:** 960mg BD x 5 days **Amoxicillin:** 500mg QDS x 5 days Tabs Ciprofloxacin 500mg OD x 5 days
Intestinal amoebiasis: Acute amoebic dysentery: As with shigella, but usually no fever (except amoebic liver abscess)	**Metronidazole:** 800mg TDS x 5–10 days ***OR*** Tinidazole 2g OD for 3 days
Acute giardiasis: Prolonged diarrhoea, often marked eructation (belching), flatulence	**Metronidazole:** 800mg TDS x 5–10 days ***OR*** Tinidazole 2g OD for 3 days

6.1.5 PREVENTION OF DIARRHOEAL DISEASES

- Proper sanitation: Provision of safe drinking water in sufficient quantities and disposal of faeces.
- Hygiene during food preparation: Remember the 4C's – Clean hands, Clean food, Clean utensils, Clean storage.
- Cholera vaccine.

6.2 Gastritis

This is an acute ulceration of the stomach, usually multiple lesions, non-recurrent and self-limiting.

Aetiology
Drugs (NSAIDs), alcohol, acute stress associated with massive burns, head injuries

Clinical Features
Epigastric pain with or without vomiting. May follow ingestion of drugs and herbal preparations. Heartburn may be a feature. Examination reveals tenderness in the epigastrium and the regions around it.

Investigations
Not always necessary if cause is obvious. Otherwise barium meal and endoscopy.

Management
- Treat the primary disease, e.g., head injury, renal failure.
- Avoid drugs known to cause ulceration.
- Magnesium trisilicate tabs 2–4 QDS or frequently ***OR*** mist antacids 30ml 1 hour and 3 hours after meals. Adjust dose according to pain.
- Role of triple therapy (see Section 6.4, below, on peptic ulcer disease).

6.3 Gastro-Oesophageal Reflux Disease (GORD)

Physiological process characterized by effortless movement of gastric contents from the stomach to the oesophagus. Symptoms and pathology occur when the oesophageal mucosa has excessive contact with gastric contents as a consequence of continual failure of anti-reflux mechanism.

Clinical Features
- Heartburn is the characteristic symptom of GORD, with or without regurgitation of gastric contents into the mouth.
- Pain on swallowing hot drinks or alcohol.
- Oesophagitis causes bleeding, which can be massive.
- Peptic stricture causes gradually progressive dysphagia.
- Aspiration of gastric contents resulting in aspiration pneumonia.
- Oesophageal ulcers cause same type of pain as gastric or duodenal ulcer.

Diagnosis
- Detailed history points to the diagnosis
- Barium swallow, will show oesophagitis, ulcers or stricture.
- Oesophagoscopy: With oesophageal washing or biopsy confirms diagnosis.

Management – Uncomplicated GORD
- Elevate head of bed 6 inches.
- Advise to avoid strong stimulants of acid production (e.g., coffee, alcohol, fatty foods, smoking).
- Take antacids 30ml 1 hour after meals and at bed time.
- Give H2 receptors antagonists and proton pump inhibitors (see peptic ulcer).

- Give cholinergic agonists (e.g., metoclopromide 10mg PO 30 minutes before meals and at bedtime).

6.4 Peptic Ulcer Disease

Ulceration of gastroduodenal mucosa that has tendency to be chronic and recurrent. Can be duodenal or gastric.

Clinical Features

- **Duodenal ulcer:**
  - Epigastric pain, typically at night and when hungry
  - May present for the first time with complications (see later in this section)
  - Wide individual variation in symptoms and food that give pain
  - 95% of duodenal ulcers are caused by Helicobacter pylori (H. pylori).

- **Gastric ulcer:**
  - Epigastric pain, worse with food
  - Other features as in duodenal ulcer above.

Investigations

- Stool for occult blood
- Barium meal.
- Upper GIT endoscopy, where available and biopsy of the gastric mucosa for H. pylori.

Management

- Avoid any foods that in the patient's experience give pain.
- Avoid obviously acidic foods, e.g., cola drinks.
- Limit alcohol intake and smoking.
- Advise bed rest in acute attacks.
- Avoid gastric irritating drugs (NSAIDs).
- Give magnesium based antacids or combined magnesium-aluminium compounds, liquid preferred. Maximum dose is 6 tablets a day. Adjust dose to limit pain. If no response; give cimetidine 800mg or ranitidine 300mg nocte for 4–6 weeks then 400mg or 150mg, respectively, as maintenance.
- Aim for H. pylori eradication by triple therapy:
  - Regime I:
    – Omeprazole 20mg BD 14 days
    – Clarithromycin 500mg BD 14 days
    – Amoxicillin 1g BD 14 days
  - Regime II:
    – Omeprazole 20mg BD 14 days
    – Amoxicillin 1g BD 14 days
    – Metronidazole 400mg TDS 14 days

Other PPI such as esomeprazole can be used instead of omeprazole.
- Admit for all the above management.
- Indications for surgery in peptic ulcer disease:
  - Intractable haemorrhage of more than 5 units of blood in 24 hours
  - Recurrent bleeding after non surgical management during same hospitalization
  - Perforation
  - Penetration to the pancreas
  - Intractable ulcer pain
  - Suspicion of malignancy, especially in gastric ulcers.
  - Gastric outlet obstruction.

Complications
Haematemesis, obstruction, perforation, penetration to the pancreas, malignancy.

6.5 Upper GIT Bleeding

Bleeding from the GIT above the ligament of Treitz.

Aetiology
- Oesophageal varices
- Gastritis and gastric ulcers
- Duodenal ulcers
- A-V malformation
- Malignancies – Stomach and oesophagus
- Mallory-Weiss syndrome
- Polyps

Clinical Features
Vomiting of fresh bright blood or coffee-ground vomitus (haematemesis). Forceful vomiting followed by haematemesis suggests gastroesophageal junction tear.

Excessive alcohol intake or ingestion of anti-inflammatory drugs may suggest erosive gastritis; previous epigastric pain suggests peptic ulcer. In massive haemorrhage, blood may appear per rectum.

Investigations
- Haemoglobin, platelet count
- Investigate as per cause, if obvious, e.g., liver function test in liver disease
- Barium swallow/meal after patient is stable
- Endoscopy if available.

Management
- Set up large IV line, start infusion of normal saline.
- Group and cross-match at least 3 units of blood.
- Perform nasogastric suction to assess blood loss.
- Infuse fluids to maintain normal pulse, blood pressure, and urine output and substitute with whole blood as soon as possible.

- Assess any further loss of blood as evidenced by: Persistent tachycardia, postural hypotension, continuing haematemesis.
- Admit all patients with haematemesis.

6.6 Lower GIT Bleeding

This may be frank bleeding (haematochezia) or occult bleeding, depending on the cause.

Common Causes
- Haemorrhoids
- Anal fistula and fissures
- Tumours:
  - Benign: Polyps, leiomyoma, fibromas
  - Malignant
- Infections
  - Bacterial: shigella, campylobacter, salmonella
  - Protozoa: amoebiasis
  - Parasite: schistosomiasis
- Trauma
- Angiodysplasia
- Inflammatory bowel disease (Crohn's disease and ulcerative colitis)
- Diverticular disease
- Bleeding disorders

Investigations
- Haemogram and ESR
- Stool for microscopy, C&S
- Double contrast barium enema
- Proctoscopy, sigmoidoscopy, colonoscopy, and biopsy
- Coagulation screen

Management
- Group and cross match if necessary.
- Treat the cause.
- Refer to the surgeons any suspicious rectal bleeding.

☛ **No physical examination is complete without a rectal examination.**

6.7 Viral Hepatitis

This is liver inflammation caused by viruses, including hepatitis A, B, C, D (delta), and E.
- Hepatitis A and D are transmitted through the fecal oral route; the rest are by blood and blood products. The hepatitis A virus causes an acute hepatitis, which is usually self-limiting, while the rest can go to the chronic stage.
- Chronic B and C infections can lead to cirrhosis and hepatocellular carcinoma.

Clinical Features
Symptoms and signs of acute hepatitis include yellowness of eyes, fever, nausea, anorexia, vomiting, right upper quadrant pain. Physical examination reveals upper abdominal tenderness.

Investigations
- For hepatitis A
  - 1g specific anti-HAV titres
- For hepatitis B
  - Hepatitis B surface antigen
  - 1g anti-hepatitis B core antigen
- For hepatitis C
  - Hepatitis C antigen
- Liver function tests

Management
- General: Supportive of liver function.
- Specific:
  - Hepatitis B and Hepatitis C immunoglobulins.
  - Interferon alpha 2b pegelated; interferon alpha 2a nucleoside
  - Tenofovir, lamivudine, entecavir, adefovir, telbivudine

NB: Use dual therapy for Hepatitis C.

Prevention
- Hygiene
- Safer sex practices
- Vaccination
- Precaution in handling biological fluids and laboratory equipment
- Vaccination against hepatitis A and B

6.8 GIT Parasitic Infestations

6.8.1 AMOEBIASIS
An infection usually of the colon caused by Entamoeba histolytica. Most cases can be prevented if at level 1 strict attention is paid to personal hygiene, availability of clean, uncontaminated water, environmental sanitation and waste disposal.

Clinical Features
Amoebic dysentery. Amoebic liver abscess. Amoebiasis and “vague” abdominal complaints. Asymptomatic cyst carrier.

Investigations
- Stool for microscopy – trophozoites with ingested RBCs and cysts of entamoeba histolytica in amoebic dysentery
- Chest x-ray
- Full haemogram
- Liver ultra-sound scan
- Needle aspiration for microscopy in amoebic liver abscess

Management

- Amoebic dysentery:
  - Correct dehydration
  - Give metronidazole 400mg TDS for 5 days
- Amoebic liver abscess
  - Give metronidazole 750g OD for 3–5 days
  - Refer pointing abscesses for surgical drainage
- Amoebiasis and "vague" abdominal complaints:
  - Where amoebiasis is common, there is a tendency to blame any abdominal complaints on amoeba. Usually these patients have cysts in stool but no evidence of invasive disease, e.g., ingested RBC in trophozoite. Exclude other causes of abdominal pain.
- Asymptomatic cyst carriers:
  - Treat cyst carrier only if patient is a food handler. Use diloxanide furoate 500mg twice daily for ten days, or a combination of diloxanide furoate with metronidazole (entamizole) 1 tab 3 times a day for 10 days.

Prevention

- Provision of safe drinking water and sanitary disposal of faeces are important preventive measures.
- Regular examination of food handlers and appropriate treatment when necessary.

6.8.2 INTESTINAL WORMS

These infections comprise a large group of parasitical cestodes, schistosomes, flukes, nematodes, and filarial worms. Only nematodes are dealt with in this section. They include hookworm disease, ascariasis, enterobiasis, trichuriasis, trichostrongyliasis, anisakiasis, capillariasis, and gnathostomiasis. Still, only the common ones are highlighted. Table 6.4 (overleaf) summarizes the most common worm infections with their clinical features and the method of detection.

Management

Management of the more common intestinal worms is summarized in Table 6.5.

Table 6.5: Treatment regimens for common intestinal worms

Worms	Adult treatment dosages
Ascaris lumbricoides (roundworms)	Albendazole 400mg STAT ***OR*** Levamisole 2.5mg/kg as a single dose
Hookworms	Albendazole 400mg STAT ***OR*** Levamisole 2.5mg/kg as a single dose
Trichuris trichiura (whipworms)	Albendazole 400mg STAT
Strongyloides stercoralis	Albendazole 400mg BD × 3 days
Enterobius vermicularis (pinworms)	Mebendazole 500mg STAT; Levamisole 2.5mg/kg as a single dose REPEAT AFTER 10 days
Taenia saginata (beef tapeworms)	Praziquatel 25mg/kg/dose TDS for 2 days; albendazole 400mg once daily for 3 days

Table 6.4: Common intestinal worms – Features and investigations

Worms	Clinical features	Investigations
Ascaris lumbricoides (roundworms): Large round, cream coloured worms that live in the small intestines	▫ Infection by swallowed embryonated eggs ▫ Loef?er's syndrome ▫ Mild bouts of recurrent colic ▫ The mother has seen the worm in stool or vomitus ▫ Complications such as obstruction, vomiting may occur	Stool for ova
Hookworms	▫ "Ground itch" ▫ Features of anaemia (iron deficiency)	Stool for ova Haemogram
Trichuris trichiura (whipworms)	▫ Diarrhoea with blood ▫ Rectal prolapse ▫ Anaemia ▫ Wasting	Stool for ova Worms may be seen adhering to rectal mucosa
Strongyloides stercoralis	Most infections are asymptomatic but the following may occur: ▫ Larva currens (buttocks) ▫ Soiling of innerwear with stool ▫ Hyperinfection syndrome ▫ Diarrhoea ▫ Gram-negative septicaemia ▫ Bacterial peritonitis ▫ Encephalitis	Direct stool microscopy (motile larvae, adult worms
Enterobius vermicularis oxyuriasis (pin worm) Synonyms: Threadworm, pinworm, seatworm. The worm is 4mm long and is just visible to the human eye	Mode of spread *Auto-infection:* ▫ Direct anal to mouth transfer via the fingernails ▫ Retro- infection; eggs may hatch into larvae at the anal-rectal area. Then larvae move retrogradely to the caecum. *Cross infection:* ▫ Contamination of fingers by clothing, objects, toilet seats, etc. ▫ By inhaling and swallowing eggs in the dust ▫ Main presentation: perianal and perineal itching. Migrating larvae may cause: ▫ Vaginitis, vulvitis, salpingitis, and peritonitis ▫ Irritation, insomnia may occur	Stool for ova Ova can be obtained from the perianal region by use of adhesive tape
Taenia saginata (beef tapeworm)	▫ Non-specific symptoms, irritability ▫ Segment may be passed with stools ▫ Egg in stools	Stool for ova (motile proglottides)

7. Selected Infections and Related Conditions

7.1 Parasitic Infections

Parasitic, bacterial, fungal and viral infections are leading causes of morbidity and mortality. Accurate diagnosis and appropriate, cost-effective treatment are essential. individual infections are discussed depending on their clinical importance.

7.1.1 MALARIA

Malaria parasites are usually transmitted by the bite of an infected female anopheles mosquito. Plasmodium falciparum is the commonest in Kenya and is associated with significant morbidity and mortality. The other species are: P. malariae, P. vivax, P. ovale.

CLINICAL FEATURES

Uncomplicated Malaria

- Classically, malaria presents with paroxysms of fever, chills, rigors, and sweating.
- Other features include malaise, headache, myalgia, joint pains, refusal to feed, nausea, vomiting, abdominal discomfort, and diarrhoea.

Severe Malaria

Severe malaria presents with a combination of most of the above plus either one or more of the following:

- Parasitaemia >5% or >200,000 parasites per µl of blood in high transmission area or >100,000 parasites per µl of blood in low transmission area
- Anaemia Hb <5gm%
- Cerebral malaria manifesting as confusion, stupor, convulsions or coma
- Jaundice
- Hyperpyrexia, temperature >39^{o}C
- Hypoglycaemia (blood sugar <2.2mmol/L)
- Pulmonary oedema
- Disseminated intravascular coagulopathy (DIC – spontaneous bleeding)
- Malaria haemoglobinuria (Coca-cola coloured urine)
- Oliguria
- Hypovolaemic shock
- Fluid electrolyte imbalance

INVESTIGATIONS

- OPD cases:
  - Thick blood smear for malaria parasites (several slides may need to be done)
- Inpatient cases:

- Thin blood smear for parasite count, species identification, and RBC morphology:
  - Haemoglobin
  - Blood sugar
  - Urinalysis

☛ A negative slide does not necessarily rule out malaria. Where cerebral malaria is suspected, begin appropriate therapy promptly.

☛ Exclude other diseases, e.g., meningitis, which may present with similar features. ***Do not assume a positive slide explains the cause of a febrile illness*:** 20–30% of the normal population in endemic parts of Kenya will have positive slide for malaria parasites without symptoms and signs of malaria.

MANAGEMENT

Uncomplicated Malaria

These cases are treated as outpatients:

- The current recommended treatment of patients with uncomplicated malaria is a combination of artemether-lumefantrine. This is available as a fixed-dose combination with a tablet containing 20mg of artemether and 120mg of lumefantrine. Treat adults with a 6-dose regimen of 4 tablets STAT, then 4 on hours 8, 24, 36, 48, and 60.
- Should the patient deteriorate clinically at any time or symptoms persist 3–14 days after initiation of treatment, this should be considered as treatment failure. Treat such patients with quinine. Tablets come in 200mg or 300mg preparations. The dose is approximately 10mg/kg of body weight 8 hourly for 7 days.

Recommended second line drugs are dihydroartemisinin plus piperaquine.

Severe Malaria

Prompt diagnosis and management of the specific complication is vital. Quinine is the recommended treatment for severe malaria.

- Give quinine injection as a loading dose of 20mg/kg IM then refer. Where referral is not possible, continue with a maintenance dose of 10mg/kg 8 hourly.

OR

- Give artemether as loading dose 3.2mg/kg IM injection, then 1.6mg/kg maintenance dose until the patient can take oral therapy, then put on a full course of AL.

Management – General

- Reduce temperature if hyperpyrexia if present.
- Maintain fluid and electrolyte balance especially if there has been significant fluid loss.
- Monitor output. Output should be at least 30ml per hour. if hydration is inadequate and oliguria persists give frusemide 40–80mg IV STAT.
- Convulsions: Use diazepam 0.3mg/kg IV/IM ***OR*** Rectal 0.5mg/kg OR Paraldehyde 0.2ml/kg IM.

- Hypoglycaemia: Monitor blood glucose regularly. Large doses of dextrose may be required 25% 2ml/kg or 50% 1ml/kg.
- Anaemia: Monitor Hb regularly. Transfuse if Hb is less than 5g% AND patient develops cardiorespiratory distress (grunting, nasal flaring, chest indrawing, heart failure).
- Check blood slide for malaria parasites daily to confirm if parasitaemia is falling.

Management – Specific

The management of adults with severe malaria must be appropriate to each complication that develops. Quinine is not contraindicated in pregnancy. Fluid and antimalaria drugs are given as for children. IV quinine should be given as follows:

- First dose 20mg/kg in ½ litre of fluid in 5% dextrose given over 4 hours (max 1,200mg).
- Then give 10mg/kg in ½ litre of fluid over 4 hours (max 600mg) 8 hours after commencing the initial dose
- Repeat 10mg/kg 8 hourly until the patient can take orally.
- Change to oral AL full dose or oral quinine to complete 7 days therapy. Assess fluid regularly, including urine output.

Monitoring response:

It is similar to that for children, with special attention to the complications.

- If patient cannot be weighed, loading dose should be 900mg, followed by 600mg 8 hourly.
- Monitor for and correct hypoglycaemia with 50% dextrose (1ml/kg). NB: Each infusion of quinine should be given over 4 hours.
- Use quinine IM if IV drip cannot be monitored or fail to get IV access.

☛ Quinine hydrochloride may be given IM in emergencies as shown in Table 7.1.

Table 7.1: Dosage of intra-muscular injection of quinine dyhrochloride

Weight range (kg)	Volume of quinine injection (ml)	No. of injection sites
31 – < 36	3.2	2
36 – < 41	4.0	2
41 – <46	4.5	2
46 – < 51	5.0	2
51 –< 56	5.5	2
56 – < 60	6.0	2
60 +	6.0	2

Use 10ml sterile syringe. Draw up 4ml of sterile water for injection. Then into the syringe, draw up 600mg (2ml) from an ampoule of quinine and shake. The syringe now contains 100mg quinine per ml.

NOTE: Each injection should not be more than 3ml per injection site.

The dose for adults above 60kg should not exceed 600mg.
- Quinine hydrochloride may be given IM in emergencies.
- Oral quinine may be introduced intragastrically by NG tube in situations when parenteral quinine is not available.
- Look out for renal failure.

Chemoprophylaxis
- Anti-malaria prophylaxis should be given to the following groups when going to malaria prone areas:
  - All non-immune visitors to malarious areas:
    – Long-term residence >4 weeks
    – Short-term residence <4 weeks
  - Patient with sickle cell disease and thalassaemia
  - Children with impaired immunity (e.g., HIV, leukaemia)
  - Patients with hyperimmune malaria syndrome, leukaemia or splenectomy
  - Pregnant women (minimum of 2 IPT doses a month apart)
- Chemoprophylaxis regimen:
  - Current recommended antimalaria prophylaxis for those at risk is mefloquine 250mg given weekly starting 2 weeks before travel to a malaria endemic area and continued for up to 4 weeks after return to a non malarious area.

Patient Education
- Seek early treatment for fever.
- Cover exposed skin in the evenings.
- use long lasting insecticide treated nets (LLINs).
- As a community, participate in indoor residual spraying (IRS) in epidemic prone areas.

7.1.2 TRYPANOSOMIASIS (SLEEPING SICKNESS)

A zoonotic disease caused by Trypanosoma brucei, trypanosomiasis is transmitted by bites of the tsetse fly (glossina spp.). There are 2 types in Africa, T. brucei rhodesiense (East Africa) and T. brucei gambiense (West Africa) .

Clinical Features

Disease caused by T. brucei rhodesiense is an acute febrile illness complicated by myocarditis and meningoencephalitis that is rapidly fatal if not treated, while that caused by T. brucei gambiense is a chronic debilitating illness with mental deterioration and physical wasting. History of travel to an endemic area helps in the diagnosis.

Investigations

Laboratory demonstration of trypanosomes in blood, bone marrow, CSF, and scraping from chancre.

Management

- Suramin for early cases 20mg/kg body weight, maximum single dose of 1g. Test dose of 200mg required initially. Treatment given on days 1, 3, 7, 8, 14, and 21. The total single course is 5g and should not exceed 7g.
- Pentamidine isethionate (lomidine) 4mg/kg IM on alternate days for a total of 10 injections.
- Melsoprol (Mel B) for CNS disease 2–3.6mg/kg per day IM in 3 divided doses in day 1, 2, and 3, then repeat on day 10, 11, and 12 and again on day 21, 22, and 23.

7.1.3 LEISHMANIASIS

Disease caused by Leishmania species.

VISCERAL LEISHMANIASIS

Visceral leishmaniasis (kalaazar) is caused by Leishmania donovani. It is transmitted by a sandfly, which has an animal reservoir in domestic dogs and other canines.

Clinical Features

Presents with a massive enlargement of spleen and liver, as well as wasting despite a good appetite. It occurs as an opportunistic infection in the immunocompromised.

Management

- Sodium stibogluconate(pentostam) 20mg/kg/day for 28 days ***OR***
- Liposamal amphotericin B 3mg/kg daily on days 1–5, 14–18, and 21–25; aminosidine IM OD for 3 to 4 weeks

CUTANEOUS LEISHMANIASIS

Not common in Kenya. This disease is caused by Leishmania tropica.

Clinical Features

Presents as ulcers or skin lesions that may be confused with fungal disease or even neoplasm.

Management

- Sodium stibogluconate (Pentostam)

7.1.4 TOXOPLASMOSIS

Caused by T. gondii. Common in immunocompromised persons. Transmitted by blood products, ingestion of contaminated foods, tissue and organ transplantation, and laboratory accidents.

Clinical Features

Presents with lymphadenopathy, CNS, and ocular manifestations

Investigations
- Isolation of organisms from body fluids and tissues
- PCR of tissue/body fluids
- Detection of 1gG and 1gM antitoxoplasmosis antibodies

Management
- Pyrimethamine and sulphadiazine combination pyrimethamine 200mg in 2 divided doses on day 1, then 25–l00mg daily for 6–8 weeks and sulphadiazine 75mg/kg day 1 (4g maximum), then l00mg/kg per day (up to 6g) in 2 divided doses per day for 6–8 weeks.
- Folinic acid supplementation to be given with pyrimethamine.
- Clindamycin 600–1,200mg 8 hourly can be given, in combination with pyrimethamine orsulphadiazine for 6–8 weeks then maintenance till CD is above 200.

7.1.5 SCHISTOSOMIASIS

Infection with blood flukes of the genus Schistosoma, which may cause chronic disease of intestines, liver, or genito-urinary tract. Adult flukes are white worm-like creatures that inhabit parts of the human venous system. All need a molluscan intermediate host. Important species of schistosomiasis in Kenya are: S. haematobium and S. mansoni. Adult worms live and copulate within the veins of the mesentery. The sexually mature ones are found in the intestinal veins for S. mansoni mainly, while those of S. haematobium are mainly located in the venous plexus of the genitourinary tract.

Some eggs penetrate the intestinal or bladder mucosa and are passed in faeces or urine. Eggs hatch in fresh water, liberating cercariae that multiply in snails (intermediate host) and produce thousands of cercariae. These penetrate human skin within a few minutes after exposure and transform themselves into schistosomes, which develop into sexually active adult worms in the intestinal veins or venous plexus of the genitourinary tract depending on the species. The lifespan of adult worms ranges from 3 to 37 years. S. haematobium is common along the coastline, Tana river, Kwale, and Lamu. S. mansoni is widespread, particularly in Machakos, rice schemes, parts of Nyanza, and even Nairobi.

Clinical Features
Acute dermatitis and fever after exposure is a rare presentation. Occasionally transverse myelitis and convulsions may occur. Chronic schistosomiasis with S. mansoni may result in portal hypertension, splenomegaly, anaemia, and oesophageal varices, while terminal haematuria, dysuria, progression to obstructive uropathy, and bladder cancer may occur in the case of S. haematobium

Metastatic eggs can be found in other organs such as the spinal cord and brain. Salmonella infection in patients with schistosomiasis is difficult to eradicate until the schistosomiasis has been treated. Salmonella infection may present as recurrent pyrexia. Treatment consists of the following:
- Pyrimethamine and sulphadiazine combination pyrimethamine 200mg in 2 divided doses on day 1, then 25–100mg daily for 1–2 weeks and

sulphadiazine 75mg/kg on day 1 (4g maximum) , then 100mg/kg per day (up to 6g) in 2 divided doses per day for 1–2 weeks.
- Folic acid supplementation to be given with pyrimethamine.
- Clindamycin alone can be given, or combined with pyrimethamine or sulphadiazine.

Investigations
- For S. mansoni:
  - Stool for ova, use concentration or Kato technique
  - Rectal snip for histological examination
  - Barium swallow and endoscopy to demonstrate oesephageal varices
  - Abdominal ultrasound
- For S. haematobium:
  - Urine for RBC and for ova of S. haematobium
  - Hatching test
  - X-ray lower abdomen – May show calcified bladder (sandy patches)
  - Intravenous urogram when obstructive uropathy is suspected

Management
Praziquantel 40mg/kg BD for a day is effective against all types of shistosomiasis.

NB: Patients should be examined for living eggs; if positive, re-treat.

Prevention
- Pyrimethamine and sulphadiazine combination pyrimethamine 200mg in 2 divided doses on day 1, then 25–100mg daily for 1–2 weeks daily and sulphadiazine 75mg/kg on day 1 (4g maximum), then 100mg/kg per day (up to 6g) in 2 divided doses per day for 1–2 weeks.
- Folic acid supplementation to be given with pyrimethamine.
- Clindamycin alone can be given, in combination with pyrimethamine or sulphadiazine.

7.1.6 FILARIASIS
Arthropod-borne diseases caused by thread like nematodes that in their mature adult stage reside in lymphatic or connective tissue (refer to Table 7.2).

Investigations
Demonstration of microfilariae in blood or tissues.

Management
- Lymphatic types: Ivermectin 150–200µg/kg in a single dose repeated at 6 and 12 months.
- Onchocerca volvulus: Ivermectin 150µg/kg in a single dose repeated at 6 and 12 months.

Prevention
Vector control: avoid bites of mosquitoes and other vectors by wearing clothing that covers the limbs, applying repellent creams, and using insecticide treated nets.

Table 7.2: Summary of species, vectors, and pathologies for filariasis disease

Species	Vector	Pathology
Wuchereria bancrofti	Mosquitoes	Lymphatic (elephantiasis) and pulmonary
Brugia malayi	Mosquitoes	Lymphatic (elephantiasis) and pulmonary
Brugia rimori	Mosquitoes	Lymphatic (elephantiasis)
Onchocerca volvulus	Black fly	Skin, eye, and lymphatics
Loa loa	Deer fly	Allergy
Mansonella perstans	Midges	Allergy
Mansonella streptocerca	Midges	Skin
Mansonella ozzardi	Midges	Vague

7.2 Viral Diseases

7.2.1 MEASLES

Measles occurs mainly in children; although rare in adults, in this case it carries much higher mortality rates. For a full description see Part II, Section 21.

7.2.2 VIRAL HAEMORRHAGIC FEVERS

Viral infections characterized by fever and haemorrhage. Refer to Table 7.3 for a summary of clinical signs and management.

Table 7.3: Summary of viral haemorrhagic fevers

Condition	Vector	Clinical manifestations and diagnosis	Management
Yellow fever	Aedes mosquitoes	Severe fever Jaundice Vascular permeability, shock, and DIC Diagnosis:Blood and liver examination for viruses	Treatment is supportive
Dengue fever	Aedes mosquitoes	Severe fever Vascular permeability, shock, and DIC Diagnosis: RT-PCR for virus	Treatment is supportive
Tick bornediseases	Ticks	Severe fever Vascular permeability, shock, and DIC Diagnosis: Blood and tissue examination	Treatment is supportive
Congo Crimean fever	Contaminated materials	Severe fever Vascular permeability, shock, and DIC	Treatment is supportive
African haemorrhagic fevers: Marbug and Ebola viruses		Fatal haemorrhage, fever, rash, hepatic and pancreatic inflammation. Diagnosis: ELISA	Treatment is supportive

7.3 Bacterial Infections

7.3.1 MENINGITIS

An acute inflammation of the pia and arachnoid coverings of the brain with spread into the cerebro-spinal fluid (CSF). Most commonly due to invasion by bacteria (Pyogenic meningitis), and less so by viruses (Aseptic meningitis), tubercle bacilli (Tuberculous meningitis), or fungi (Fungal meningitis). The commonest bacterial organisms are Streptococcus pneumoniae (Pneumococcus), Haemophilus influenzae, and Neisseria meningitidis (Meningococcus), but almost any other bacteria may be involved depending on circumstances of the invasion and the age of the person.

Predisposing factors are low immunity, prematurity and septicaemia; infections in the nose, sinuses, ears, throat, and lungs; penetrating injuries of the skull and spinal column, and congenital malformations of the brain and spine. Meningococcal meningitis often occurs in epidemics.

Clinical Features

Neck stiffness, positive Kerning's sign, altered level of consciousness, headaches, fever, vomiting, convulsions, photophobia are common features.

Investigations

- Lumbar puncture – Mandatory
- Fundoscopy – Also mandatory
- Where possible a head CT scan where there is evidence of focal neurological deficit
- Haemogram and ESR
- CXR
- Others: Mantoux test, history of contact with TB

Table 7.4: CSF characteristics

Type	Colour	Protein	Sugar	Cells
Normal	Crystal clear	Below 0.4g/L	Above 2.5mmol/L	0–5(x10/L)
Pyogenic	Cloudy	High	Low or nil	Hundreds to thousands mainly polymorphs
Tuberculous	Clear OR opalescent	Moderately raised	Low	A few hundreds mainly lymphocytes
Viral	Clear OR opalescent	Moderately raised	Normal	A few hundreds mainly lymphocytes

☛ **Admit patient if meningitis is suspected. Initiate treatment immediately.**

Management – General

- When seizures occur:

  - Stop seizures by giving IV/IM diazepam 0.3mg/kg ***OR*** 0.5mg/kg STAT rectally. Repeat as necessary.
  - Prevent seizures by giving phenobarbitone 3–6mg/kg IM BD or TDS ***OR*** 3–6mg/kg/day orally.
- Treat coma as follows:
  - Keep airway clear and suck out secretions.
  - Nurse the patient on the side; turn every 2 hours.
  - Give oxygen, if necessary, 0.5–1L/min by intranasal catheter.
  - Give IV fluids if necessary.
  - Observe vital signs carefully every 2 hours until awake.
- Follow the patient's progress:
  - Take the temperature and pulse.
  - Assess neck stiffness/Kerning's sign.
  - Maintain fluid and electrolyte balance.
  - Ensure patient is passing urine well.
  - Ensure patient does not go into further seizures.
- Treat for malaria if in endemic area for malaria.
- Give dexamethasone 4mg IM/PO TDS for 72 hours in adults to reduce sequel of meningitis such as deafness. Carry out physiotherapy on the patient.

Management – Pharmacological

If CSF is normal, discontinue antimeningitis therapy and investigate and treat patient in line with other clinical and laboratory findings.

Antibiotics

- Streptococcus pneumoniae: Benzyl penicillin 4 mega units IV 6 hourly for 14–21 days ***OR*** chloramphenicol 1g IV 6 hourly for 14 days, ***OR*** ceftriaxone 24g/day IV 12 hourly for 14–21 days, Vancomycin 2g/day IV 8–12 hourly ***OR*** meropenem 2g/day IV 8 hourly may also be given.
- Neisseria meningitidis: Benzyl penicillin 4 mega units IV 6 hourly for 10 days ***OR*** chloramphenicol 1g IV 6 hourly for 10 days. Ceftriaxone may also be given as above. Dexamethasone 0.15mg/kg IM/PO 8 hourly for 4 days in adults to reduce sequel of meningitis such as deafness.

Prophylaxis

- To close contacts or household members for meningococcal meningitis:
  - Sulphadiazine 1g BD PO for 2 days (if the organism is susceptible) ***OR***
  - Rifampicin 600mg BD PO for 2 days, ***OR***
  - Minocycline 100mg BD PO for 2 days for adults only
- Purified capsulate polysaccharide vaccine is available to control outbreaks, but it must be administered within 3–7 days of case identification to prevent an epidemic. NB: The vaccine is not very useful for children <2 years.

Complications

- These include subdural effusion, hydrocephalus, blindness or deafness, secondary epileptic seizures, mental and physical retardation.

☛ ***Notify the medical officer of health if meningococcal meningitis is diagnosed***.

7.3.2 TETANUS

Neurological disorder characterized by muscle spasms due to endotoxin produced by Clostridia tetani. Tetanus occurs in several clinical forms, including generalized, neonatal, and localized disease.

Clinical Features

Trismus (lock jaw), opisthotonos (rigid arching of back muscles), dysphagia, laryngospasm. Diagnosis is mainly clinical.

Management

- Maintain adequate airway (intubation is necessary)
- Insert a nasogastric tube as early as possible for nutrition and drug administration
- Neutralize toxin: 1,000–3,000 IU of human tetanus immunoglobulin IM wound. Horse serum is an alternative.
- Eliminate toxin production:
  - Crystalline penicillin 1 mega unit IV QDS for 10 days (children 50,000 IU/kg/day; Neonates BD, older children QDS)
  - Metronidazole 2g/day for 7–10 days
  - Other agents that can be used include cephalosporins, imipenem, macrolides and tetracyclines.
  - Surgical toilet of the wound
- Control spasms – general
  - Diazepam is the drug of choice. Add phenobarbitone or chlorpromazine if additional sedation is required. All 3 drugs may be needed in severe cases. (Refer to Table 7.5 for a guide to the dosage of these drugs.)
  - Diazepam 10–60mg IV/rectally QDS
- Phenobarbitone 30–90mg IV/IM every 12 hourly chlorpromazine 100mg IM QDS alternating with diazepam. Maintain fluid balance.
- Monitor for and treat intercurrent infections.
- Nurse in a dark, quiet isolation.

Prevention

People with open wounds should be given 2 doses of tetanus toxoid at least 4 weeks apart. Only 1 dose if immunized during the last 3 years and adequate surgical toilet.

Table 7.5: Guideline for dosage administration for tetanus drugs

Drug being administered	Time in hours								
	0	3	6	9	12	15	18	21	24
Diazepam	+		+		+		+		+
Chiorpromazine		+		+		+		+	
Phenobarbitone	+								+

Note: Frequency of drug administration should be titrated against clinical condition. Optimum level of sedation is achieved when patient remains sleepy but can aroused.

7.3.3 TUBERCULOSIS

Tuberculosis is caused by Mycobacterium tuberculosis (M-TB). This is commonly M-TB hominis, but M-TB bovis also causes human infections Transmission is by droplet infection through coughing and sneezing. The bovine type is mainly contracted by drinking unpasteurized milk. The incidence of TB is on the increase because of its association with HIV/AIDS, poverty, malnutrition, and overcrowding.

Clinical Features

Most cases of tuberculosis in Kenya (80%) are pulmonary. Features of pulmonary tuberculosis are cough for 3 weeks or more, haemoptysis, chest pain, fever and night sweats, weight loss, and breathlessness.

Extrapulmonary tuberculosis symptoms depend on the organs affected. TB adenitis manifests as lymphadenopathy, TB arthritis as painful swollen joints, TB meningitis as meningitis with features of meningitis, TB peritonitis as ascites and TB pleural as pleural effusion.

Investigations

- Sputum for AAFB (2 sputum spot and early morning).
- Mantoux test.
- Chest x-ray.
- Lymph node biopsy.
- Fine needle aspirate of lymph nodes.
- Body fluids for biochemistry and microsccopy (CSF, pleural, pericardial, and peritoneal fluids)
- PCR
- Sputum for AAFB culture and sensitivity (before the start of treatment in those on treatment and suspected drug resistant TB).

Management

The success of tuberculosis treatment depends on strict adherence to WHO's DOTS (directly observed treatment short-course) strategy.

General Management

- Follow national treatment guidelines.
- Ensure adequate supply of drugs.
- Use correct regimens and dosages.
- Ensure regular patient attendance.
- Always supervise initial phase of treatment.
- Trace defaulters promptly.
- Maintain accurate patient information and clinic attendance records.

Pharmacological Management

Pharmacologic management depends on the classification of the patient and the presence of other conditions, such as HIV.

Classification of TB Patients. Patients are classified into the following groups for epidemiological and treatment reasons depending on the site, microbiology, severity of disease, and history of previous treatment. These same categories are used in the TB register for reporting:

- New (N): Patient who has never been treated for TB before.
- Relapse (R): Patient who has received treatment and was declared cured, but now has TB again.
- Transferred in (TI): Patient who was registered in another district initially and has now reported to continue treatment.
- Treatment resumed (TR): Patient who interrupted treatment, and was declared "out of control", but is now resuming treatment.
- Other (O): Other types of patients, e.g., failure cases put on retreatment.

Short Course Chemotherapy (SCC). SCC is given to all TB patients registered by the National Leprosy and Tuberculous Programme (NLTP). Different SCC regimens are used for the different categories of tuberculosis. The following apply:

- In the first 2 months (initial phase of treatment) the drugs should be administered under the direct observation of either a health care provider in a health facility or another reliable member of the household or community.
- Drugs and tools for registration and reporting should be available before treatment is started. Patient should be admitted if is too ill or DOTS cannot be ensured.
- During the continuation phase the patient should collect a supply of drugs 2 weekly for daily self-administration at home.

Treatment Regimens and Drug Dosages. The treatment regimen for new adult smear-positive patients and other seriously ill cases of TB, e.g., TB meningitis, miliary TB, and TB of vital organs is summarized as: 2RHZE/4RH (see Table 7.6).

Table 7.6: 2RHZE/4RH regimen for new/seriously ill TB patients

Schedule/Drugs	Intensive phase	Continuation phase
Schedule of treatment	Daily treatment with appropriate patient support, including DOTS, for 2 months	Daily treatment with appropriate treatment support, including DOTS, for 6 months
Drugs used	Ethambutol (E)+ Rifampicin (R)+ Isoniazid (H)+ Pyrazinamide (Z) +	Ethambutol (E) and Isoniazid (H), 6 months. *OR* Rifampicin (R) and isoniazid (H), 4 months

Re-treatment regimens for relapse (R), treatment failure (F), or treatment resumed. (TR) patients with active TB disease and who have a positive sputum smear or culture result are summarized as 2SRHZE/1RHZE/5RHE. Refer to Table 7.7.

The dosages, according to body weight, of the different anti-tuberculosis drugs used are shown in Table 7.8.

Table 7.7: 2SRHZE/1RHZE/5RHE regimen for relapsed, failed, and resumed TB patients

Schedule/drugs	Intensive phase		Continuation phase
Schedule oftreatment	Daily treatment with appropriate patient support for 2 months	Daily treatment with appropriate patient support for 1 month	Daily treatment with appropriate patient support for 5 months
Drugs used	Streptomycin (S) + Ethambutol (E) + Rifampicin (R) + Isoniazid (H) + Pyrazinamide (Z)	Ethambutol (E) + Rifampicin (R) + Isoniazid (H) + Pyrazinamide (Z)	Ethambutol (E) + Rifampicin (R) + Isoniazid (H)

Caution

- DO NOT give pregnant mothers or patients older than 40 years more than 0.75g of streptomycin per daily injection.
- Do not exceed 600mg of rifampicin per day.
- Take follow up sputum smears at 2, 5, 6 and 2, 5, 8, and 3, 5, 8 months for those of the 6-month, 8-month, and 9-month retreatment regimens, respectively. Manage patients who remain sputum smear positive after 5 months as treatment failures; put them on retreatment regimen 2SRHZE/ 1RHZE/5RHE, and submit sputum samples for culture and drug susceptibility testing.

Treatment of TB in HIV/AIDS Patients. HIV increases a person's susceptibility to infection with M. tuberculosis. In individuals infected with M. tuberculosis, HIV is a potent cause of progression of tuberculosis infection to disease. In HIV infected children, dissemination of TB is common. TB meningitis, miliary tuberculosis, and widespread tuberculous lymphadenopathy occur. Offer all TB patients HIV testing

Table 7.8: Drug dosages for varying pretreatment weights and drug formulations

Drug being administered	Formulation for the drug being administered	Pre-treatment weight		
		Over 55kg	40–54kg	30–39kg
Streptomycin	Intramuscular injection	1g	0.75g	0.50g
Rifampicin 150mg Isoniazid 75mg, Pyrazinamide 400mg, Ethambutol 275mg	4-FDC tablet RHZE	4	3	2
Rifampicin 150mg Isoniazid 75mg Pyrazinamide 400mg	3-FDC tablet RHZ	4	3	2
Rifampicin 150mg + Isoniazid 75mg	2-FDC tablet RH	4	3	2
Rifampicin 150mg+ isoniazid 75mg +	Tablet E	4	3	2
ethambutol 275mg (RHE)	Tablet EH	2	2	2

and counselling, and pit all HIV-positive patients on cotrimoxazole preventive therapy. For these patients, do a work up for ART and request them to bring their regular sexual partners for counselling and HIV testing.

Complications of TB
These include haemoptysis (coughing up blood), spontaneous pneumothorax, bronchiectasis, lung fibrosis and lung abscess.

Acquired Drug Resistant TB
Acquired drug resistance results from inappropriate use of one drug or poor adherence to treatment. This suppresses the growth of organisms susceptible to the drugs but encourages the multiplication of isolated strains with spontaneous drug resistance.

Multiple Drug Resistant TB (MDR-TB). This is resistance to at least both rifampicin and isoniazid as a consequence of poor adherence to recommended treatment regimens by clinicians and patients. This resistance is further associated with increasing poverty and the HIV/AIDS epidemic. MDR-TB is confirmed on culture and sensitivity.

Prevention of MDR-TB. Drug resistance can be prevented by:
- Strengthening TB programmes.
- Ensuring directly observed therapy whenever rifampicin is used.
- Using fixed dose combination tablets containing rifampicin.
- Referring all drug-resistant TB patients to higher level for appropriate management.

7.3.4 SALMONELLA INFECTIONS

Disease caused by the following salmonella: Salmonella typhi and Salmonella paratyphi A, B, and C commonly cause Enteric fever. Salmonella enteritis causes gastroenteritis.

TYPHOID FEVER

Systemic disease caused by S. typhi. Typhoid bacilli are shed in the faeces of a symptomatic carrier or in the stool or urine of those with active disease.

Transmission is via contaminated food or water by:
- Direct contamination by faeces or urine.
- Flies from faeces to food.
- Healthy carriers who are food handlers.
- Health personnel through inadequate hygiene when changing soiled linen.
- Healthy carriers, who can shed organisms for more than a year.

Clinical Features
These include high fever, headaches, anorexia, weight loss, diarrhoea, constipation, abdominal tenderness, changes in sensorium, splenomegaly, relative bradycardia, and Rose Spots (blanching lesions). A high index of suspicion for typhoid is required when investigating any patient with unexplained fever.

Investigations
- Full haemogram: Relative leukopaenia in relation to the fever
- Cultures: Positive in blood in first week; stool and urine cultures become positive in the third week
- Widal test: Fourfold rise in spared specimens acquired 2 weeks apart suggest S. typhi infection. Rising titres of O antigen are significant. NB: Only titres of O antibody of 1:160 or more are significant. The gold diagnostic standard should be isolation of bacilli in cultures.

Management
- Chloramphenicol: (2–4g in adults ***OR*** 50mg/kg body weight per day in children) for 2 weeks
- Cotrimoxazole 4 tabs BD for 2 weeks
- Amoxicillin 4–6g or 100mg/kg/day in 3 divided doses for 2 weeks
- Ciprofloxacin 500–750mg BD for 14 days ***OR***
- Ofloxacin 400mg BD for 14 days ***OR***
- Norfloxacin 400mg BD for 14 days ***OR***
- Ceftriaxone 1g OD IV for 7–14 days

Complications
- Intestinal haemorrhage.
- Chronic carrier state for Salmonella typhi.
- Intestinal perforation leading to peritonitis, sepsis, and septicaemia.
  - Clinical features: Abdominal pain and distension with rebound tenderness.
  - Investigations: Plain x-ray abdomen – erect and decubitus may show pneumoperitoneum or multiple fluid levels.
  - Management: Drugs as above and surgical laparatomy.

Prevention
- Drink wholesome drinking water (boil water for 10 minutes or use water that is chlorinated).
- Drink pasteurized milk or boiled milk.
- Prevent healthy carriers of Salmonella typhi from handling food.
- Treat healthy carriers.
- Ensure hygienic waste disposal.
- Vaccination:
  - Live attenuated oral vaccine 4 capsules given on alternate days. Avoid antibiotics for 1 week NB: contraindicated in immuno-suppression cases.
  - Typhim VI vaccine – Single dose 0.5ml IM (70% efficacy; booster dose needed every 2–3 years).

7.4 Other Selected Infections and Related Conditions

Some common conditions with their recommended first and second line antibiotic treatment are presented in Table 7.9.

Table 7.9: Selected infections with recommended antibiotic treatment

Infection or related condition	First line antibiotic treatment	Second line antibiotic treatment
Acute rheumatic fever	Benzathine penicillin	Erythromycin
Acute osteomyelitis	Clidamycin	Cloxacillin + chloramphenicol
	Cloxacillin + gentamicin	
Cellulitis	Cloxacillin	
Conjunctivitis (bacterial)	Tetracycline eye ointment	Chloramphenicol eye drops
Dysentery (shigella)	Ciprofloxacin	Ceftriaxone
Ludwig's angina	Benzyl penicillin	
Otitis media	Cotrimoxazole	Amoxicillin
Pneumonia (mild)	Cotrimoxazole	Amoxicillin
Pneumonia (severe)	Benzyl penicillin + gentamicin	Ceftriaxone
		Amoxicillin + clavulinate
Septic arthritis	Cloxacillin + gentamicin	Amoxicillin + gentamicin
Urinary tract Infections		
Lower	Cotrimoxazole	
Upper (outpatient)	Amoxicillin + clavulin	Cotrimoxazole
Upper (inpatient)	Gentamicin	Ciprofloxacin

8. Musculoskeletal Conditions

8.1 Arthralgia, Non-Specific

Joint pain without features of inflammation.

Clinical Features
General malaise and joint pains; joint mobility not affected, joint not red, not warm, not tender or only slightly tender. Usually it is a feature of another illness and careful systemic examination is warranted.

Investigations
None except for the illness of which arthralgia is a feature.

Management
Ibuprofen 400mg 8 hourly ***OR*** paracetamol 1g 8 hourly.

8.2 Gout

A metabolic disorder due to hyperuricaemia. Causes may be primary or secondary (e.g., myeloproliferative, lymphoproliferative disorders, haemolytic anaemia, polycythaemia; tumour lysis syndrome following cytotoxic therapy and thiazide diuretics).

8.2.1 ACUTE GOUT

Clinical Features

Excruciating joint pain, usually single joint commonly the big toe. Pain becomes more severe as attack progresses, but subsides spontaneously in about 4 days. Tophi are found primarily in the pinna, and overlying olecranon bursa. There is erythema and warmth over the affected joint.

Management

- If severe, Diclofenac 75mg IM STAT/PRN then 50mg PO 8 hourly ***OR*** Ibuprofen 400–800mg 8 hourly.
- Several other NSAIDs may be used as long as side effects, especially renal and gastrointestinal, are taken into consideration.
- Colchicine 0.5mg hourly till patient improves or GIT side effects appear, or maximum of 6mg has been taken.

8.2.2 INTERCRITICAL GOUT

This is defined as the period between attacks. Initially inter-critical periods are long, but later acute attacks occur more frequently. If arthritic attacks are frequent, renal damage is present, or serum uric acid levels are significantly elevated, then serum uric acid should be lowered.

- Colchicine at maintenance level should be started before manipulation of uric acid at 0.5–0.6mg given BD a few days prior to initiation of uric acid lowering drugs.
- Allopurinol 300mg OD is drug of choice for lowering uric acid levels. (Allopurinol should not be given when the patient is in pain.)

8.2.3 ASYMPTOMATIC HYPERURICAEMIA

This is the situation that arises when there is hyperuricaemia without any symptoms.

Management

- No drug treatment is needed.
- Advise patient to reduce weight.
- Avoid alcohol consumption.
- Avoid heavy consumption of foods containing high concentrations of purines, e.g., roasted meat.

8.2.4 TOPHACEOUS AND GOUTY ARTHRITIS

This describes the situation in which there is deposition of uric acid crystal in cartilage, tendons, and soft tissue. In 90% of cases there is renal involvement.

Management

- Treat with allopurinol 300mg per day or probenecid 250mg BD.
- Initiate colchicine prophylaxis before starting allopurinol.
- Watch out for:
  - Renal impairment.
  - Uric acid nephrolithiasis.
  - Failure to respond to the therapy.

8.3 Osteoarthritis

This is a degenerative joint disease characterized by cartilage degeneration and bone hypertrophy at the articular margins. It is chronic but does commonly present with acute-on-chronic flares.

Clinical Features
Pain, stiffness, immobility, and "cracking" of the joints. Pain worse towards end of day. Joint tenderness, bony swelling, loss of full range of movement, and crepitus on movement. Heberden's nodes. Joints commonly involved are cervical and lumbar spines, the knees and hips, as well as the hands and feet. It may also occur secondarily in response to severe or chronic joint injury (e.g., after fractures).

Investigations
- Haemogram, ESR
- X-ray, joints – Loss of joint space, osteophytes, marginal bone lipping, bone cysts
- Arthroscopy
- MRI scan

Management
- Resting of joints, including use of crutches; involve physiotherapist.
- Ibuprofen 400mg tabs 8 hourly until pain is relieved.
- Others are:
  - Non-selective NSAIDs combined with gastric mucosal protectant.
  - Pure analgesics such as tramadol.
  - Intra-articular glucocorticoids, e.g., methyl prednisolone acetate and betamethasone. Dipropionate/sodiumphosphate (2mg/5mg) depot preparation.

8.4 Rheumatoid Arthritis

Systemic disease of unknown aetiology. It is symmetrical, peripheral, polyarthritic, most commonly involving the small joints of hands, wrists, metatarsophalangeal joints, ankles, knees, and cervical spine.

Clinical Features
- Articular: Symmetrical peripheral polyarthritis mostly of small joints (warm, painful, stiff, swollen). Stiffness worse in the morning. Muscle wasting. Deformity, ulnar deviation, boutonniere deformity.
- Extra-articular: Fever, weight loss, lassitude, anaemia, subcutaneous nodules, splenomegaly, lyinphadenopathy, keratoconjuctivitis, pericarditis, pleuritis.

Investigations
- Haemogram – Moderate hypochromic, microcytic anaemia; or leucopaenia in Felty's syndrome
- ESR – Elevated

- X-ray, especially hands and any other involved joint
- Rheumatoid factor
- Antinuclear antibodies

Management
- Initiate physiotherapy.
- Initiate occupational therapy.
- Provide drug treatment as indicated:
  - Ibuprofen 400mg tabs 8 hourly until pain is relieved.
  - Other NSAIDs.
  - Glucocorticoids, especially prednisone at doses not exceeding 10mg/day.
  - Concomitantly with disease modifying antirheumatic drugs (DMARDs). These drugs should be started as soon as diagnosis is confirmed. These are methotrexate 7.5–15mg once weekly, ***OR*** sulfasalazine 500mg twice daily increased to 1g twice daily in 2 weeks up to a maximum of 3g, hydroxychloroquine 200–400mg once daily.
- Refer for orthopaedic review if:
  - Deformities are present (seek surgical opinion).
  - Disease not responding to non-steroidal anti-inflammatory drugs (NSAIDs).
  - There is systemic organ involvement.
- Admit for:
  - Management of acute exacerbation.
  - Bed rest (may need to splint the affected joint).
  - Intensive physiotherapy.
  - Systemic complications.

Complications
All the systems are involved in this disease. It needs specialist attention, as does the use of steroids or chloroquine. Refer patients.

8.4.1 JUVENILE RHEUMATOID ARTHRITIS (JRA)

Clinical Features
Arthritis beginning at or before the age of 16 years. Similar to adult rheumatoid arthritis (RhA). Tends to affect large and small joints and may interfere with growth and development. Refer to Table 8.1 for a summary of characteristics and the clinical classification.

Management
- Supportive treatment is as for adults.
- Drug treatment is similar to that in adult type, except that aspirin is used with caution because of concerns about Reyes syndrome. For dosage see under adult treatment or paediatric schedule.

Prognosis
- Overall prognosis is better than for adult rheumatoid arthritis.
- Complete remission occurs in 50–75% of patients.
- Those with polyarticular and RhF positive have a less favourable prognosis.

NB: For osteomyelitis and septic arthritis see Chapter 20 (orthopaedics).

Table 8.1: Summary of juvenile rheumatoid arthritis (JRA)

Characteristic noted or observed	The clinical classification of JRA observed		
	Systemic disease	**Pauciarticular**	**Polyarticular**
Percentage	20%	40%	40%
Rheumatoid factor	-ve	-ve	+/-+ve/-ve
Antinuclear factor	-ve	75%	
HLA B27		+/-+ve/-ve	-ve
Clinical presentation	High fever, rash, splenomegaly, generalized lymphadenopathy, serositis, striking leucocytosis, and thrombocytosis	Type I: mainly male Type II: mainly female	As for adult rheumatoid arthritis

9. Neoplasms

Neoplasms can be benign or malignant. Malignant neoplasms are also referred to as cancers. Neoplams most commonly present as swellings, and at times pain and malfunction of the affected organs or tissues. Patients with suspected malignancies should be urgently referred to appropriate consultants for diagnostic examinations and treatment. Neoplasms can occur in any age group. In general, most will require treatment in referral hospitals (level 6). Refer to Table 9.1 for site-specific investigations and management and to Table 9.2 for a summary of common malignancies.

Psychosocial support for the patient and caregivers is essential as these are chronic diseases with lots of psychological and social impact.

Table 9.1: Site-specific investigations and management of malignancies

Tumour site	Clinical features	Investigations	Management
Nose and paranasal sinuses	Nasal blockage, rhinorrhoea, epistaxis, nasal mass, facial swelling, paraesthesia, headaches, proptosis, and neck node(s)	CT scan EUA and biopsy Nasal endoscopy and biopsy	Surgery, radiotherapy, chemotherapy, targeted therapy (levels 5 and above)
Nasopharynx	Nasal obstruction, epistaxis	CT scan, EUA, and biopsy	Same
Oropharynx	Sore throat, mass, pain radiating to the ear, trismus, bleeding	CT scan, EUA, and biopsy	Same
Hypopharynx	Pain on swallowing radiating to the ear, increasing dysphagia, nodes, and hoarseness	Barium swallow, CT scan, endoscopy, and biopsy	Same
Larynx	Persistent hoarseness, stridor, cough, neck nodes appear late	Endoscopy, CT scan, and biopsy	Same

Table 9.2: Common malignancies, clinical manifestations, investigations, and management options

Tumour	Clinical features	Investigations	Management
Leukaemias occur in children and adults. Can be acute or chronic, lympho-blastic, lymphocytic or myelogenous	Anaemia Bone pains Haemorrhagic tendencies, epistaxis and gum bleeding Repeated infection, malaise	Haemogram Bone marrow Cytochemistry Flow cytometry	Refer to oncologist/ haematologist for specialized care (level 5 and above) for chemotherapy. For chronic leukaemias, drugs used depend on type and disease phase. For acute leukaemias, drugs used depend on type and treatment phase.
Burkitt's lymphoma (predominant in children, also seen in young adults, rarely in older adults, but more in those with AIDS)	Usually a jaw tumour May also present as an abdominal mass OR central nervous system tumour	Biopsy of the mass for histology, fine needle aspiration cytology, immunohistochemistry. Haemogram, bone marrow, x-ray, Ultrasound scan, CT scan, PET scan Lumbar puncture	Refer for specialized care (level 5 and above) Chemotherapeutic protocols commonly combine cyclopho-sphamide, doxorubicin, methotrexate, vincris-tine, and prednisone
Hodgkin's disease (seen in children and adults)	Lymph node enlargement, usually cervical Splenomegaly abdominal masses	Haemogram Chest x-ray Lymph node biopsy for histology and immunohistochemistry Bone marrow	Refer for specialized care (level 5 and above) for chemo-therapy with or without radiotherapy Chemotherapy commonly used combines doxorubicin, bleomycic, vinblastine, dacarbazine (ABVD)
Nephroblastoma (Wilms' tumour) A paediatric tumour	Average age 2 years: Embryonal tumour Early childhood Painless loin mass (abdominal mass) Fast growing	Full haemogram U/E in normal IVU (Intravenous urography) shows displaced calicyes FNAC shows malignant embryonal tumour cells CXR for metastasis	Refer to specialized care: Chemotherapy and surgery – nephrectomy with post surgical chemotherapy has good prognosis (level 5 and above) Drugs used include actinomycn D, doxorubicin, vincristine and cyclophosphomide
Neuroblastoma	Embryonal tumour Abdominal mass in loin region Markedly elevated blood pressure Fast growing often crossing midline Child is sick looking	Full haemogram IVU shows caudally displaced normal kidney FNAC – malignant embryonal cells Ultra sound shows supra renal tumour with normal kidney CXR – look for metastasis, 24-hour urine – VMA grossly elevated	Refer to specialist centre (level 5 and above) Treatment depends on stage and involves surgery, radiotherapy and chemotherapy. The chemotherapy pro-tocols commonly used combine vincristine, actinomycin D, doxoru-bicin, and ifosfamide. Carboplatin and etopo-side are also used.

Continued

Table 9.2, *continued*

Tumour	Clinical features	Investigations	Management
Dysgerminoma	Commonest mid-line tumour in neo-natal period Commonest in ovary, testis, thymus, sacrococcygeal (most dramatic – teratoma) Presents with pressure symp-toms; may ulcerate especially when malignant	Plain x-ray may show calcification U/S – defines extent/site of tumour Foetoprotein tumour marker	Good prognosis. Surgical excision Radiotherapy and chemotherapy are highly effective. Etoposide, bleomycin, and cisplatin combination commonly used.
Rhabdomyo-sarcoma	Tumour of muscle Juvenile and adult variants occur. Can occur anywhere; commonest in pel-vis; bladder, vagina may present with a fungating mass (sarcoma botryoid) May ulcerate and bleed	Good physical examination: Full haemogram U/S, CXR CT scan when available Biopsy FNAC	Juvenile type favourable prognosis, adult variant poor prognosis Surgery and chemotherapy used. Doxorubicin, ifosfamide or doxorubicin, cyclophosphamide, vincristine combinations used
Retinoblastoma	Age usually below 3 years Inherited through chro-mosome 13 May be unilateral or bilateral Yellowish whitish reflex	Skull x-ray Urine catecholamines Fundoscopy CT scan head	Refer to ophthal-mologist and oncologist for specialized treatment (level 5 and above) Surgery and chemo-therapy are offered. Combination of cyclophosphamide, doxorubicin, vincristine, or etoposide and carboplatin
CNS tumours	Headache, convul-sions, vomiting, papilloedema disturbance of gait & vision	X-ray skull CT scan MRI scan	Refer to neurosurgeon (level 5 and above) Surgery, radiotherapy, chemotherapy

10. Haematological Conditions

10.1 Anaemia

Patients with anaemia have a reduction in total red blood cell mass, decreased concentration of red blood cells (RBC) and haemoglobin (Hb) in the peripheral blood and a corresponding decrease in the oxygen carrying capacity of the blood. Normal Hb levels are:

- Males: 13.5–17.5g/dl
- Females: 12.0–16.0g/dl

Common causes of anaemia in Kenya are:
- Haemolysis due to infections especially malaria and haemoglobinopathies, especially sickle cell disease.
- Iron deficiency due to chronic blood loss, nutritional deficiency and intestinal parasites, e.g., hookworm.
- Bone marrow depression (aplastic anaemia).

Clinical Features
Meticulous history is essential, e.g., history of previous hospitalization for sickle cell, blood loss due to menorrhagia. Clinical features include irritability, listlessness, anorexia, easy fatigability, and pallor of the mucous membranes (conjunctivae, lips and tongue), nail beds, and palms. There may be splenomegaly and a short, soft, apical "haemic" systolic murmur. Severe cases may present in heart failure and shock.

Investigations
- Full haemogram/Hb estimation
- Thin blood film examination for cell morphology and blood parasites
- Stool for ova of helminthes, occult blood
- Urinalysis
- Bone marrow
- Sickling test/HB electrophoresis

Management
Identify the cause and treat:
- Malaria:
  - Give a full course of an appropriate antimalaria drug. Thereafter give antimalaria prophylaxis [see section on malaria] for 3 months. If the spleen is palpable, continue prophylaxis until it is not palpable.
- Iron:
  - Give iron orally if the anaemia is mild or moderate. Adults: ferrous sulphate 200mg 8 hourly with folate 5mg once daily, continue for a minimum of 3 months after normal HB levels are reached.
  - Give parenteral iron in patients who cannot receive transfusion, with chronic renal failure, or in inavailability of blood. For those who are unable to tolerate oral iron or if compliance is poor, consider iron sucrose or other similar. This also replenishes body stores of iron.
- Folic acid: Give to all patients who have malaria and anaemia. Dose is 5mg once daily.
- Hookworm treatment:
  - Give albendazole 400mg STAT for adults
- Sickle cell anaemia:
  - Folic acid, malaria prophylaxis (see Section 7.1.1, malaria)

Blood transfusion
- Use blood only when required to save life.
- Do not give blood transfusion routinely unless the haemoglobin level is < 6g/dl, or patient has early features of haemodynamic instability. The rate of loss of blood should guide the decision on blood transfusion.

- Transfuse any patient if the haemoglobin is less than 8g/dl and there is also:
- More than 20% blood loss (more than 1 litre in an adult).
- Active bleeding with shock, hypotension, cold extremities, slow capillary refill.

Admit patients with:
- Severe anaemia.
- Active and severe bleeding.
- Anaemia (any degree of severity) that is accompanied by pneumonia, heart failure, dizziness, confusion, oedema.

10.2 Sickle Cell Disease (Anaemia)

A chronic haemolytic anaemia found mainly in Nyanza, Western and Coast provinces, sickle cell anaemia is characterized by sickle-shaped RBCs as a result of homozygous inheritance of HBS. In HBS, amino-acid valine is substituted for glutamic acid in the position 6 of the b-chaun. This Hb polymerizes at sites of low partial pressures of oxygen (PO2) and the RBCs assume the "sickle shape". Such cells adhere to vascular endothelium and plug small capillaries and arterioles leading to occlusion and infarction. Because sickled RBCs are fragile and cannot withstand the trauma of circulation, haemolysis occurs in the small blood vessels. These abnormal RBCs are also destroyed within the spleen.

Clinical Features
- Impaired growth and development
- Susceptibility to infections (malaria, H. influenza, pneumococcal)
- Anaemia and mild jaundice
- Hepatosplenomegaly in young children
- Bone pain (especially long bones in children)
- Pain and swelling of the hands and feet (hand and foot syndrome)
- Arthralgia with fever may occur
- Avascular necrosis of the femoral head is common
- Severe abdominal pain with vomiting
- Occlusion of major intracranial vessels may lead to hemiplegia, cranial nerve palsies and other neurological deficits
- Acute chest syndromes (sudden onset of fever, chest pain, leukocytosis, and pulmonary infiltrates on x-ray) may be fatal.
- Tower shaped ("bossing") skull.

Investigations
- Full haemogram to include peripheral smear, Hb
- Sickling test
- Hb electrophoresis
- X-ray:
  - Long bones: Cortical thinning noted with irregular bone densities and new bone formation.
  - Skull bone: Widening of diploic space.

Management
Transfuse for very severe anaemia (aplastic crisis, infections)

Sickle Cell Crisis
There are 3 types of crisis: Thrombotic (vaso-occlusive, painful or infarctive), aplastic (sequestration), and haemolytic.

- Management of the crisis
  - Give IV or oral fluids until they produce dilute urine.
  - Give analgesics regularly. In the acute phase if pain is severe, give narcotic analgesics (e.g., morphine injection 10mg PRN)
- Treat infections vigorously and promptly if present by use of ceftriaxone 1g IV once daily for 7 days or coamoxiclav 1.2g 8 hourly for 7 days.
  - Treat malaria if present endemic areas.
  - Give supplementary folic acid but AVOID iron.
- Blood transfusion
  - Blood must be given immediately at the time that it is needed. Re-evaluate the patient immediately prior to transfusion to ensure that blood is still required to save life.
  - Use only blood that is free of HIV, has been properly grouped and cross matched, and is in the correct bag labelled for the patient.
  - Remove the bag of blood from the Blood Bank refrigerator just before transfusion.
  - Never transfuse blood that has been out of the refrigerator for more than one hour or out of the donor for more than 21 days.
  - Give frusemide (1mg/kg STAT) IV at the beginning of the transfusion (but only if the patient is NOT actively bleeding). If patient has heart failure, give frusemide immediately; do not wait until blood is available.
  - Give antimalaria drugs (full course) to all patients having blood transfusion only in malaria endemic areas.
  - Transfusion of adults requires a minimum of 2 units of blood. Transfusion of only 1 unit in an adult is probably not needed.
- Management of transfusion reactions:
  - If the patient develops fever, skin rash or becomes ill, then:
    - Stop blood transfusion immediately.
    - Give chlorpheniramine 5mg IV STAT ***OR*** 5mg IM STAT.
    - Return blood to the bank with a fresh sample of patient's blood.
    - Monitor urine output.
- Monitor cardiovascular and renal function
  - If hypotension develops start IV fluids.
- Hydroxyurea should be given to patients with more than 3 crises per year. This can be started at a dose of 10mg/kg orally and escalated by 5mg/kg to a maximum dose of 25mg/kg/day.

11. Conditions in Pregnancy

11.1 Anaemia in Pregnancy

This is a major obstetric problem in Kenya. In Kenya, anaemia is generally accepted as Hb <10gm%. Degrees of anaemia are categorized as “mild anaemia” at haemoglobin levels of Hb 8–10gm, “moderate anaemia” at Hb 6–7gm, “severe anaemia” at Hb 4–5gm, and “very severe anaemia” at below Hb 4gm.

In severe anaemia the pregnancy is in danger of abortion, premature labour, or IUFD, while in very severe anaemia the mother’s life is also in danger. Most cases are due to iron deficiency resulting from dietary deficiency, or blood loss from hookworm infestations, haemolysis due to malaria and sickle cell disease. Anaemia can also be due to folate deficiency resulting from inadequate intake. Iron deficiency and folic acid deficiency often occur together causing “Dimorphic Anaemia”.

Clinical Features
General weakness, dizziness, pallor, and oedema may occur, while haemolytic anaemia may be associated with jaundice and hepatosplenomegaly.

Investigations
- Full haemogram (Hb, PCV, PBF)
- Stool for hookworm ova and schistosomal ova, where applicable
- Urine urobilinogen and schistosomal ova, where applicable
- Blood slide for malaria parasites
- Sickling test

Management
- Raise Hb (oral or parenteral haematinics, transfusion).
- Eradicate cause – dietary deficiency, treat malaria, treat hookworms, give haematinics if dietary deficiency exists.
- Prevent recurrence.

Table 11.1: Management of anaemia in pregnancy

Severity of anaemia	Corresponding level of haemoglobin	Management options recommended
Mild	8–10	Treat cause.Oral haematinics, as for prophylaxis
Moderate	6–7	As above.Iron dextran (Imferon)
Severe	4–5	As above.Transfuse and iron depot.
Very Severe	Below 4	Resuscitation and treat as for severe anaeemia

Prevention
- Prophylaxis iron throughout pregnancy
- Antimalaria prophylaxis (see Section 11.5, Malaria in Pregnancy)
- Balanced diet
- Routine antenatal screening at first visit and visits near term

11.2 Cardiac Disease in Pregnancy

In Kenya, this is often of rheumatic heart disease origin, involving the valves.

Clinical Features
History of rheumatic fever in childhood, known rheumatic heart disease. Features of dyspnoea, palpitations, body oedema, cough, easy fatigability, evidence of heart enlargement, murmurs, thrills, left parasternal heave, raised jugular venous pressure, tachycardia. Hepatomegaly, ascites and basal crepitations may be present.

Investigations
- Routine antenatal profile (Hb, VDRL, blood group, urinalysis)
- Urine for microscopy and culture and sensitivity
- Shielded chest x-ray in early pregnancy
- ECG, echocardiogram

Approach to Management
This depends on the following functional classification devised by the New York Heart Association:
- Class I – Asymptomatic
- Class II – Symptomatic with heavy work
- Class III – Symptomatic with light work or exercise
- Class IV – Symptomatic at rest

Approach to management of cardiac disease in pregnancy according to classification:
- Class I and II are managed as outpatients until 34–36 weeks of gestation, when they are admitted for bed rest and observations in hospital.
- Class III and IV are admitted on first visit at any gestation for the entire duration of pregnancy.

Management – Supportive
- Order bed rest.
- Give haematinics supplementation.
- Treat intercurrent infections.
- Avoid undue physical and emotional stress.
- Do regular urine analysis and culture.
- Ensure dental hygiene.
- Carry out regular U/E estimations.

Management – Pharmacological
- Note that digitalization is indicated in imminent and overt cardiac failure, if not previously on digoxin. Rapid digitalization by mouth, 1–1.5mg in divided doses over 24 hours, less urgent digitalization 250–500μg daily (higher dose may be divided).
- Continue maintenance therapy with digoxin 250μg, frusemide 20mg as needed.
- Continue prophylactic benzathine penicillin 2.4 MU monthly.

11.3 Diabetes in Pregnancy

Diabetes mellitus is a metabolic disorder characterized by hyperglycaemia.

Clinical Features
- Overt diabetes: If not already diagnosed, the symptoms include polydipsia, polyuria, weight loss, blurred vision, lethargy. Glycosuria is common but not diagnostic.
- Gestational diabetes: This will occur in 1–5% of pregnancies. Historical risk factors include previous gestational diabetes, family history of diabetes, previous macrosomic infant, previous unexplained stillbirth, polyhydramnios, obesity, and advanced maternal age. Glycosuria may be present but is not diagnostic.
- Complications of diabetes include: Chronic hypertension and nephropathy, pregnancy-induced hypertension, foetal macrosomia, intrauterine growth retardation, polyhydramnios, foetal distress, and foetal hypoglycaemia.

Investigations
- Postprandial blood glucose level
- Glucose tolerance test (GTT) to confirm diabetes

Management
- Stabilize uncontrolled diabetes in pregnancy in hospital.
- Maintain regular daily physical activity to the extent possible.
- Ensure appropriate diet: 30–35 calories/kg/day, i.e., 1,800–2,400 calories per day, carbohydrate 200g/day and protein 90g/day.

Manage non-insulin requiring gestational diabetes by diet alone and monitor with serial blood sugar. If not controlled by diet, start the patient on insulin soluble under the supervision of the diabetic team during admission. Start with 10 units of soluble insulin TDS subcutaneous to maintain the sugar under 7–10mmol/L. Change the dosage as required. Once controlled, convert to insulin 70/30; give 2/3 of the daily dose of soluble in the morning and 1/3 in the evening.To prevent PET, start aspirin 60–75mg OD to start at 16th week and stop at 36th week to avoid excess bleeding.

Delivery
- Non-insulin requiring gestational diabetic should be delivered at term.
- Well controlled insulin-requiring diabetic should go to 38 weeks before delivery.
- Insulin dependent diabetic with hypertension, renal, retinal or cardiac disease, PET, intrauterine growth retardation must be delivered at 37th week. When in labour give 1/2 of the daily dose as souble insulin STAT subcutaneously and then put the other half of the daily dose as soluble insulin in an infusion of 1 litre 5% dextrose to be given given over 8 hours.
- Intrapartum blood glucose is monitored hourly and insulin doses adjusted accordingly in small doses (discontinue usual insulin regime) as soluble insulin subcutaneously to maintain the sugar at 7–10mmol/L.

Postpartum Care

- Insulin requirement usually reduces after delivery, so serial glucose monitoring should be done hourly for the first 4 hours and then monitor 2 hours after a meal. Give soluble insulin subcutaneously and this needs to be done while allowing adjustment of insulin dose to achieve stable control.

Patient Education

- Pre-pregnancy counselling: Achieve optimum glucose control before pregnancy to minimize foetal complications in diabetic pregnancy.
- Family planning: Advise on a small family.
- Recommended FP methods: These include VSC, barrier methods, norplant, IUD, and progesterone-only pill.

11.4 Drugs in Pregnancy

Drugs taken by the mother during pregnancy can be harmful to the developing foetus in a variety of ways. Drugs taken just before delivery can also affect the baby. Table 11.2 provides guidelines on drugs that are considered safe or relatively safe in pregnancy, drugs that should be used with caution and only when necessary, and drugs that are contraindicated

11.5 Malaria in Pregnancy

Falciparum malaria is particularly dangerous in pregnant women. The clinical features of malaria in pregnancy depend, to a large extent, on the immune status of the woman, which in turn is determined by her previous exposure to malaria. (Refer also to Section 7.1.1, on malaria.)

Clinical Features

- Non-immune (women from endemic area): These have a high risk of maternal perinatal mortality. Clinical features include acute febrile illness, severe haemolytic anaemia, hypoglycaemia, coma/convulsions, and pulmonary oedema. Abortion, intrauterine death, premature labour, and intrauterine growth retardation are other possible outcomes.
- Semi-immune (women from endemic area): These may be asymptomatic, despite placental infection. They may develop severe anaemia and deliver low birth weight babies. More common in primigravidae than multigravidae. One of the dangers of malaria in these settings is that it is not detected or suspected. Antimalarials should form part of the case management of all women with severe anaemia who are from endemic area irrespective of whether they have a fever or a positive blood slide (see Section 11.1, Anaemia in Pregnancy).

Investigations

- Hb, PCV
- Blood slide: peripheral blood film for identification of parasites. This may be negative in a woman from endemic areas, despite the presence of malaria parasites in the placenta.

Table 11.2: Guidelines for drug use in pregnancy

Types of medication	Degree of safety for use in pregnancy		
	Safe or relatively safe	**Some risk – Use with caution**	**Contraindicated in pregnancy**
Analgesics	Codeine, morphine, pacacetamol, pethidine	Indomethacin, salicylates	
Anti-convulsants	Ethosuximide, phenobarbitone, primidone	Clonazepam, phenytoin	
Anti-microbials	Ampicillin, amoxycillin, cephalosporins, clidamycin, dicloxacilin, erythromycin, gentamicin, isonizid, miconazole, oxacillin, penicillin	Chloramphenicol, metronidazole, nitrofuratoin, streptomycin, sulfonamides, trimethoprim, rifampicin, kanamycin	Tetracycline
Anticoagulants	Dipyridamole, heparin	Dicumarol, warfarin	
Antiemetics	Hydroxyzine, meclizine, prochlorperazine	Phenothiazines	
Antihypertensive	Hydralazine, methyldopa, propranolol	Diazoxide	Nitroprusside
Bronchodilators	Aminophylline, beclomethasone	Cromolyn sodium	
Cardiac drugs	Atropine, digoxin, lidocaine, procainamide, quinidine	Dispyramide, nifedipine	
Decongestants	Pseudoephedrine		
Diuretics	Frusemide, Hydrochlorothiazide		Acetazolamide
Gastrointestinal drugs	Antacids, cimetidine, ranitidine		
Hypoglycemics	Insulin		Chlorpropamide, tolbutamide
Sedative & psychiatrics	Barbiturates, flurazepam	Diazepam, chlordiazepoxide, haloperidol, lithium, phenothiazines, tricyclic antidepressants	
Thyroid preparations	L-thyroxine, propylthiouracil		Iodide
Vaccines	Polio, tetanus, rabies		Rubella, measles, smallpox
Other drugs	Ferrous sulphate, probenecid		Antineoplastic drugs, oestrogens, DES

Management – Supportive

- Check blood sugar regularly as hypoglycaemia is a common problem in women with severe disease.
- Correct dehydration.
- Evacuate if incomplete/inevitable abortion.
- Deliver if foetal death or established labour.

Management – Pharmacological

See Section 7.1.1, on malaria.

11.6 Puerperal Psychosis

The following aspects in the patient's history may help to identify high-risk patients and to facilitate early identification of patients with puerperal psychosis:
- Family history of major psychological illness of close relative, e.g., mother.
- Major emotional complications during and after a previous pregnancy.
- "Reaction" of current pregnancy.
- "Fear" of labour from a previous experience.
- Traumatic childhood.
- Deprivation of emotional support during adult life, e.g., single mother.
- Severe prolonged or multiple somatic symptoms with no apparent organic cause during current or previous pregnancy.
- Major sustained mood changes or repeated rapid mood swings or abnormal sleep patterns.
- Refer to Chapter 16, Mental Illness, for clinical features and management.

12. Lower Respiratory Tract Conditions

12.1 Pneumonia – Adults

This is consolidation of the lung parenchyma due to infection.

Clinical Features
Breathlessness, cough with or without sputum (which may be rust coloured), fever, pleuritic chest pain, bronchial breathing, reduced chest movements, reduced breath sounds, tachypnoea, crackles and percussion dullness. Features less pronounced in elderly patients.

Classification
- Primary: Occurring in a previously healthy person living in the community. This is usually lobar due to pneumococci. Usually a very short history.
- Secondary: Develops in association with prior respiratory disease, immunocompromised patients, debilitated patients, alcoholics, or post operative patients.

Investigations
- Haemogram - PBF, WBC
- Sputum microscopy
- Chest x-ray PA

Management – Community Acquired Pneumonia
Outpatients
- IM benzyl penicillin 2 MU STAT, then amoxicillin 500mg TDS for 7 days.
- If penicillin allergy is present: Erythromycin 500mg QDS for 7 days. Alternative antibiotics include cotrimoxazole.
- Analgesics: Paracetamol ***OR*** acetyl salicylic acid (aspirin).

Inpatient care

- Admit fo***r*** inpatient care in the presence of the following:
  - Cyanosis
  - Respiratory distress (RR >25 per minute)
  - Heart failure or pleural effusion
  - More than one lobe is involved.
  - Poor response as outpatient.
  - Patient is dehydrated.
  - Secondary pneumonia is suspected.
- After admission, give the following treatment:
  - IV/IM Crystalline penicillin 2 mega-units QDS till response, then discharge on amoxicillin 500mg TDS. If allergic, give erythromycin 500mg QDS or cotrimoxazole for 5 days.
  - If no response, consider investigation for TB.

Management – Secondary Pneumonia

- Admit patient.
- Treat with benzyl penicillin 2 mega units IM IV 6 hourly + gentamicin 240mg IM IV once a day 5 days ***OR*** IV ceftiaxone 2g every 24 hours ***OR*** erythromycin 500mg 6 hourly for 5 days
- In case of aspiration add metronidazole 500mg IV 8 hourly or use coamoxiclav 1.2g 8 hourly in place of benzyl penicillin.
- If staphylococcus is suspected add flucloxacillin 500mg IV 6 hourly.
- As a special precaution, consider pseudomonas and staphylococcus.

Prevention

Give Pneumovaccine to those who have sickle cell disease and with impaired spleen function.

12.2 Asthma (Adults)

A clinical syndrome characterized by increased responsiveness of the tracheobronchial tree to a variety of stimuli resulting in airway obstruction, which varies in severity either spontaneously or as a result of treatment.

Clinical Features

Patients present with breathlessness, wheezing and cough with tenacious sputum.

Examination shows:

- Mild attack: Wheezing, pulse less than 100/min, BP normal, RR less than 20/min.
- Moderate: Wheezing with cough, sweating, pulse 100–120, RR 20–30/min, and BP is normal.
- Severe: Cyanosis, pulse 120/min, RR 30/min, pulsus paradoxicus, respiratory distress in upright position, and may have a silent chest.
- Chronic: Mild attack (see above) all the time.
- Status asthmaticus: Moderate or severe attack not responding to conventional therapy or it persists for more than 12 hours.

Investigations
- Chest x-ray: PA, erect.
- Peak expiratory flow rate (PEFR)
- Forced expiratory volume in the first second (FEV1)
- Maximal mid-expiratory flow rate (MMEFR)
- PETR, FEV1, and MMEFR are all decreased in acute asthmatic attack.

Management

Mild asthma
- SC adrenaline 1:1000 0.5ml STAT, repeat after 20–30 minutes if there is no response (up to a total of 3 doses). If there is response, discharge on salbutamol 4mg TDS for 1 week ***OR*** theophylline 200–250mg BD or TDS. Inhaled medium acting B2 agonist such as albuterol, terbutaline, dibuterol, and metaproterenol.

Moderate asthma
- Adrenaline as above up to 3 doses or salbutamol and ipatropium bromide nebulization every 20 minutes till response or patient gets tremors. If no response, IV aminophylline 6mg/kg slowly over 15 minutes, and then 0.9/mg/kg/hour. If there is good response, discharge on salbutamol 4mg TDS for 1 week ***OR*** theophylline.
- If no response, treat as severe asthma. Oral and inhaled corticosteroid or antileukotriene, or inhaled theophylline. Inhaled B-agonist should be added to any of these as needed.

Severe asthma
- Give oxygen 3–5 L/min if cyanosed
- IV aminophylline 0.9mg/kg/hour in normal saline drip after a loading dose if not already given. IV hydrocortisone 200mg STAT or methylprednisolone 1g IV STAT or dexamethasone 2–4mg IV/IM STAT.
- Give oral prednisone 10–15mg TDS on admission, tail off in 7–10 days.
- Give inhaled corticosteroid. Or long acting inhaled B-agonist, or antileukotriene, or theophylline.
- Give amoxicillin or cotrimoxazole or tetracycline.

Chronic asthma
- Salbutamol 4mg TDS orally or salbutamol inhaler or steroid inhaler.
- If poor response, oral theophylline 100–200mg TDS.
- If response is still poor, refer to higher level.

Status asthmaticus
- Treat as severe.
- Consult appropriate physician as soon as possible.

12.3 Chronic Obstructive Pulmonary Disease

Clinical syndrome of chronic dyspnoea and cough with expiratory airway obstruction produced by either chronic bronchitis or emphysema or both.

Clinical Features

Chronic productive cough for many years with slowly progressive breathlessness that develops with reducing exercise tolerance. Tachypnea, purse-lip breathing, use of accessory muscles of respiration. Chest hyper-resonance, breath sound decreased, wheezes with or without rhonchi. Cyanosis may be present. Note absence of clubbing. In acute exacerbations, symptoms worsen and the sputum becomes yellow or may increase in quantity.

Investigations

- Chest x-ray: Note flattened diaphragm, diminished vascular markings with or without bullae. Look for pneumothorax.
- Haemogram: Especially polycythaemia, eosinophilia, neutrophilia (to suggest infection).

Management

In acute exacerbations:

- Bronchodilators: Salbutamol 4mg TDS or inhalation 2 puffs 6–8 hourly or theophylline 250mg BD or TDS
- Aminophylline 0.9mg/kg body weight/hour intravenous infusion
- Albuterol nebulizer 0.5–2mg 4 times daily
- Terbutaline nebulizer 0.1–0.2mg 4 times daily
- Ipraprotium bromide metered dose inhaler 0.5mg 4 times daily
- Prednisone tabs 30–60mg daily for 5–10 days on outpatient basis
- Chest physiotherapy
- Amoxicillin 250–500mg TDS or tetracycline for 5 days

Admit if:

- Cyanosis is present.
- Hypotension or respiratory failure is present.
- Chest x-ray shows features of pneumothorax, chest infection or bullous lesions.
- Corpulmonale is present.

Patient Education

- Advise to stop smoking and avoid dusty and smoky environments.
- Explain that relatives should seek medical help if hypersomnolence and/or agitation occurs.
- Provide psychosocial support for the patient and caregivers. This is essential as asthma is a chronic disease with a lot of psychological and social impact.

13. Mixed Selection of Common Conditions

13.1 Coma

Coma is a state in which the patient is unarousable and unresponsive to external stimulation. In profound coma, brain stem and myotatic reflexes may be absent. Coma noticed for the first time is always an emergency. It is only after the cause is known and its implications are understood that it may be treated otherwise.

Aetiology
Infections (malaria, meningitis, encephalitis), trauma, tumours, cerebro-vascular accidents, diseases (diabetes, epilepsy, liver failure), drugs (alcohol, methyl alcohol, barbiturates, morphine, heroin), chemicals, and poisons (see Section 1.5, on poisoning).

History
Detailed history from relative or observer to establish the cause if known or witnessed. The circumstances and temporal profile of the onset of symptoms of critical importance in ascertaining the cause of the coma. Documentation of use of drugs and pre-existing diseases is important.

Examination
- Secure a patent airway.
- Determine if cardiac output is adequate (BP, pulse rate).
- Evaluate and monitor according to Glasgow Coma Scale (see Section 49.3, on head injury).
- Monitor temperature, pulse, respiratory rate, and their pattern
- Consider leads to possible causes:
  - Hypothermia: Occurs in alcohol, barbiturate, and sedative poisoning, hypoglycaemia, and hypothyroidism.
  - Hypotension: Occurs in internal haemorrhage, myocardial infarction, septicaemia, alcohol or barbiturate poisoning.
  - Hyperventilation with a change in pulse rate may signify increased intracranial pressure.
  - Hypertension may signify hypertensive encephalopathy or a cerebrovascular accident.
  - Fever occurs in systemic infection with meningitis or encephalitis.
  - Neck stiffness could signify meningitis, subarachnoid haemorrhage, or cerebral malaria.
- Determine the muscle tone and deep tendon reflexes. Note any asymmetry.

Investigations
These vary according to findings but generally include:
- Blood slide for malaria parasites
- Blood sugar
- U&E
- Liver function tests
- Lumbar puncture (after fundoscopy)

- Skull x-ray (if there is evidence of trauma)
- CT scan, where available

Management to Be Initiated at Any Level where It Occurs
- Maintain adequate airway – nasal, oral or endotracheal intubation.
- Ensure adequate circulation – always fix a large IV canula immediately in anticipation of drug administration.
- Monitor vital signs.
- Turn patient 2 hourly to avoid pressure sores
- Condom catheters in males (uricondom)
- Urethral catheters in females. Change regularly and repeat urine and catheter tip cultures at least fortnightly.
- Prevent contractures by regular daily passive exercises (physiotherapy)

Management – Specific
- Identity and treat cause appropriately.
- Rapidly and assiduously correct hypertension, hypoxia, hypercapnia, hypoglycaemia, hypothermia .
- Give 50ml of 50% dextrose IV diluted in an equal volume of normal saline or 5% dextrose or water for injection if blood glucose is low (<3.5mmol/L).
- Begin therapy for meningitis immediately if suspected.
- Treat malaria if confirmed or suspected.
- Treat the underlying cause when identified.

13.2 Fever

An elevation of core body temperature above the normal circadian (daily) range. Normal body temperature in adults 18–40 years is 36.8°C ±0.4°C. Substances that cause fever are called pyrogens. Fever accompanies a wide variety of illnesses and need not always be treated on its own. In general, the cause should be ascertained before therapy as far as possible.

Management – General
Conditions that merit lowering the temperature on their own:
- Precipitation of heart failure
- Delirium/confusion,
- Convulsions,
- Coma,
- Malignant hyperpyrexia or
- Heat stroke, and
- When the patient is extremely uncomfortable.

Treat by:
- Immersing in cold water at 20–25°C or tepid sponging.
- Treating cause of the fever.
- Treating the fever with acetylsalicylic acid injection or tablets ***OR*** paracetamol tablets.

☛ ***Fever alone is not a reason to give antibiotic.***

13.2.1 FEVER OF UNKNOWN ORIGIN

This describes fever of more than 3 weeks duration, the cause of which is not apparent after at least 1 week of intensive investigations. Assessment should include observation of the fever pattern, detailed history and physical examination, laboratory tests, and non-invasive and invasive procedures. This definition excludes common short self-limiting infections and those that have been investigated and diagnosed within 3 weeks.

For common diseases to be considered it is worth noting that:

- Most cases of prolonged obscure fever are instances of well-known diseases presenting atypically.
- Actual pattern of graphic record, despite emphasis in traditional books, is so variable as not to be practically helpful.
- Aggressive diagnostic effort is justified as cure is possible in some cases.
- Infections (accounts for 50% being due to viral infection):
  - Tuberculosis: This is the commonest cause of pyrexia of unknown origin in Kenya. The lesions of miliary TB may not be visible easily on x-rays until disease is well advanced. Sites like kidneys and tubo-ovarian region raise diagnostic difficulties.
  - Specific bacterial infections without distinctive localizing signs. The commonest here are salmonellosis and brucellosis.
  - Deep seated bacterial abscesses, e.g., subphrenic or periphrenic abscess, purulent infections of large bowel or female pelvic organs. Reactivated old osteomyelitis should be considered as well.
  - Infective endocarditis especially due to atypical organisms, e.g., Q-fever, aspergillus.
- Viral infections:
  - Anicteric hepatitis virus infection
  - Slow-viruses: commonest is HIV.
  - Neoplasms (10–20% in children).
- Lymphomas: These are the commonest among the neoplastic causes of PUO. Diagnosis may be difficult if lesions are deep seated retroperitoneal nodes.
- Leukaemia: Contrary to common belief, it is extremely rare for leukaemia to present with fever only.
- Solid tumours: The commonest among solid tumours is hypernephroma with pancreatic carcinoma, and sarcomas coming next although presentation with fever alone is rare.
- Immunogenic diseases: These diseases may present with fever only for several months. The common ones are rheumatoid arthritis, systemic lupus erythematosus, polyarthritis nodosa, rheumatic fever, and cranial arteritisipolymyalgia in the old.
- Other causes:
  - Chronic granulomatous hepatitis – steroids would be useful.
  - Recurrent small pulmonary thromboembolism.
  - Drug fever.
  - Liver cirrhosis.
- Habitual hyperthermia: Usually young adult female with imperfect thermo-regulation.

- Cause may remain unknown in 10–20% of children.
- Temperature: Rarely exceeds 37.6°C. It is mentioned because no action need be taken.

Investigations
The routine investigations listed below should be done before a diagnosis of PUO is made:
- Blood count
- Blood C&S
- Urinalysis
- CXR
- Urea and electrolytes
- LFTS

Additional investigations that need to be done include the following:
- Repeated history taking and examination may detect:
  - New clinical features that give a clue.
  - Old clinical signs previously missed or overlooked.
- New tests:
  - Immunological: rheumatoid factor (Rh factor), antinuclear antibody (ANA), anti-streptolysin O titre (ASOT).
  - Most PUOs have abdominal involvement hence, do: barium studies of GIT; intravenous urography; scan liver, spleen, kidneys either computerized axial tomography or ultrasound.
  - Withhold drugs for a few days. Fever disappears in drug fevers.
- ECG may detect right heart strain in embolism
- Invasive procedures
- Liver biopsy
- Finally diagnostic laparotomy may be justified. NB: Very experienced surgeon required.

Refer to levels 5 and 6 if:
- Patient deteriorates rapidly.
- New tests described above are not available in your centre.
- Invasive procedure is required.

☛ **Prognosis: 10–20% causes remain unknown; 5–10% mortality rate.**

13.3 Hepatosplenomegaly

Enlargement of the liver to more than 3cm below the costal margin and the spleen to more than “just palpable”. The liver size should be described as centimetres below costal margin and below xiphisternum. Since splenomegaly is an extremely common sign and commonly related to malaria, probably splenomegaly smaller than grade 3 Hacket will not cause major concern.

Causes of Hepatosplenomegaly
Condition responsible: Hepatomegaly splenomegaly
Infections: Malaria , kalaazar, schistosomiasis, infectious hepatitis, amoebic hepatitis/abscess

Management
- No other symptoms, see as outpatient:
  - Exclude schistosomiasis (stool x 3), rectal snip, blood diseases (Hb, WBC, sickle cell test), brucellosis (brucella test blood), malaria (malaria slide).
  - If tests normal, treat as idiopathic splenomegaly syndrome with proguanil 50mg daily below 3 years, 100mg in older children for 6 months or until spleen is definitely smaller.
- Admit
  - If patient is anaemic
  - If patient is febrile
  - For invasive diagnostic tests, e.g., bone marrow, liver biopsy.

13.4 Jaundice

Yellow colouration of skin and mucous membranes due to excess bilirubin. Serum bilirubin >2mg% (34.2µmol/L). In general terms, hyperbilirubinaemia may be pre-hepatic, hepatic, or post-hepatic.
- Pre-hepatic: Due to excess intravascular release of bilirubin by haemolysis.
- Hepatic: Due to hepatocyte dysfunction (faulty uptake, metabolism or excretion of bilirubin)
- Post-hepatic: Due to impaired removal of bilirubin from biliary system (e.g., common bile duct obstruction, intrahepatic cholestasis)

Common causes, as summarized in Table 13.1, include viral hepatitis, haemolytic anaemia (e.g., sickle cell, malaria), cirrhosis, biliary obstruction, hepatoma, drug induced (e.g., alcohol, isoniazid).

Clinical Features
Meticulous history and physical examination are important before ordering investigations. History should include exposure to hepatotoxic drugs pre-existing known haematological disorder. History of anorexia, nausea, and aversion to smoking is suggestive of viral hepatitis, while history of dark urine, pale stool, and pruritus is suggestive of obstructive jaundice. Physical examination should include observation for presence of spider naevi, gynaecomastia, loss of axillary hair, parotid gland enlargement, and ascites, which is suggestive of cirrhosis. Splenomegaly is suggestive of parenchymal liver disease or haemolytic jaundice.

Investigations
- Blood slide for malaria parasites. ***Jaundice in a patient with malaria is a medical emergency.***
- Urine – Bilirubin:
  - Absence of bilirubin in a patient suggests haemolytic anaemia.
  - Presence of bilirubin suggests hepatobiliary jaundice.

Table 13.1: Common causes of jaundice

Condition responsible	Hepatomegaly	Splenomegaly
Infections	Malaria	Malaria/tropical splenomegaly
	Kala azar	HIV
	Schistosomiasis	Kala azar
	Infectious hepatitis	Schistosomiasis, Infectious hepatitis
	Amoebic hepatitis/abscess	Brucellosis
	Brucellosis	Other infections like SBE, typhoid fever, infectious mononucleosis
Blood conditions	Haemolytic anaemia	Haemolytic anaemia, e.g., sickle cell anaemia in child <3 years
	Leukaemia	autoimmune haemolytic anaemia
		Leukaemia
Nutrition	Kwashiorkor	Iron deficiency
Congestion	Cardiac failure	Portal vein thrombosis
Other	Liver tumour	Liver cirrhosis
	Displaced rather than enlarged liver	Rheumatoid arthritis (Felty's syndrome)
		SLE

  - Urine – Urobilinogen:
  - Excessive urobilinogen suggests haemolysis. Urobilinogen is absent in obstructive jaundice.
- Liver function tests:
  - Gamma globulin transaminase – Elevated levels suggest alcohol abuse.
  - Alkaline phosphatase – Elevated levels suggest obstruction.
  - SGOT (AST) – Elevated levels suggest hepatocellular damage.
  - SGPT (ALT) – Elevated levels suggest hepatocellular damage.
- Serum proteins:
  - Albumin – Low levels in chronic liver disease such as cirrhosis.
  - Globulins – Hyperglobulinaemia is found in chronic active hepatitis, cirrhosis.
- Full haemoglobin – Polymorphonuclear leukocytosis is found in leptospirosis. Sickle cells may be seen in the peripheral blood smear.
  - Reticulocyte count – Increased reticulocyte count indicates a haemolytic anaemia.
- If above investigations are not diagnostic consider:
  - HBs Ag, HAV – Ab. TORCHES (toxoplasmosis, rubella, cytomegalovirus, herpes, syphilis) in young infants.
  - Ultrasound: useful in obstructive jaundice, gallstones, differentiating between abscess and tumour.
  - Alpha-foetoproteins: Substantial elevations of alpha-foetoproteins are found in hepatocellular carcinoma.
  - Paracentesis of ascitic fluid: Protein content <3g% is found in cirrhosis, tuberculosis, peritoneal tumours, peritoneal infection, or hepatic venous obstruction. Blood stained ascites usually indicates a malignant disease – cytology is mandatory.

- Liver biopsy is important in diagnosis of chronic hepatitis and cirrhosis and hepatocellular carcinoma.

Management
- Patients with history and physical findings suggestive of viral hepatitis can be managed as outpatients requiring advice on bed rest, avoidance of alcohol. Prescribe multivitamin tablets.
- Admit for diagnostic evaluation if cause not apparent.

Consider hepatic encephalopathy in any patient who has jaundice and mental complaint. Early treatment of hepatic encephalopathy may reduce mortality.

13.4.1 OBSTRUCTIVE JAUNDICE

This refers to jaundice resulting from obstruction of bile in the biliary tree (post-hepatic jaundice). Causes include:
- Intraluminal (within the lumen) include gallstones, which dislodge from the gallbladder and are impacted in common bile duct (CBD), and helminthiasis (ascaris and liver flukes).
- Mural (within the wall of ducts) due to inflammation, benign and malignant tumours of bile duct wall, e.g., cholangiocarcinoma, cholangitis, etc.
- Extramural (outside the walls) include choledochal cysts, enlarged lymph nodes of any cause, and carcinoma of the pancreas.
- Other causes are congenital biliary atresia, iatrogenic trauma to the ducts during surgery (especially cholecystectomy), and strictures after cholangitis and cholecystitis.

Clinical Features

It presents as painless jaundice, with pruritus that can be severe; jaundice progresses steadily
- Distended gall bladder, which is present in 60% of carcinoma of the head of the pancreas.
- Anorexia, which is usually present.
- Diarrhoea that is troublesome with foul smelling pale stool.
- Dark urine, history of flatulence, and dyspepsia in fat females are suggestive of gallstones.

Investigations
- Hb, WBC, ESR
- Liver function tests
- Prothrombin time index
- Plain abdominal x-rays
- Abdominal ultrasound and CT scan

Management
- Carry out adequate investigations and surgical management.
- Give cholestyramine 4–8g once or twice daily, maximum dose 24g a day.

13.5 Lymphadenopathy

An abnormal increase in size or altered consistency of lymph nodes. It is manifestation of regional or systemic disease.

The following common diseases are associated with lymph node enlargement:
- Infectious diseases
  - Viral diseases: HIV
  - Bacterial infections: Pyogenic. tuberculosis
- Malignant diseases
  - Haematological: Hodgkin's and non-Hodgkin's lymphoma
  - Metastatic tumours to lymph nodes: Head and neck, breast, prostate
- Immunological disease
  - Connective tissue disorders.

Clinical Features
Clinical features depend on underlying cause.

Investigations
Careful clinical examination is vital before ordering investigations, e.g., axillary lymph nodes in the presence of a breast mass points to cancer of the breast.
- Full haemogram
- Chest x-ray
- Blood for HIV test
- Bone marrow
- Lymph node biopsy

About 25% of patients will have non-diagnostic results from the biopsy. A repeat biopsy should be performed if enlarged lymph nodes and symptoms persist.

Management
Further diagnostic evaluation depends on the initial results, e.g., a thorough ENT work-up if biopsy indicates a secondary tumour deposit from the post-nasal space. Specific management depends on the specific cause of lymphadenopathy.

14. Skin Diseases

14.1 Eczema

14.1.1 ATOPIC DERMATITIS

Clinical Features
An acute, subacute but usually chronic pruritic inflammation of the epidermis and dermis often occurring in association with a personal or family history of hay

fever, asthma, allergic rhinitis, or atopic dermatitis. Sixty per cent of patients with this condition begin to suffer from it sometime during the first year of their life, but onset is most frequent in the first 2–3 months.

It commonly presents with the following skin lesions: erythema, papules, scaling, excoriations and crusting. Pruritus is the cardinal feature of eczema and the constant scratching leads to a vicious cycle of itch-scratch-rash-itch. Subsequently the skin becomes thickened (lichenified) presenting mainly on cheeks and extensor surfaces of limbs of an infant; it later localizes on the flexural areas of the limbs in both older children and adults. The natural history is that the disease clears with age in the majority of children.

Management

- Parents should be educated on the disease and its natural history and be advised to avoid any precipitating factors if identified.
  - Encourage wearing of clothing made of cotton
  - Avoid any food substance that seriously aggravates the eczema
  - Avoid agents that will cause the skin to dry excessively, e.g., detergents and medicated soaps, etc. NB: One should use normal toilet soaps.
  - Avoid any of the petroleum jelly products on those who react.
- Chlorpheniramine maleate 4mg 8 hourly can be used to alleviate itch.
- Steroids: Topical and oral steroids are the mainstay treatment. Use of the mildest steroid that controls the problem is advocated.
  - 0.1% betamethasone or 1% hydrocortisone ointments/creams.

NB: If a large body surface area is involved (e.g., 50% and over) or the disease is very severe, one is advised to consult a dermatologist who may choose to use systemic steroid prednisone 20–40mg daily. The main complications of infection need prompt treatment, e.g., bacterial, fungal, and viral. As with other atopic conditions, stress may aggravate eczema and thus older children should be assisted and encouraged to minimize stress.

14.1.2 CONTACT DERMATITIS

Acute or chronic inflammation produced by substances contacting the skin and causing toxic (irritant) or allergic reactions. Primary irritants include acids, alkalis, soaps, detergents, acetone, etc. Among the causes of allergic contact dermatitis are topical drugs, plants, shoes, clothing, metal compounds, dyes, and cosmetics. Sensitivity to latex in gloves is a particular problem for many health workers, and sensitivity to latex may preclude the use of condoms by some men.

Clinical Features

Lesions may be acute vesicles or weeping subacute erythema, or dry and scaly with papules, or chronic lichenified (thickened) excoriated and hyper pigmented rash. The lesions may take the shape of the contact with the offending item, for example shoes, watch, gloves, etc., but may be asymmetric and not have any particular shape.

Management
- Identify and remove causative agent.
- Drain large blisters but do not remove tops (roofs).
- Apply gauze or thin cloths dipped in water or normal saline.
- Apply topical 1% hydrocortisone ointment for dry lesions and cream for wet lesions.

14.3 Psoriasis

This is a common papulosquamous skin disease that occurs in 2–3% of the general population.

Clinical Features
Clinical presentations are erythematous macules, papules, or plaques that are usually covered with silvery scales.

Diagnosis
Is made by observation of the characteristic lesions and demonstration of Auspitz spots and Koebner's phenomenon. A skin biopsy may be needed in atypical cases.

Management
- Try topical therapy with corticosteroids, dithranol, calcipotriol, tazarotene, and tar; UV light based treatment using narrow bands, broad bands, and PUVA. More recently, biological therapy like etanercept, infliximab, and afalizumab are being used.
- Refer to a dermatologist.

14.4 Bacterial Infections

14.4.1 IMPETIGO CONTAGIOSUM

A contagious intradermal infection caused by streptococcus or staphylococcus. Commonly associated with poor hygiene, crowded living conditions and neglected minor trauma. Frequently complicates scabies, purpura urticaria, and insect bites. Presents as bullous lesions that rupture and crust, occurring on the face, arms, legs, and buttocks.

Management
- Local treatment by cleaning with saline water.
- Systemic antibiotics: Only for extensive lesions (flucloxacillin 500mg 6 hourly for 5 days ***OR*** erythromycin 250mg 6 hourly for 5 days)

14.4.2 BULLOUS IMPETIGO

Common in neonates (pemphigus neonatorum) although any age can be affected. Caused by staphylococcal infection. Affects mainly axilla and groin.

Causes large bullae containing pus and clear serum. These rupture easily, leaving raw areas. They do not form crusts as in impetigo contagiosum.

Treatment
- Treat as above.
- Admit for inpatient care if patient is toxic or septicaemia is suspected.

Patient Education
- Spreads easily in schools.
- Isolate and treat infected individuals.
- Separate towels and bath facilities.

14.4.3 STAPHYLOCOCCAL SCALDED SKIN SYNDROME (SSSS) – RITTER'S DISEASE

Toxin-mediated epidermolytic disease leading to detachment of superficial epidermal layers to resemble scalding. Mainly occurs in children under 2 years of age. Severity varies from localized form (bullous impetigo) to generalized form of epidermolysis. Also found in immuno-compromised adults and in renal failure.

Clinical Features
- Vesicles that are flaccid; gentle lateral pressure causes shearing off, leaving raw areas.
- Focus of infection may be found in the nose, umbilical stump, purulent conjunctivitis, otitis media, or nasopharyngeal infection.

Investigations
Pus swab for culture and sensitivity is essential.

Management
- Admit and treat with the following:
  - Parenteral cloxacillin or flucloxacillin preferred. Change antibiotics according to culture and sensitivity results.
  - Skin care:
    - Topical care baths with normal saline.
    - If widespread and weeping lesions are present, treat like burns (refer to Chapter 45, Burns)

☛ **Do not give corticosteroids**
☛ **Detect carriers to prevent nursery epidemics.**

14.5 Superficial Fungal Infections

The dermatophyte infections are caused by fungi (genus microsporum, trichophyton, and epidermophyton) and thrive on non-viable keratinized tissue of the skin (stratum, comeum, hair, nails). Sources of infection include other persons, animals such as puppies or kittens, and more rarely the soil. The nomenclature is "tinea" followed by the Latin name of the appropriate part.

Clinical Features

- ***Tinea pedis (athlete's foot):*** Scaling or maceration between toes, particularly the fourth interspace. Causative organism is T. rubrum or T. interdigitalae. Hot humid weather and occlusive footwear are predisposing factors.
- ***Tinea cruris:*** An erythematous and scaly rash with distinct margin extending from groin to upper thighs or scrotum. Itching may be severe. Common in males.
- ***Tinea corporis (body ringworm)***: Characteristically annular plaque with raised edge and central clearing with variable levels of scaling and itching.
- ***Tinea capitis (scalp ringworm)***: Mainly disease of children and has spontaneous recovery at puberty in normal circumstances. Scaling, itching and loss of hair are common also "Mashillingi". Scarring, alopecia may result.
- ***Tinea anguum:*** Involves the nails and presents with nail discolouration and subungual hyperkeratosis (friable debris).

Investigations

Direct microscopy of skin scale in 20% potassium hydroxide mounted on a slide to demonstrate hyphae.

Management

- For dry lesions, apply 1% clotrimazole ointment 12 hourly until 1 week after lesions have healed.
- 2% miconazole ointment applied once or twice a day.
- Terbinafin 250mg daily ***OR*** weekly fluconazole where indicated and prescribed by dermatologist.

14.6 Parasitic Infestations

14.6.1 SCABIES

Scabies is caused by the human itch mite (Sarcoptes scabiei) and spreads through intimate personal contact, facilitated by overcrowding, poor hygiene and sexual promiscuity. Transmission via beddings or clothing is infrequent (the mites do not survive for a day without host contact).

Clinical Features

- Intense itching worse at night or after hot shower.
- Burrows occur predominantly on the finger webs, the wrists flexor surfaces, elbow and axillary folds, and around the areolas of the breasts in females, the genitals especially male, and along the belt line and buttocks.
- Secondary infection causes urticarial papules, crusts and pustules.

NOTE: The burrow is a fine, wavy, scaly line (0.5–1cm long) with a small papule/vesicle at the end.

Investigations

- Demonstration of typical burrows: This may be difficult.
- Microscopy of skin scrapings (avoid KOH) and demonstrate the mite, ova, or faecal pellets.

Management
- 25% benzyl benzoate emulsion (use 12.5% in children): Apply to entire skin (neck down), day 1, repeat day 2. Day 3 bathe and apply again.
- Non-specific:
  - Advise on personal hygiene.
  - Treat the whole family and personal contacts.
- Treat secondary bacterial infection – Cloxacillin in severe cases.

14.6.2 JIGGERS (TUNGA PENETRANS)

Diagnosis is not a problem, but education to the community on treatment is mandatory.
- Use 5% chlorohexidine to suffocate the jiggers.
- Extract the jiggers with clean pin.
- Suffocate jiggers by soaking feet in liquid paraffin or kerosene.
- Give tetanus toxoid.
- Dust earthen floors with insecticide powders – this is highly recommended.
- Keep the patient comfortable and give adequate analgesia.
- Offer supportive feeding.
- Restore normal health and independence.

14.7 Pellagra (Niacin Deficiency)

Occurs in dietary deficiency (starvation, alcoholism, or deranged absorption or utilization), isoniazid therapy, various diarrhoeal conditions, and liver cirrhosis. An increasing number of patients are now seen amongst prisoners in Kenya.

Clinical Features

Presents with characteristic features of dermatitis, diarrhoea, dementia. Other features include weight loss, anorexia, fatigue, malaise, pruritus burning, dysphagia, nausea, diarrhoea, vomiting, impaired memory, confusion, and paranoid psychosis. Skin lesions are limited to exposed areas of the face, neck, hands and feet. Mucous membranes show scarlet stomatitis and scarlet red tongue.

☛ ***Patients with pellagra may die if they are not treated.***

Management
- High protein diet
- Multivitamin tablets or syrup
- Niacinamide 100–300mg in 3 divided doses daily

14.8 Seborrhoeic Dermatitis

An inflammatory scaling disease of the scalp, face and occasionally other areas with high density of oil glands (axilla, upper chest, anogenital areas).

Clinical Features

Symptoms develop gradually as:
- Dry or greasy diffuse scaling of scalp (dandruff) with pruritus

- Yellow-red scaling papules in severe cases found along the hairline, external auditory canal, eyebrows, conjunctivae, and naso-labial folds. Does not cause hair loss.
- Cradle cap (thick yellow crusted scalp) in newborns.

NOTE: Severe seborrhoeic dermatitis is found in neurological disorders (Parkinson's disease) and HIV infection.

Management
- Control scaling by 2% salicylic acid in oil.
- Use shampoos containing selenium sulphide, sulphur, and salicylic acid, or tar shampoos daily till dandruff is controlled as advised by dermatologists. (More recently ketaconazole shampoo is excellent.)
- To treat superimposed bacterial, fungal, or viral infections, which are prevalent in HIV patients

14.9 Dermatological Emergencies

14.9.1 ERYTHEMA MULTI FORME SYNDROME

A common problem because of the increased prevalence of HIV/AIDS. It is an infiltration into the dermo-epidemial junction by mono-nuclear cells leading to vesicle formation. Generally found in the extremities, palms and soles in the mild form of disease. In severe forms, widespread mucosal involvement occurs (Stevens-Johnson syndrome) that may last 1–2 months with a high mortality.

Causes
- Idiopathic (50% no known causes).
- Drugs, e.g., sulphonamides, phenytoin, barbiturates, penicillins, thiacetazone, etc.
- Infections: Viral (Herpes simplex), streptococcal and mycoplasma.
- Underlying malignancies.

Clinical Features
- In severe form the mucous membranes are always involved, with extensive bullae formation and systemic symptoms of fever and prostration.
- Cheilitis and stomatitis interfere with feeding, while vulvitis in females and balanitis in males lead to difficulties in micturition.
- Keratitis as a result of conjunctivitis.
- Epidermal necrolysis: ***This is a life threatening condition.***

Investigations
- HB
- WBC
- U/E/C
- Serum albumin
- HIV test
- VDRL

Management
- Admit all cases.
- Start on IV fluids and monitor urine output.
- Give supportive therapy, e.g., transfusion, feeding.
- Stop offending factor – minimize drug therapy; intravenous hydrocortisone 100mg 8 hourly initially then change to oral prednisone 1–2mg/kg/24 hours.
- Skin care – Clean with saline water.
- Eye care – 1% tetracycline eye ointment. Refer to ophthalmologist.
- Use antibiotics to treat Gram-negative bacteria, e.g., ciproflo.
- Give antihistamines.
- Mouth care – Antiseptic wash.
- Keep patient warm.
- Cradle nursing.

14.9.2 EXFOLIATIVE DERMATITIS

Synonyms: Exfoliative erythroderma syndrome, erythroderma.

Clinical Features

Serious, life threatening reaction pattern of the skin characterized by generalized and confluent redness with scaling and associated systemic toxicity, generalized lymphadenopathy, and fever. The disease presents as an acute and also as a chronic one. More than 50% of the patients have a history of pre-existing dermatosis, commonly eczematous dermatitis (atopic, contact), psoriasis, drug reaction. They may also have pre-existing leukaemia, lymphoma, or other malignancy. In up to 10–20% no possible cause is identified.

Constitutional symptoms include fatigue, weakness, anorexia, weight loss, malaise, feeling cold with (shivering), clinically red appearing skin that is thickened and with scaly lesions and no recognizable borders. Oedema of lower legs and ankles may occur. When palms and soles are involved there is thickening and fissuring. There tends to be alopecia (hair loss, but not uniform) and nails tend to be shed.

Prognosis is guarded and therefore this is a medical problem that should be dealt with using modern inpatient dermatology facilities and personnel. The disease has many multi-systemic complications.

Management
- Bath soaking
- Bland emollients: Liquid paraffin, emulsifying ointment.
- Nursing care: Single room, keep warm, etc.
- Systemic management:
  - Supportive – Fluid, electrolyte, protein replacement.
  - Systemic steroids used under specialist care are prednisone or prednisolone 0.5mg/kg/day in 2 divided doses.
- Confirm primary skin disorder by skin biopsy.

Note: Erythroderma may be purely secondary to HIV infection.

15. Genito-Urinary Diseases: Urinary Tract and Renal Conditions

15.1 Urinary Tract Infections

Main causes include:
- Normal GIT bacteria: E. coli (75%), Strep faecalis, klebsiella.
- Organisms causing UTI, particularly where there are congenital malformations of the urinary tract: Proteus vulgaris, pseudomonas sp.
- Rarely: staphylococcus.

Predisposing factors:
- Obstruction in the urinary tract due to prostatic enlargement, pregnant uterus, calculi (stones), vesicoureteric reflux, cervical prolapse, cystocele, tumours.
- Diabetes mellitus.
- Catheterization of bladder.

Investigations
- Urinalysis: >10 WBC/mm^3 in uncentrifuged urine midstream or catheter specimen
- Bacterial colony count: Most reliable, providing urine has been plated within 1 hour of voiding. Interpret results as follows:
  - <10,000 – non-specific contaminants 10,000–100,000; doubtful significance. Repeat cultures and evaluate clinical symptoms.
  - 100,000 diagnostic of UTI.
- Intravenous urography.

15.1.1 LOWER URINARY TRACT INFECTION

This includes infections of the urinary bladder (cystitis), urethra, prostate, or ureters.

Clinical Features
Painful micturition (dysuria). Painful desire to pass urine even though the bladder is empty (strangury). Frequency. Cloudy and sometimes foul smelling urine.

Investigations
- Urinalysis reveals pus cells, haematuria and urinary casts
- Urine C&S for recurrent infections
- Further evaluation, including intravenous urography in young men with first infection and women with more than 3 infections in 1 year

Management
- Encourage a lot of oral fluid.
- Use single dose regimens (for uncomplicated lower UTI) ***OR***
  - Nitrofurantoin 50–100mg 6 hourly for 3–5 days (for use in pregnancy, uro-surgery, and children only)

- Ciprofloxacin 250mg 12 hourly for 3–5 days ***OR***
- Cefuroxime axetil 125–250mg 12 hourly for 7 days

◆ Refer to levels 5 and 6 if: Evaluation reveals underlying urinary tract abnormality.

15.1.2 UPPER URINARY TRACT INFECTION (ACUTE PYELONEPHRITIS)

Acute inflammation of the parenchyma and pelvis of the kidney.

Clinical Features

Loin (lumbar) pain and tenderness. Dysuria. Strangury. Frequency. Cloudy urine. Fever (temperature 38–40°C). Vomiting.

Investigations

◆ Urinalysis: Microscopy for pus cells organisms and casts
◆ Culture of midstream specimen of urine
◆ Full blood counts
◆ Blood cultures
◆ Urea and electrolytes
◆ Intravenous urography
◆ U/S for perinephric abscess

☛ **The urine specimen should reach the laboratory within 2 hours of voiding or be refrigerated at 4°C for a period not exceeding 24 hours.**

Management

◆ A lot of fluids orally or intravenously if vomiting
◆ Cotrimoxazole:
  - adult – 2 tabs BD for 10–14 days
  - children – 48mg/kg/day in 2 divided doses

  OR
  - Amoxicillin 500mg TDS for 10–14 days

◆ Paracetamol 1g PO QDS as needed for fever or pain
◆ If admitted:
  - Ciprofloxacin 200mg IV or 500mg oral 12 hourly for 2–4 weeks, review antibiotics with culture results.

  OR
  - IV Ceftriaxone 1–2g once daily for 2 weeks

◆ Admit if
  - Temperature is greater than 38°C.
  - Kidney is palpable.
  - Costovertebral tenderness (may suggest renal or perinephric abscess).
  - Patient is vomiting.
  - Patient compliance is doubtful.

15.2 Renal Disease Signs and Symptoms

15.2.1 HAEMATURIA

Causes include:

- Infections (urinary tract infection, tuberculosis, schistosomiasis).
- Acute glomerulonephritis,
- Trauma,
- Meatal ulcers,
- Blood disorders (bleeding disorders, leukaemia, purpura, scurvy, sickle cell disease),
- Tumours, and
- Congenital abnormalities.

☛ **Haematuria is a serious sign of disease and should be aggressively investigated. Refer urgently for appropriate management.**

15.2.2 PYURIA

The finding of more than 10 white blood cells per high-power field on a urine specimen is suggestive of urinary tract inflammation. Pyuria as an isolated finding is most commonly associated with bacterial urinary tract infection. When associated with haematuria or proteinuria, pyuria is suggestive of parenchymal renal disease such as interstitial nephritis. Persistent sterile pyuria is often due to TB; cultures for TB recommended.

Investigations

- 24-hour urine collection for Mycobacteria and brucellosis
- PCR

15.2.3 HYPERKALAEMIA

Serum potassium levels persistently above 5.5mmol/L. Usually, there are no clinical consequences until the levels rise to 6mmol/L and above and often people will be oliguric.

Causes include:

- Acute renal failure,
- Severe chronic renal failure, and
- Use of potassium retaining drugs (e.g., spironolactone, triamterene, ACE inhibitors).

Consequences include:

- Muscular weakness
- Abdominal distension
- Tingling of the face, hands, and feet
- Irregular pulse
- Heart block
- Increased amplitude of the T-wave on the ECG

Investigations
- Urea and electrolytes
- ECG
- Monitor urine output

Management
- Give IV 10ml 10% calcium gluconate to be injected over 5–10 minutes.
- Inject 50ml of 50% solution of glucose and 5–10 units soluble insulin intravenously and repeat if hyperkalaemia recurs.
- Transfer to a centre with facilities for dialysis if the cause of hyperkalaemia is likely to be persistent.

15.2.4 HYPOKALAEMIA

Serum potassium levels persistently below 3.5mmol/L. Causes include:
Inadequate dietary intake (rare),
- Gastrointestinal fluid loss (vomiting, diarrhoea, fistulae, paralytic ileus),
- Renal loss (diuretics, uncontrolled diabetes mellitus),
- Systemic metabolic alkalosis, Use of inappropriate IV fluids for rehydration, and
- Failure to give potassium supplementation while treating DKA

Clinical Features
- Muscle weakness
- Tetany
- Fatigability
- Thirst
- Polyuria
- Paralytic ileus
- Cardiac arrhythmias
- Elevated serum bicarbonate
- Low serum chloride
- ST segment depression and appearance of V waves on ECG

Investigations
- Urea and electrolytes
- ECG

Management
- Treat cause where possible.
- If necessary give oral potassium (Slow K), 80–100mmol daily (at a rate of infusion not to exceed 25 mmol/hour). If patient has low potassium levels (<3.5) give IV potassium chloride slow infusion at a rate not exceeding 25mmol/hour and not more than 80mmol in 24 hours. This should be given diluted in 0.5–1 litre of fluid; shake periodically. Monitor potassium levels once or twice a day. Care must be taken in patients with renal failure to avoid hyperkalaemia.

☛ ***NEVER give potassium IV as a bolus. The patient will have cardiac arrest.***

15.2.5 AZOTAEMIA

This is the accumulation of nitrogenous waste products such as urea and creatinine due to loss of the excretory functions of the kidney.

15.2.6 ABDOMINALLY PALPABLE RENAL MASSES

Causes include nephroblastoma, polycystic kidneys, horse-shoe kidneys, neuroblastoma, and hydronephrosis.

Investigation

- Abdominal ultra sound
- Intravenous urogram (IVU)
- Urinalysis for cytology, gram stain, and ZN stain
- Abdominal CT scan or MRI

Management

Manage depending on cause.

15.3 Acute Glomerulonephritis

This is an inflammatory renal disease commonly following streptococcal infection of skin and tonsils.

Clinical Features

Smoky haematuria or tea coloured urine. Oedema, puffiness of the eyes more noticeable in the morning. The oedema is seldom severe or generalized. Back pain. Hypertension commonly presenting as headaches, visual disturbances, vomiting, and occasionally pulmonary oedema with dyspnea; convulsions and coma due to encephalopathy. Evidence of primary streptococcus infection, most often as an acute follicular tonsillitis with cervical adenitis and less often as skin sepsis. Altered urine output; occasionally there will be oliguria followed by diuresis (oliguric and diuretic phases).

Investigations

- Urinalysis: RBC, RBC casts and WBC. Granular and hyaline casts, mild to moderate proteinuria
- Blood urea: Moderately high in oliguric phase; otherwise normal
- Antistreptolysin O titre: Increased except in those with a skin primary cause where it remains normal
- Throat and skin swab where indicated. Streptococcus may be cultured.
- Renal ultra-sound scan
- Renal biopsy

Management

- Give amoxicillin 500mg TDS for 10 days. Restrict fluid input in oliguric phase.
- Order low salt protein diet in oliguric phase.
- Give frusemide 20–140mg in oliguric phase.
- Measure weight daily.

- Treat hypertension if present (see Section 3.6, Hypertension).
- Refer to nephrologist in acute renal failure.

15.4 Acute Renal Failure

Acute or subacute decline in the glomerular filtration rate and/or tubular function characterized by rapid accumulation of nitrogenous waste products, e.g., urea and creatinine. See Table 15.1 for a summary of the aetiologies of acute renal failure.

Table 15.1: Aetiologies of acute renal failure

Type	Examples
Pre-renal acute renal failure	Vomiting, diarrhoea, burns, diuretic treatment, peritonitis, pancreatitis, heart failure, liver disease with ascites.
Diseases of renal arteries and veins	Direct trauma to renal vessels, dissecting aortic aneurism.
Intrinsic renal:	Post-infective glomerulonephritis
Glomerulonephritis	Related to drugs, e.g., methicillin, ibuprofen, gentamicin
Acute interstitial nephritis	
Acute tubular necrosis	Following volume depletion and due to toxins Following
Intratubular obstruction	volume depletion and due to toxins, rhabdomyolysis, multiple myeloma, uric acid nephropathy
Obstruction of collection system	Bladder outlet obstruction, bilateral ureteral obstruction, ureteral obstruction in a single kidney

Clinical Features

Low or no urine output (may sometimes be normal). Other associated features include oedema., heart failure, hypertension, hyperkalaemia, acidosis, and rising blood urea and creatinine.

Diagnostic Work-up

History and physical examination, including:

- Careful review of medical records and medications (e.g., gentamicin use)
- Presence of swelling and oedema of muscles may indicate rhabdomyolysis
- Abdomen or flank pain may indicate obstruction to urine flow or inflammation of the kidneys.

Investigations

- Full blood counts
- Urinalysis and urine culture and sensitivity
- Urea and electrolytes
- Serum creatinine

Management

- Manage treatable causes.
- Replace fluid to a point of slight over hydration in patients who have vomiting, diarrhoea, or burns.

- Do not give drugs that may further damage the kidneys, e.g., gentamicin, tetracycline, sulfonamides, non-steroidal anti-inflammatory drugs (especially when used in combination with frusemide), nitrofurantoin.
- Try to maintain the blood pressure with intravenous fluids to about 140/90mgHg.
- If the blood pressure is normal or high and the patient is not dehydrated give intravenous frusemide (lasix) in a dose of 1–5mg/kg.
- Most important of all, transfer the patient to a centre with facilities for dialysis as soon as possible after the initial measures.
- Refer (to levels 5 and 6) if:
  - Anuria is present for more than 24 hours ***OR*** oliguria of more than 48 hours.
  - Hyperkalemia: For acute management of hyperkalemia give 10 IU of soluble insulin and 25g of glucose, the latter infused over 30 minutes as a 10% solution or sodium bicarbonate infusion. Administration of 10–30ml of 10% calcium gluconate over 10–20 minutes is also useful but requires constant ECG monitoring. Use of cation exchange resins in the sodium cycle may promote GIT potassium loss. These are sodium polystyrene sulphonate (kayexelate) 20g in 70% sorbitol solution 3 to 4 times a day.
- Carry out renal dialysis in patients whose fluid/electrolyte homeostasis and control of urea/creatinine levels are not being achieved rapidly with conservative manoeuvres.

15.5 Chronic Renal Failure

The term chronic renal failure describes the existence of irreversibly advanced and usually progressive renal failure. Causes include chronic glomerulopathies, hypertension, chronic interstitial nephritis, diabetes mellitus.

Important Manifestations of Chronic Renal Failure

- Biochemical: Acidosis, hyperkalaemia. elevated blood urea, elevated serum creatinine
- Cardiovascular: Pulmonary oedema, hypertension, pericarditis and cardiac tamponade, heart failure
- Skeletal: Bone pain and fractures (rare)
- Nervous system: Encephalopathy (confusion, convulsions), peripheral neuropathy
- Haematological system: Anaemia, excessive bleeding, e.g., from gums, skin, nose
- Skin: Scratching (pruritus), darkening of skin

Suspect chronic renal failure if

- Previous history of renal disease, e.g., acute nephritis, nephrotic syndrome is present.
- There is known history of hypertension.
- There is known history of diabetes mellitus.
- Blood urea and serum creatinine levels are high.
- Some of the systemic manifestations listed above are present.

Management
- Monitor urine output.
- Reduce salt intake.
- Reduce protein intake.
- Treat hypertension.
- Do not transfuse blood or infuse fluids if the urine output is low or if there is evidence of fluid overload such as hypertension, heart failure, peripheral or pulmonary oedema.
- Give:
  - Calcium carbonate tablets if hypocalcaemic.
  - Alpha D3, 0.25µg Erythropoietin. Iron sucrose.
  - Erythropoietin 2,000–4,000 IU SC twice a week.
- Carry out renal replacement therapy by hemodialysis and peritoneal diaslysis in selected centres if in end-stage renal disease.
- Refer patient to a centre doing renal transplantation.

15.6 Nephrotic Syndrome

A pre-school and school age renal disease characterized by generalized oedema, proteinuria, and hypo-albuminaemia. Causes include idiopathic/unknown in majority of cases. Congenital in rare cases. May also be secondary due to post acute glomerulonephritis, plasmodium malaria, allergy, e.g., bee stings, heavy metal poisoning (e.g., mercury and lead), urinary tract infection.

Clinical Features
- Oedema: Marked to massive oedema. Ascites and pleural effusion may occur.
- Proteinuria: Marked proteinuria.
- Hypoproteinaemia: Low serum albumin in blood.
- Hyperlipidaemia.

Investigations
- Urinalysis
- 24-hour urine for protein
- Serum protein
- Urea and electrolytes
- Serum cholesterol
- FHG ESR
- HIV, HBSAg, HCV, VDRL
- RBS
- Renal ultrasound
- Renal biopsy if indicated

Management
- Order normal to low protein diet if urea is normal.
- Order low salt diet.
- Administer frusemide carefully to induce diuresis 1.5 litres/day.
- Give spironolactone 25–200mg daily.
- Give ACE inhibitors or ARBs.

- Give immunomodulating drugs, e.g., prednisone, azathioprine, etc., as prescribed by a nephrologist.
- Use antibiotics if there are clinical signs of/or suspected infections. Possibility of urinary tract infection should always be considered.
- Vaccinate against pnuemococci.
- Monitor side effects of immunomodulators.

16. Mental Disorders

16.1 Acute Confusion (Acute Psychosis)

Sudden onset of mental symptoms in an otherwise previously normal person.

Aetiology
- Neurological causes: Cerebrovascular accidents (CVA), brain tumours, subdural haematomas, brain abscess.
- Infections: Acute meningitis, encephalitis, malaria, HIV.
- Metabolicitoxic causes:
  - Metabolic derangements, e.g., DKA, hypoglycaemia.
  - Drug intoxication.
- Psychiatric causes: Schizophrenia, depression, and manic episode.

Clinical Features
A good history and physical examination are essential. The patient may be ill-looking, not appreciating surroundings, not alert, not aware of time, place, or who they are. They may also be unable to remember, and may forget easily with poor attention and concentration. They may have visual/auditory hallucinations or delusions (grandiose or paranoid) or may be aggressive and excited. They may also have illusions (e.g., a stick is mistaken for a snake). In general, symptoms get worse at night.

Investigations
- HB, blood slide for MPS, culture and sensitivity, blood sugar, and serum urea and electrolytes
- CSF examination (after fundoscopy)
- X-rays – Skull
- Head CT and MRI scans

Management — General
Identify and manage physical (underlying) causes.

Management – Pharmacological
- Make appropriate psychiatric diagnosis (acute manic episode, schizophreniform disorder).
- Give chlorpromazine 100–200mg IM STAT then 12 hourly IM/oral ***OR*** haloperidol 5–10mg IM/oral 12 hourly.

- Continue inpatient treatment until patient develops insight, then outpatient treatment and follow up for at least 6 months.
- If after 6 months the patient relapses refer to a psychiatrist.

16.2 Alcohol Withdrawal (Delirium Tremens)

Clinical Features
Suspect if a patient with acute psychosis also has history of excessive drinking, tremors, weakness, restlessness, insomnia, hallucinations (visual), profuse perspiration. May develop features of withdrawal when admitted to hospital for another disease.

Investigations
- Blood sugar to exclude hypoglycaemia
- Full haemogram for evidence of macrocytosis
- Liver function test (especially liver enzymes)

Management
- Admit patient.
- Give thiamine 100mg parenterally IM once daily for 5 days then orally for at least 1 month to prevent brain damage ***OR***
- Inject high potency vitamin (ascorbic acid 500mg, nicotinamide 160mg, pyridoxine HCl 50mg, riboflavin 4mg, thiamine HCl 250mg) 1x daily for 5 days.
- Sedate with: IV diazepam 10–40mg 6 STAT then 10–20mg orally 8 hourly for the first 24 hours and then gradually taper off. Aim of therapy is sedate patients until they are calm.
- Maintain fluid and electrolyte balance 10% dextrose 1,000ml to alternate with Hartmann's solution 1,000ml 8 hourly until well hydrated.
- If hallucinations occur, give oral/IM chlorpromazine 100–200mg 12 hourly ***OR*** haloperidol PO 1.5–15mg until symptoms are controlled (in the elderly give a half the dose), then adjust dose according to symptoms. Do not treat with chlorpromazine alone since it reduces seizure threshold.
- Provide supportive care:
  - Give multivitamins containing folic acid.
  - Manage head trauma; treat pneumonia and any other infections, which are common in alcohol abusers.
  - Treat specific disorders symptomatically, e.g., cirrhosis, neuropathy.
  - Treat seizures with diazepam IV.
  - Give 50ml of 50% dextrose to correct hypoglycaemia; this should be given after thiamine injection.
  - Avoid long-term use (not more than 14 days) of sedatives as they may lead to addiction.
  - In motivated patients, try disulfiram 05g PO once daily for 1–3 weeks, tapered to 0.25g once daily for another 3 weeks.

☛ **Delirium tremens has a high mortality if not diagnosed and treated early.**

Patient Education
- Counsel the patient; abstinence may be essential.
- Encourage healthy diet.
- Involve the family in the long-term management.

16.3 Substance Use Disorders

These are syndromes arising out of repeated maladaptive use of substances, with substance defined as any chemical with brain altering properties. They are characterized by significant impairment in psychological, social and occupational functioning as observed over a 12-month period. Commonly abused substances in Kenya include tobacco, Cannabis sativa, khat (miraa), opioids (heroin), cocaine, and solvents (glue, petrol, wood varnish). Substance-related syndromes include intoxication, dependence, withdrawal, psychosis, mood disorders, anxiety, sleep disorders, sexual disorders. High risk groups are:
- 12–20-year-olds.
- Patients with primary mental disorders.

16.3.1 SUBSTANCE ABUSE BY THE ADOLESCENT

Usually present with self-neglect, slovenliness, deteriorating school/job performance, excessive sleeping, rough appearance, increasing and unexplained demand for money from caregivers, involvement in petty crime (pilfering), running away from home – in addition to aforementioned substance-related disorders.

Investigation
- Liver function tests
- HIV screening – especially for opioid abusers
- Urinalysis
- Blood for toxicology
- HBSAg
- HCV
- Urine for drug screen

16.3.2 MANAGEMENT OF SELECTED SUBSTANCES OF ABUSE

OPIOID DETOXIFICATION

Opioids abused include heroin, morphine, dihydrocodeine, and pethidine. Tolerance develops rapidly and withdrawal features include agitation, lethargy, sweating, goose-flesh pimples, running nose, shivering, musculo-skeletal pains, diarrhoea, and abdominal cramps. These effects peak at 48 hours and subside over a period of 10 days. Because of the highly addictive nature of the opioids, admission to hospital is necessary for effective management.

Management – Pharmacological
- For agitation, use diazepam 20–80mg PO daily to be tapered off in 10 days.
- For the sympathetic upsurge, use clonidine 0.15–3mg PO daily for 10 days.

- For any assaultive behaviour, use haloperidol 5–10mg 12 hourly PO/IM ***OR*** chlorpromazine100–200mg 12 hourly as necessary.
- For pain, use paracetamol 1g PO every 8 hours as necessary.
- Provide nutritional support vitamins.
- Manage any comobidities.

CANNABIS DEPENDENCE

Chronic users may develop psychosis, anxiety, mood disorders, and a withdrawal state. Admission is usually necessary for initiating abstinence. Treatment of the psychiatric complication is the same as for the primary syndromes.

KHAT (MIRAA) DEPENDENCE

Chronic users may develop anxiety, mood disorders, and schizophrenia-like psychosis. Abstinence is to be encouraged. Treatment of the related psychiatric disorders is the same as for the primary syndromes.

SOLVENT ABUSE

Solvents have powerful euphoriant properties. They are mainly abused by street children and the homeless. Chronic users may develop organ damage (liver, heart, kidney), apart from neurological damage. Patient education is vital. Involve family and relevant authorities in rehabilitation.

16.4 Anxiety

An unpleasant, vague and diffuse feeling of apprehension. It is an alerting signal. Usually the threat is unknown and patient functioning becomes impaired. Pathological anxiety includes panic disorder, which may be dramatic in presentation; phobias which are fears that are out of proportion; obsessive compulsive disorder, which is characterized by an irresistible urge to act; and generalized anxiety disorder.

Clinical Features

The patient presents with an empty feeling in the stomach, lightness in chest, pounding heart, perspiration, urge to void, non-exertion dyspnoea, blurred vision, hyper reflexia, dizziness, and light headedness. Hypertension (transient) may be noted with some restlessness (e.g., pacing). A good history and physical examination are of crucial importance. It is important to exclude physical causes like thyrotoxicosis, pheochromocytoma, hypoglycaemia, and temporal lobe epilepsy.

Investigations

Exclude organic causes like thyrotoxicosis and temporal lobe epilepsy.

Management

- Correct hypoglycaemia, if present.
- For uncomplicated anxiety:
  - Reassure patient.
  - Give amitriptylline 25–50mg nocte, as it may be helpful.
  - Do not use benzodiazepines.
- For complicated anxiety with presence of phobias, panic attacks, etc., refer to a psychiatrist for:
  - Psychotherapy.
  - Behaviour therapy.
  - Counselling.
  - Other pharmacological interventions, which include SSRIs, tricyclic antidepressants.

16.5 Post Traumatic Stress Disorder

A common anxiety disorder that develops after exposure to a terrifying event or ordeal in which grave physical harm occurred or was threatened. This gives rise to both psychological and social effects. Psychological effects are those that affect different levels of functioning, including cognitive (perception and memory as a basis for thoughts and learning), affective (emotions), and behavioural. "Social effects" pertain to altered relationships with the family and community networks, and effects on the economic status.

Clinical Features

In the acute phase, these may include intrusive flashbacks, grief reaction, denial, disbelief, numbness, restlessness, anxiety, social withdrawal, and uncontrollable crying.

Management

- Provide psychological first aid for those showing acute distress. This is an informal, non-clinical intervention that entails:
  - Providing basic, non-intrusive care with a focus on listening but not asking to talk.
  - Showing empathy by validating the person's feelings.
  - Reminding the distressed person that their feelings are a normal reaction to an abnormal situation, and that it is expected that the uncomfortable or bothersome feelings or painful symptoms will disappear over time.
  - Assessing needs and ensuring that these needs are met.
  - Encouraging but not forcing friendships, companionship, and otherwise positive interactions with others. For example, if the person is ready, help to join a social activity group.
  - Providing as much factual information as possible about access to services and any plans for the affected communities that may have been made.
- Refer for psychiatric management.

16.6 Psychosexual Disorders

These range from deviant sexual behaviour such as homosexuality, sex change, and transvestism (tendency to appear to be of different sex) to overtly criminal activities such as rape and paedophilia.

Management
Refer to higher level for appropriate management.

16.7 Conversion Syndromes

These are mental disorders in which there is a psychogenic disturbances of either motor or sensory function in some parts of the body.

Clinical Features
May present as paralysis of a part of the body, tremors, blindness, deafness, seizures, aphonia. The severity of disability fluctuates and the patient fails to exhibit the seriousness the disability accords. Good psychiatric history may reveal the source of conflict.

- Thorough physical examination; even though the patient often appears normal, this should be done.
- Refer to psychiatrist for appropriate management.

16.8 Depression

The primary and dominant characteristic is a change in mood, consisting of depressive mood with characteristic changes in behaviour, attitude, thinking efficiency, and physiological functioning.

Clinical Features
Dysphoric mood characterized by sadness, crying spells, irritability, or lowered ability to function socially. Negative views of self and the environment and the future, indicated by guilt, loss of interest, difficulties in concentrating or suicidal thoughts. There may be insomnia with loss of – or increase in – appetite. There may be weight loss or gain with multiple somatic complaints, e.g., fatigue, weakness, headaches, backache, etc. A meticulous history is important as under-diagnosis is common and many patients suffering from depression are often missed and receive inadequate treatment. Many depressed patients have a precipitating factor, e.g., loss of income, death of a spouse, onset of disability, or are on drugs that produce depression as a side effect, e.g., methyldopa.

Management – General
Most patients are managed as outpatients. It is important for the care provider to maintain a positive and hopeful attitude towards the patient and to the extent possible involve the relatives in the management of the patient, especially to improve compliance.

Management – Pharmacological
Antidepressants:
- Amitriptyline 50mg nocte: for patients who require sedation. ***OR***
- Imipramine 50mg nocte for patients who do not require sedation ***OR***
- Fluoxetine 20mg once daily preferably given in the morning for patients with BPH and cardiac disease and elderly
  OR
- The dosage timing may improve patient compliance. Antidepressants take at least 2 weeks to take effect. If no improvement at 4 weeks review the diagnosis and medication.
- If medications are effective, they should be continued for 3 months and then reduced at 25mg/week.

Failure to respond to therapy may be due to:
- Poor compliance
- Inadequate dosage
- Misdiagnosis
- Inadequate therapeutic trial (usually 6 weeks)

Refer to psychiatrist for:
- Re-evaluating the diagnosis
- Instituting chronic treatment (prophylaxis) in those with recurrent serious depression
- Changing to second generation antidepressants, e.g., maprotiline, monoamine oxidases inhibitors.
- Considering electroconvulsive therapy (ECT).

Patient Education
- Inform the patient that there will be a delay of 2 weeks before beneficial effects of treatment are experienced.
- Explain about the side effects, e.g., dry mouth, constipation, hypotension, daytime sedation (drowsiness).
- Warn patient about dangers of alcohol consumption.
- Review the patient at least once every 2 weeks until maintenance dose is reached and then once a month until total drug withdrawal or as necessary.
- Involve the relatives in long-term management.

☛ **Do not give large prescriptions to patients. There is risk of suicidal overdose. Drug II administration should be monitored while at home.**

16.9 Bipolar Mood Disorder (Manic Episode)

The primary characteristic is a change in mood consisting of an exaggerated sense of wellbeing and enhanced esteem.

Clinical Features
The clinical features include hyperactivity that is usually goal oriented, over generosity, extravagance, disinhibition (promiscuity and drug abuse), irritability,

accelerated speech, infectious elated congruent mood, grandiose delusions, enhanced self-esteem, insomnia, and weight loss (no time for food). In severe forms patients appear disorganized and may be violent; legal involvement may be necessary in their management. History and physical examination are essential; it is necessary to establish if ever depressed in past.

Management – General
- Rule out intoxication.
- Involve family members in management.

Management – Pharmacological
- Immediate if disturbed:
  - Haloperidol 10mg IM ***OR***
  - Chlorpromazine 150-200mg IM
  - Lithium carbonate 300mg 3–4 times daily . Monitor serum levels closely.
  - Sodium valproate 750mg/day in 3–4 divided doses initially, increase every 3–4 days to a dose of 1,000–2,500mg/kg/day in divided doses
  - Carbamazepine and other anticonvulsants such as lamotrigine, gabapentine, and topiramate can also be used.
  - Olanzapine 2.5–20mg PO/IM per day
  - Zuclopenthixole acuphase 100mg IM

Long-term:
- Start on haloperidol PO 5–10mg nocte.
- The agents used in the acute state can also be used.
- For non-compliant patients, haloperidol decanoate 100–200mg IM monthly or fluphenazine decanoate 25–50mg IM monthly.
- Clopenthixol decanoate 200mg IM monthly.
- Mood stabilizer, e.g., carbamazepine 200mg twice a day or lithium or sodium valproate.

Refer to psychiatrist if there is no response in 4–6 weeks and you have excluded:
- Poor compliance
- Inadequate dose

Electroconvulsive therapy (ECT) can be administered for acute mania or severe depression.

Admit if:
- Patient is a risk to others or self.
- Patient is exhausted.

16.10 Schizophrenia

A form of mental illness characterized by loss of contact with reality, hallucinations, delusions, abnormal thinking, flattened affect, and disturbed work and social function, occurring in a setting of clear consciousness, memory and orientation.

Clinical Features
The clinical features include withdrawal and generalized loss of interest in the environment, with thought disorder. The normal association of ideas is lost and there is characteristic incongruence of affect. There are also delusions, hallucinations in any sensory modality, and disturbances in behaviour and motor function, e.g., grimacing, odd postures.

History obtained from the patient and relatives is most important. Continuous signs of illness should be present for 6 months at some point in the patient's life, with some clinical features at the time of diagnosis.

Management – General
Psychological and social support entails use of psychiatric community nurses and social workers in involving the family to understand the illness and help in rehabilitation of the patient into community activities. Importance of drug compliance should be explained to relatives and patients.

Management – Pharmacological
- Severely disturbed patient – admit:
  - Give chlorpromazine 100–200mg IM and then start on oral chlorpromazine 100–200 12–24 hourly
  - Fluphenazine 2.5–40mg orally daily
  - Trifluoperazine 1–5mg orally daily
  - Haloperidol 2–25mg orally daily
- Mildly disturbed patient:
  - Manage as outpatient.
  - Give chlorpromazine 100mg TDS ***OR*** haloperidol 5mg TDS. If patient was diagnosed as a schizophrenic and missed the drugs, restart the drug as before.
- Maintenance therapy, chlorpromazine 100–200mg TDS ***OR*** haloperidol 5–10mg TDS
- Onset of extra pyramidal side effects: reduce dose and start on benzhexol 2.5–5mg TDS
- For patients who are not dependable about taking oral drugs, depot preparations are available:
  - Fluphenazine decanoate 25mg IM monthly
  - Haloperidol decanoate 50mg IM monthly
  - Clopenthixol decanoate 200mg IM monthly
  - Flupenthixol decanoate 40mg IM monthly.
  - Resperidone 2–6mg PO once to twice daily.
- Electroconvulsive therapy (ECT) can be administered for refractory cases.

☛ **Caution: Aim to use lowest dose that is therapeutic in cases of long-term use to minimize risk of side effects.**

☛ **Admit if patient is severely disturbed, violent, or catatonic.**

Patient Education
Compliance to therapy is important to prevent relapses
Relatives should bring the patient to the hospital at early signs of relapse
Drugs may have to be taken for a long time depending on response.

16.11 Sleep Disorders

16.11.1 INSOMNIA

Insomnia is difficulty in initiating or maintaining sleep, leaving the patient feeling unrested. Insomnia can be a symptom of most other psychiatric and physical disorders, which should be excluded. Rule out use of addictive drugs (caffeine, etc).

Management
Hypnotics, e.g., diazepam 5–10mg nocte for 1–2 weeks and then taper off.

☛ **Caution: Avoid chronic use (over 14 days) of hypnotics.**

16.11.2 OTHER SLEEP DISORDERS

Hypersomnia (narcolepsyicataplexy): Patient complains of excessive sleep without any demonstrable cause.

Management
Forced naps at regular times of the day
Methyl phenidate 30mg morning and 20mg midday until symptoms disappear, maximum dose 60mg daily.

16.12 Suicide Attempts

Unsuccessful attempt to end one's own life.

Clinical Features
Suicide threats. May occur in the following conditions: depression, schizophrenia, under influence of alcohol/drugs, under severe social problems or stress, or personality disorder. Often the attempted suicide itself is the first symptom.

Management
- Admit patient
- Urgently restore physical fitness
- Once patient's life is out of danger, take a full history without accusing the patient. Treat the patient with understanding and respect. An empathetic approach is very important if you are to win the confidence of the patient so that he/she will be able to tell you the true story.

- Assess the seriousness of the attempt: Every suicide attempt should be regarded as serious: A successful attempt may follow. Do not regard an attempt as just attention seeking. Factors indicating seriousness include:
  - Patient living alone, divorced or single
  - History of a relative committing suicide
  - Chronic incurable physical illness
  - Suspicion of or diagnosis of cancer or AIDS
  - Presence of a suicide note
  - Attempt done in a place unlikely to be discovered
  - Impotence in males and infertility in females
  - Continuous difficulty in sleeping (insomnia)
  - Alcohol and drug abuse – continuous social problems
  - Whether patient regrets having failed to die
  - If tablets taken, did the patient believe the dose was lethal
  - Previous attempted suicide
  - Failure to succeed, particularly at examinations

16.13 Value of Electro-Convulsive Therapy (ECT)

- Shortens hospital average length of stay, where necessary, e.g., elderly patients, puerperal patients.
- Alternative treatment where side effect of psychotropic drugs are to be avoided, e.g., elderly patients, pregnant mothers.
- Suicidal patients.
- Refractory mental illnesses where there is an indication.

Classical Indications
- Major depressive disorder
- Psychosis
- Suicide attempts
- Stupor
- Schizophrenic stupor
- Bipolar mood disorder (manic episode) refractory to pharmacotherapy

Management of Side Effects of Anti-Psychotic Drugs
For extra pyramidal side effects (EPSE) and anticholinergic side effects, administer tabs benzhexhol hydrochloride 2–5mg TDS PO.
OR
Biperiden tabs 2–4mg TDS PO.

PART II
Paediatrics and Related Disciplines

IN THIS SECTION:

17. Paediatric Emergencies

17.1 Recognition of a Seriously Ill Child (Triage)

It is important that all health care workers learn to quickly recognize a child needing emergency care as soon as the child is brought to a health facility. Fortunately this depends on a few clinical features that are easy to learn with practice. Parents/ care givers may have tried to treat the child at home or the child may have fallen sick quickly. They are advised to come to the health care facility as soon as possible if the child is weak, not able to drink, has severe diarrhoea, cold hands and feet, very high fever, or convulsion.

17.2 Causes of Cardio-Respiratory Arrest after Neonatal Period

These include:

- Fluid loss: Diarrhoea, blood loss, burns.
- Fluid maldistribution: Anaphylaxis, septic shock, cardiac disease.
- Respiratory distress: Pneumonia, asthma.
- Foreign body (obstructed airway).
- Respiratory depression: CNS infections, convulsions, poisoning.
- In addition to the above, severe malnutrition is a common cause of death in young children.
- Trauma can also be a cause.

The figures shown below assist you to triage and manage these children as they arrive at the health facility. Management in all these states includes the ABC's: Airway, Breathing, Circulation.

17.3 Summary of Steps Taken: ABCD of Resuscitation

- Always have a resuscitation tray ready.
- Airway/breathing: Start immediate treatment to restore breathing.
- Circulation: Restore circulating blood volume by giving 20ml/kg of Ringer's lactate or normal saline over 15 minutes. Repeat until return of pulse; this may be repeated up to 4 times.
- Convulsions: Give anticonvulsants if child is convulsing.
- Carry out emergency investigation if you are able: Blood glucose, blood smear, haemoglobin.
- Reassess every 15–30 minutes until stabilized following the same format – airway, breathing, circulation:
  - When ventilation and massage are effective, carotid and femoral pulses become palpable, pupils constrict, and the colour of mucous membranes improves.

- NOTE: External cardiac massage (chest compressions): apply appropriate pressure over the sternum:
  - For newborn or small infants, effective cardiac output can be produced by applying maximum pressure with the tip of 2 fingers placed on the sternum just below the intermammary line or hands round the infant's chest.
  - For larger infants and small children, use the heel of one hand over the sternum one finger breadth above the xiphisternum.
  - For big children, the heel of the right hand is placed over the heel of the left hand to provide the strength of both arms and shoulders. Hands are placed 2 finger breadths above the xiphisternum. Refer urgently after stabilizing the child. During transport ensure adequate airway, breathing, and circulation. Make sure you write a comprehensive report of what you have done to the receiving hospital clinician.

17.4 Triage of Sick Children

Refer to the flow chart in Figure 17.1 for a guide to the assessment and support of sick children in paediatric emergencies

17.5 Basic Life Support – Cardio-Respiratory Collapse

Refer to Figure 17.2 for the response to cardio-respiratory collapse is a child.

Figure 17.1: Emergency signs for screening sick children

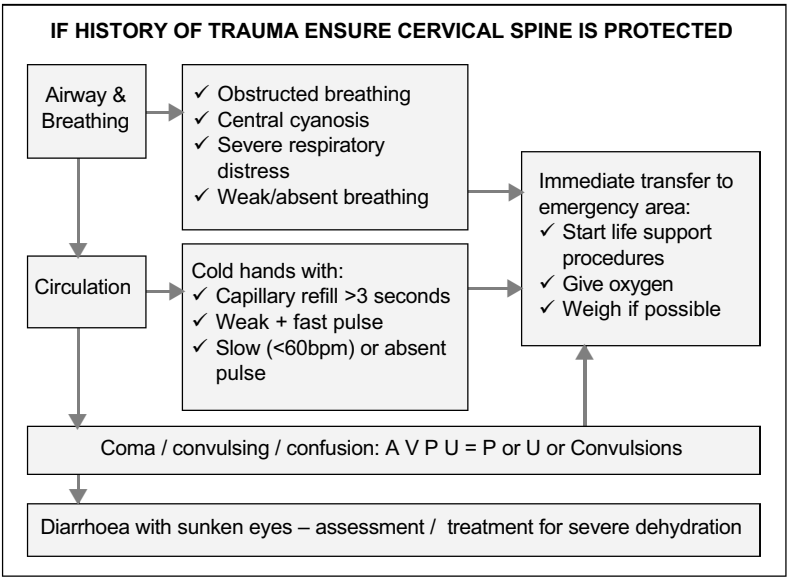
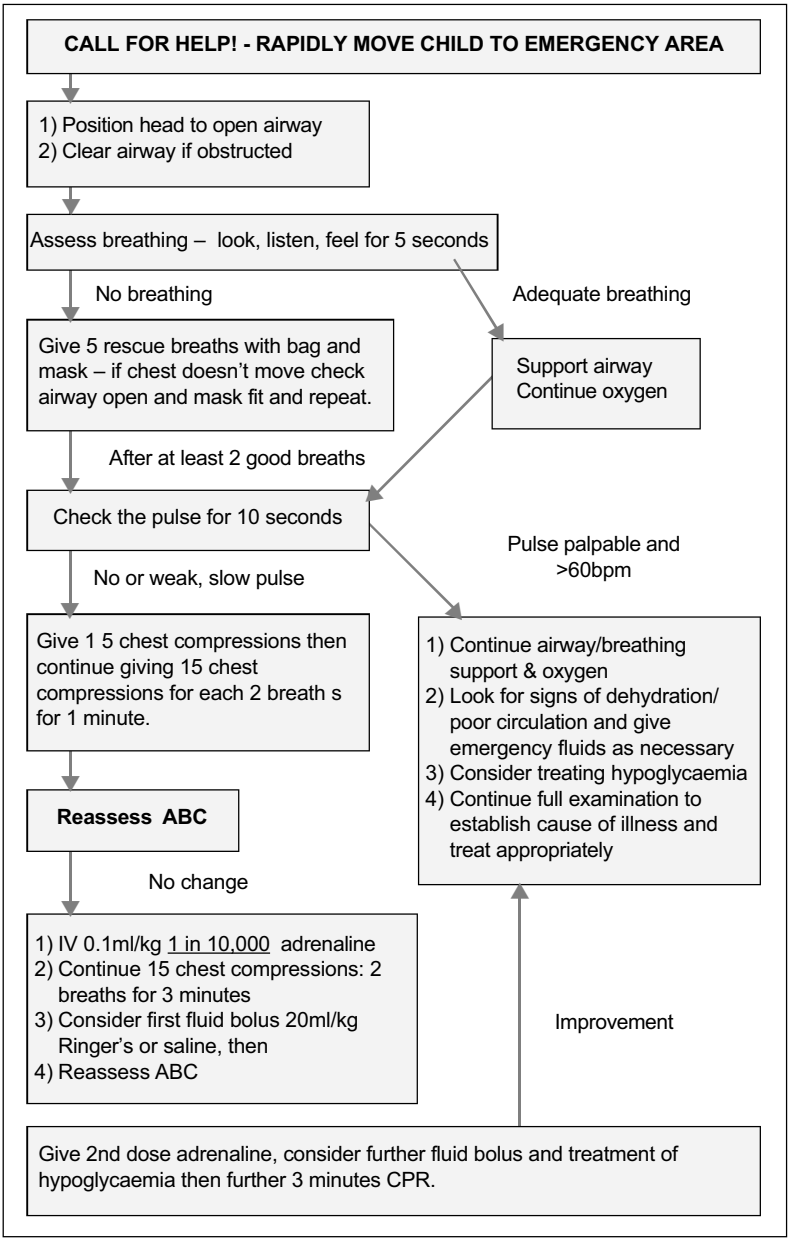


Figure 17.2: Flow chart for cardio-respiratory collapse



17.6 Shock

Causes of shock include
- Bleeding
- Severe infection (septic shock)
- Severe dehydration
- Cardiac disease
- Trauma

Clinical Features
- Cold hands
- Capillary refill >3 seconds
- Weak fast pulse

☛ ***Children with these signs are in shock and need emergency treatment.***

Treatment
For a child without severe malnutrition:
- Infuse 20ml/kg of normal saline or Ringer's lactate as rapidly as possible.
- Reassess and give a second dose if there is no improvement. You may need 2 or 3 repeats to restore circulating blood volume

For a child with severe malnutrition:
- Give 15ml/kg of Ringer's lactate with 5% dextrose or half normal saline with 5% dextrose and infuse over 1 hour.
- After resuscitation: Admit and look for the cause if not already obvious and treat.

Investigations
- Hb, WBC, platelets
- Blood sugar
- Urea and electrolytes, creatinine
- Blood sugar
- C&S (blood and body fluids).
- Coagulation screen if needed

Management – General
- Resuscitate with normal saline or dextran 20ml/kg. Repeat if necessary – up to 80ml/kg may be required but watch for heart failure. A CVP line is useful.
- Hourly pulse and BP
- Catheterize and monitor urine output hourly: If less than 1–2ml/kg/hr after adequate fluid replacement give frusemide 1–2mg/kg IV STAT. If urine output does not increase assume renal failure and manage accordingly.
- Oxygen via nasal prongs or catheter.
- Definitive treatment of cause.

Management – Pharmacological

- Start empirically on:
  - Crystalline penicillin + gentamicin + metronidazole IV. Oral metronidazole can be started as soon as patient is able to swallow.
  - Specific antibiotics depend on source of infection and C&S results.
- Ensure that the facilities and skills for intensive care management are available.

17.7 Anaphylaxis

This is an allergic reaction to drugs, food, stings, etc., in a sensitized individual.

Clinical Features

These include extensive skin rash, pruritus, urticaria, respiratory distress that may be accompanied by a wheeze or a stridor (due to laryngeal oedema or bronchospasm), and hypotension.

Management

Parents and care givers are advised to take health care facility as soon as possible any child with extensive skin rash or difficulty in breathing.

Follow the ABC of resuscitation. In addition do the following:

- Adrenaline: give IM 0.01ml/kg of 1:1,000 solution; or 0.1ml/kg of 1:10,000 solution. Can be repeated every 15 minutes for 3 doses.
- Aminophylline 5mg/kg IV over 20 minutes if there is wheezing.
- Nebulized bronchodilators, e.g., salbutamol.
- Antihistamine: Chlorpheniramine 0.1mg/kg IV slowly. Then continue IM/SC 8 hourly for 24–48 hours,
- Hydrocortisone 4mg/kg IV is of secondary value but useful to prevent delayed recurrences.

Subsequent management:

- Patients with mild to moderate reaction, e.g., urticaria or mild bronchospasm, should be observed for at least 6 hours because attacks may recur after full recovery.
- Admit those with severe reactions e.g. poor circulation, severe bronchospasm.
- Continue intravenous fluid replacement, and closely monitor pulse, BP and urinary output.
- Avoid offending agents. Inform parent/child the cause of reaction so as to know and to avoid the offending agent in future.

17.8 Choking

Infants and young children can easily choke on a number of things. Often they are playing with seeds, buttons or any small object that when put in the mouth easily goes the wrong way. All health care providers should learn how to dislodge the objects and it would be good if parents were taught the procedure. This is

because the procedure may be required urgently: by the time the child arrives at the health facility they may have already choked to death. Figures 17.3 and 17.4 shows how this is done for infants and children, respectively.

Figure 17.3: How to manage the choking infant

a) Back slaps

b) Chest thrusts

1. Lay the infant on your arms or thigh in a head down position.
2. Give 5 blows to the infant's back with heel of hand (Figure 17.3a).
3. If obstruction persists, turn infant over and give 5 chest thrusts with 2 fingers one on top of the other, one finger breadth below nipple level in midline (Figure 17.3b).
4. If obstruction persists, check infant's mouth for any obstruction that can be removed.
5. If necessary repeat the sequence with back slaps again.

Figure 17.4: How to manage the choking child

1. Give 5 blows to the child's back with heel or hand with the child sitting, kneeling or lying (Figure 17.4a).
2. If obstruction persists, go behind the child and pass your arms around the child's body. Form a fist with one hand. Immediately below the child's sternum place the other hand over the fist and quickly press upwards into the abdomen (Figure 17.4b). Repeat this Heimlich manoeuvre 5 times.
3. If obstruction persist check child's mouth for any obstruction that can be removed.
4. If necessary repeat the sequence with back slaps again.

a) Slapping the back to clear airway obstruction in a choking child

b) Heimlich manoeuvre in a choking older child

18. Diarrhoeal Diseases

Causes of diarrhoea in children:
- Young children <5 years: rotavirus, E coli
- All ages except neonates: Shigella, cholera, salmonella spp., amoeba, giardia, candida.
- Others: Lactose intolerance, food poisoning

Clinical Features
Diarrhoea is defined as the occurrence of at least 3 loose or watery stools in a day. Diarrhoeal illness is classified for dehydration, presence of blood in the stool and duration.

Definitions
- Acute watery diarrhoea: Watery stools lasting less than 14 days
- Dysentery: The presence of fresh blood in the diarrhoeal stool.
- Persistent diarrhoea: Diarrhoea that has lasted for 14 days or more.
- Dehydration: Loss of water and electrolytes.

☛ **The major cause of death from diarrhoea is dehydration, especially in infants and young children.**
☛ **Management of diarrhoea is aimed primarily at evaluation, prevention, and treatment of dehydration**

18.1 Acute Watery Diarrhoea

Assess for signs of shock; if present manage as outlined in paediatric emergencies then classify according to age of child and severity of dehydration (Table 18.1) and manage as given in Tables 18.2–18.4 and Figure 18.1.

Table 18.1: Assessment, classification, and management of diarrhoea in children below 5 years

Age of child	No dehydration (2 signs or more)	Some dehydration (2 signs)	Severe dehydration
Young infants 1 week – <2 mon	Normal	Sunken eyes Restless/irritable Skin pinch goes back slowly	Lethargic/unconscious Sunken eyes Skin pinch goes back very slowly (>2 sec)
2 months – 5 years	Normal	Thirsty Restless/irritable Skin pinch goes back slowly Eyes sunken	Lethargic/unconscious Sunken eyes Not able to drink or drinking poorly Skin pinch goes back very slowly (>2 sec)

Table 18.2: Rehydration protocol for young children

Degree of dehydration	Age	Where	Type of liquid	Volume to give	Rate
No dehydration	1 week – 2 months	Home	ORS	50–100ml	After every bout of diarrhoea
Plan A	≥2 months – 5 years	Home	ORS	100–200ml	After every bout of diarrhoea
Some dehydration **Plan B**	1 week – 5 years	Health unit	ORS	75ml/kg	4 hours, then reassess
Severe dehydration	1 week – 2 months	Health unit	Ringer's lactate or Hartmann's solution	100ml/kg	30ml/kg in 1 hr 70ml/kg in 5 hrs
Plan C	2 months – 5 years	Health unit	Ringer's lactate or Hartmann's solution	100ml/kg	30ml/kg in ½ hr 70ml/kg in 5 hrs

Table 18.3: Clinical evaluation of dehydration in older children

Clinical features	Mild dehydration	Moderate dehydration (2 signs present)	Severe dehydration (2 signs present)
General appearance: Older children and adults	Thirsty, alert	Thirsty, alert	Generally conscious, anxious, cold extremities, clammy, cyanosis, wrinkled skin of fingers, muscle cramps, dizzy if standing
Pulse	Normal	Rapid	Rapid, thready, sometimes absent
Respiration	Normal	Deep, sometimes rapid	Deep and rapid
Systolic BP	Normal	Normal	Low, sometimes unmeasurable
Skin elasticity/ skinpinch	Immediate recoil	**Decreased**	**Fold disappears very slowly** (>2 seconds)
Eyes	Normal	**Sunken**	**Severely sunken**
Tears	Present	Absent	Absent
Mucous membranes (test mouth with a clean finger)	Moist	Dry	Very dry
Urine output	Normal	**Reduced, urine dark**	**Anuria, empty bladder**
% of body weight loss	1–5%	6–9%	10% or plus
Estimated fluid deficit	10–50ml/kg	60–90ml/kg	100ml/kg

Table 18.4: Rehydration protocol for older children

Degree of dehydration	Age	Type of liquid	Volume to give	Rate
Mild	All	**ORS**	50ml/kg	In 4 hrs
Moderate	All	**ORS**	100ml/kg	In 4 hrs
Severe	Older children	Hartmann's solution, Ringer's lactate	110 ml/kg	In 4 hrs: at first as rapidly as possible until a radial pulse is palpable

NOTES: (a) Initially, older children can drink 300 ml/hour. (b) If Ringer's lactate or Hartmann's solution is not available, use normal saline.

Diarrhoea/GE Protocol (Excluding Severe Malnutrition)

- Antibiotics are NOT indicated unless there is dysentery or persistent diarrhoea and proven amoebiasis or giardiasis.
- Diarrhoea of >14 days may be complicated by intolerance of ORS, worsening the diarrhoea. If seen change to IV regimens.
- All cases to receive zinc.

Management – Rehydration Protocol for All Ages (Summary)
For children with severe dehydration:

- The volumes indicated are guidelines only.
- Rehydration must be evaluated in terms of clinical signs, not in terms of volume of fluids given.
- Monitor the child with shock every 15–30 minutes until pulse is palpable.

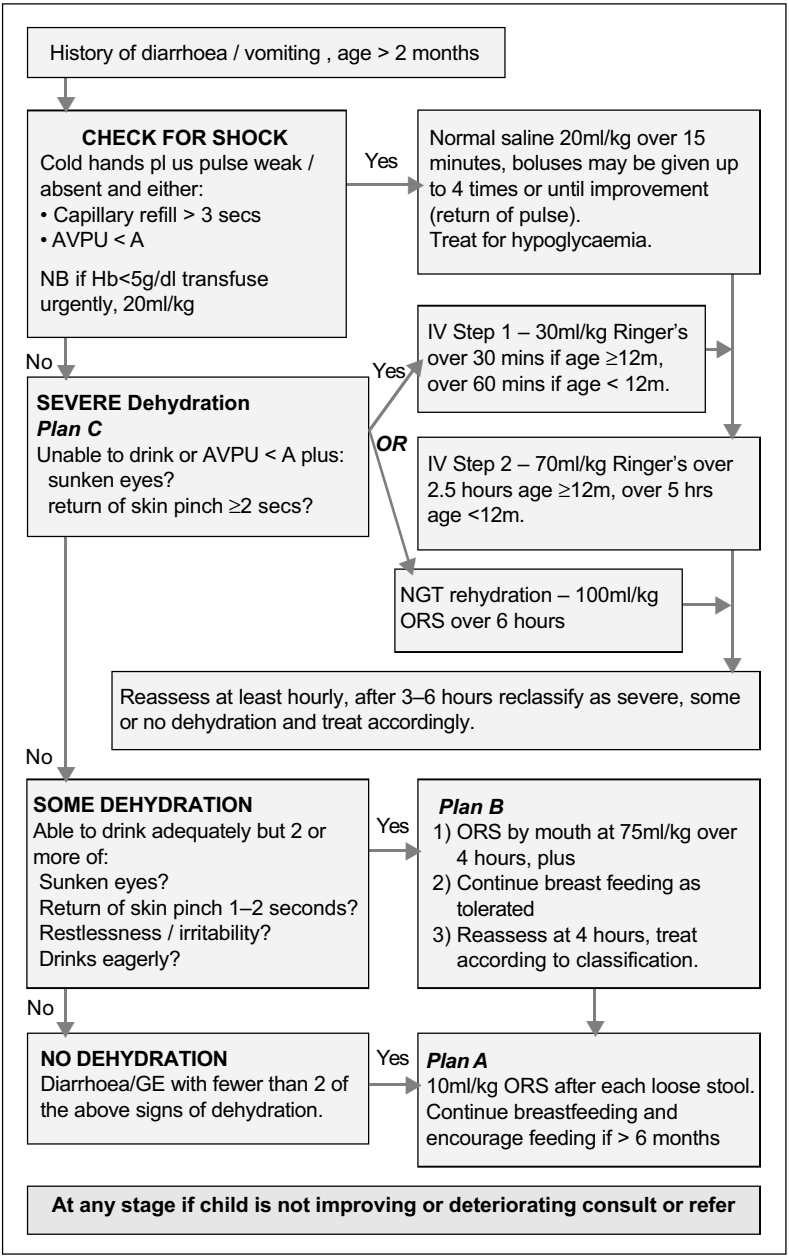
Thereafter monitor other signs of dehydration:

- If signs of severe dehydration persists, repeat the rehydration in Plan C (Table 18.2).
- If improving and child can drink, start ORS (about 5ml/kg/hr). Show the mother how to give ORS.
- Evaluate preferably every hour until signs of dehydration disappear (usually within 4 hours).
- If diarrhoea is severe (>1 stool every 2 hours) continue with IV fluids.

For other children continue ORS (Plan A – Table 18.2):

- Fluid to be given after correction of dehydration:
  - Up to 2 years: 50–100ml for every stool passed.
  - 2–5 years: 100–200ml for each loose stool.
  - 5 years and above: 300ml and more as desired. Thirst is the best guide for maintenance fluid therapy in older children.
- If child vomits, wait 10 minutes and give same volume slowly.
- Periorbital oedema is a sign of fluid overload: If this occurs stop the ORS and give plain water or breast milk in breastfeeding children.

Figure 18.1: Flowchart for diarrhoea/dehydration management



All children under 5 years give zinc for 10–14 days:
- Up to 6 months 10mg/day
- 6 months and above 20mg/day

Ask caregiver to return to health facility if no improvement in 3 days or if the patient develops the following:
- Many watery stools, very poor drinking, repeated vomiting, fever, marked thirst and blood in stool.
- Also if the caregiver is not happy with the condition.

☛ ***At any stage if child is not improving or deteriorating consult or refer.***

Management – Nutrition
It has been shown that there is no physiological reason for discontinuing food during bouts of diarrhoea and that continued nutrition is beneficial to all children. Continued feeding should be encouraged, for example:
- Under 6 months: Breastfeed on demand as soon as baby is able to feed.
- 6–24 months: Breastfeed on demand and offer complementary food.
  - ORS should constitute about two-thirds of the fluid intake until diarrhoea ceases.
- 2 years and above: Family foods can be eaten while continuing ORS:
  - Give cereal or starchy food mixed with some vegetable or protein foods.
  - Give fresh fruit or mashed bananas to provide potassium .
  - Food based fluids (soups, enriched uji, madafu, mala) can be used during the oral rehydration phase.
  - Give an extra meal per day for 2 weeks after recovery.
  - Give vitamin A if child has not received a dose in the last 3 months.

Management – Pharmacological
- Note that 50–60% of acute gastroenteritis in young children is viral.
- Anti-diarrhoea drugs (e.g., absorbents) and antiemetics are contraindicated in children.
- If child has fever, consider other diseases associated with diarrhoea (e.g., malaria, otitis media, pneumonia).
- Antimicrobial drugs should be used for children ***only*** as follows:
  - Antibiotics only for dysentery and suspected cholera.
  - Antiprotozoal drugs: Metronidazole for:
    - Amoebiasis only after antibiotic treatment of bloody diarrhoea has failed or faeces shows trophozoites of E. histolytica.
    - Giardiasis when diarrhoea has lasted over 14 days and cysts or trophozoites of giardia are seen in faeces.
- Antibiotics for specific intestinal infections are listed in Table 18.5.

☛ **Most acute diarrhoea in children is viral AND does NOT require antibiotics**

Table 18.5: Antibiotics used in the treatment of diarrhoea

Aetiology/Clinical Features	Management
Cholera: Very profuse watery diarrhoea (rice-water stools), often vomiting	Tetracycline Children >8 years: 500mg Q8hr × 2–3 days ***OR***Erythromycin 30mg/kg/day(max 250mg) Q8hr × 3 days **2nd line** Chloramphenicol 50–100mg/kg/day Q6hr
Shigella dysentery: Blood & mucus in stools, cramps, tenesmus, fever	Ciprofloxacin 20–30mg/kg/day Q12hr (max 1.5g/day)

18.2 Persistent Diarrhoea

This is diarrhoea that starts acutely but lasts 14 days or more. Can be watery or with blood. Degree of dehydration assessed as in acute diarrhoea. Causes include:

- Malnutrition
- Occult infections
- HIV
- Candidiasis
- Amoebiasis
- Giardiasis

Note: Persistent and prolonged diarrhoea predisposes to malnutrition especially if the nutritional status was borderline.

Management

Management for dehydration the same as that for acute diarrhoea. Then:

- Treat underlying condition if present
- Do not give antibiotics unless there is specific indication
- Rehydration as for acute diarrhoea

Feeding Recommendation for a Child With Persistent Diarrhoea

- Successful diet is characterized by:
  - Weight gain
  - Adequate food intake according to age
  - Disappearance of diarrhoea.
- If still breastfeeding, give more frequent, longer breastfeeds, day and night.
- If not breastfeeding: use fermented milk products such as “Mala” or yoghurt or any other high protein but low lactose food or drinks as these are tolerated better. The aim is to give 110 calories/kg/day, of which 10% is protein.
- Use locally available food.
- For other foods, follow feeding recommendations for the child’s age. Ensure adequate intake
- Encourage the child to feed.
- Give an extra meal per day and continue until 1 month after diarrhoea has stopped.

- Give micronutrients:
  - Multivitamin supplements,
  - Vitamin A,
  - Folate,
  - Iron, and
  - Zinc

Prevention of Gastrointestinal Tract (GIT) Infections

- Adequate nutrition
  - Breastfeed exclusively up to age 6 months and continue together with adequate complementary foods up to age 2 years.
- Food hygiene
  - Ensure that all food consumed by the whole household is prepared and stored hygienically. This also depends on availability of safe and adequate water supply.
  - Boil water for drinking or treat with sodium hypochlorite.
- Environmental sanitation
  - Ensure proper disposal of wastes (human and household) in the homes and communal areas. This is essential.
  - Wash hands with soap after using the toilet.
- Managing food handlers
  - Require regular examination of food handlers, especially in schools.
  - Ensure appropriate treatment of food handlers when necessary.

19. Fever

Fever is a common but non specific presenting sign in children. Any child with a temperature of 37.5 C or above is said to be febrile. Fever accompanies a wide variety of illnesses and does not always need to be treated on its own. In general, the cause should be ascertained as far as possible before therapy is started.

Clinical Features

History should take into account the duration, place of residence or travel to areas of high malaria transmission, pain on passing urine, pain in the ears, and whether there is a rash or not. A thorough physical examination to find localizing signs should also be done.

- Fever without localizing signs can be due to:
  - Malaria
  - Septicaemia
  - Urinary tract infection
  - HIV
- Fever with localizing signs can be due to:
  - Ear or throat infection
  - Pneumonia
  - Septic arthritis or osteomyelitis
  - Meningitis
  - Skin and soft tissue infection

- Fever with a skin rash is commonly due to:
  - Viral infections
  - Could also be due to meningococcal infection
- Fever lasting longer than 7 days can be due to:
  - Abscesses
  - Infective endocarditis
  - Tuberculosis
  - HIV
  - Salmonella infections
  - Any chronic infection or inflammatory condition
  - Malignancies

Investigations
- Full blood count
- Blood smear for malaria parasites
- Urinalysis and microscopy
- Blood culture and sensitivity
- If fever lasts > 7 days, in addition to the above do:
  - Mantoux test
  - Chest x-ray
  - HIV test
  - Any specific test according to suspected cause

Management – General
- Ask parent to reduce child's clothing to a minimum in all cases.
- Ensure adequate fluid intake.
- Ensure adequate nutrition.
- If fever is high (>39°C) or child in pain, give paracetamol (refer to Table 19.1).
- Treat the cause if identified.
- Give an antimalarial if at risk (see Section 20, on malaria).
- Review child after 5 days.
- Ask parent to return any time if child is not improving or is getting worse.

Table 19.1: Paediatric paracetamol doses, every 6 hours

Age	Weight(kg)	500mg tablet	l20mg/5ml syrup
2 months up to 12 months	6–9	¼	2.5–5ml
12 months up to 3 years	10–14	¼	5–10ml
3 years up to 5 years	15–19	½	10ml

☛ ***Fever alone is not a reason to give antibiotic except in a young infant (age less than 2 months).***

Management – Specific
Identification of the cause is the key to management and helps to prevent overuse of specific drugs, e.g., antibiotics or antimalarials.

Management of Fever at the Community Level
Since most of the cases of fever occur at the community level, it is essential to train health care providers and caregivers where applicable on early recognition and prompt initiation of treatment at the community level. This includes not only the use of the appropriate antimalarial, but also the use of other methods to control fever. The patients should be taken immediately to a health facility if there are any features of severity as described in the section on severe malaria below.

20. Malaria

Malaria parasites are usually transmitted by the bite of an infected female anopheles mosquito. Plasmodium falciparum is the commonest type in Kenya and is associated with significant morbidity and mortality. The other species are: P. malariae, P. vivax and P. ovale.

20.1 Clinical Features of Malaria

20.1.1 UNCOMPLICATED MALARIA

Classically, malaria presents with paroxysms of fever, chills, rigors, and sweating. Other features include:

- Malaise
- Headache
- Myalgia
- Joint pains
- Refusal to feed
- Nausea
- Vomiting
- Abdominal discomfort
- Diarrhoea

20.1.2 SEVERE AND COMPLICATED MALARIA

This presents with a combination of most of the above plus one or more of the following:

- Severe anaemia (Hb <5g/dl)
- Lethargy or altered unconsciousness or coma
- Generalized convulsions
- Jaundice
- Hypoglycaemia (blood sugar <2.2mmol/L)
- Respiratory distress, pulmonary oedema
- Acidosis
- Disseminated intravascular coagulopathy – DIC (spontaneous bleeding)
- Malaria haemoglobinuria (Coca-cola coloured urine)
- Oliguria
- Shock
- Fluid electrolyte imbalance

20.2 Diagnosis of Malaria

20.2.1 CHILDREN UNDER 5 YEARS OLD

- In high malaria endemic areas, any child with fever or history of fever should be presumptively classified and treated as malaria. The use of parasitological diagnosis is not a prerequisite for treatment.
- In low malaria endemic areas, any child with fever or history of fever in the absence of measles, running nose, or any other identifiable cause of fever should be presumptively classified and treated as having malaria. The use of parasitological diagnosis is recommended where possible.

20.2.2 OLDER CHILDREN OVER 5 YEARS OF AGE

- In all patients 5 years and above with fever or history of fever, the use of parasitological diagnosis is recommended.
- At health facilities where malaria diagnostics (microscopy or RDT) are not available, patient with fever or history of fever in whom the health worker strongly suspects malaria and has eliminated other possible causes of fever, should be presumptively classified and treated as malaria.

20.2.3 ADDITIONAL INVESTIGATIONS IN PATIENTS WITH SEVERE AND COMPLICATED MALARIA

- Thick blood smear for malaria parasites (several slides may need to be done)
- Thin blood smear for parasite count (parasitaemia >5%) species identification and RBC morphology
- Full blood count
- Blood sugar
- Serum bilirubin
- Urea and electrolytes, creatinine
- Urinalysis and microscopy
- Lumbar puncture in unconscious patients
- Blood culture

☛ ***A negative slide does not necessarily rule out malaria.*** Where cerebral malaria is suspected appropriate therapy must be instituted promptly. On the other hand, a positive blood smear may be coincidental – up to 30% of the population in high endemic malaria parts of the country have parasitaemia without features of malaria.

20.3 Treatment of Uncomplicated Malaria

20.3.1 FIRST LINE TREATMENT FOR ALL AGE GROUPS

The recommended first line treatment for uncomplicated malaria in Kenya is artemether-lumefantrine currently available as a co-formulated tablet containing 20mg of Artemether and 120mg of lumefantrine. This is administered as a 6-dose regimen given over 3 days (see Table 20.1)

Table 20.1: Dosing schedule for artemether-lumefantrine

Body weight	No. of tablets recommended at approximate timing (hours) of dosing (each tablet contains 20mg A and 120mg L)					
	0 h	**8 h**	**24 h**	**36 h**	**48 h**	**60 h**
5–14kg (<3 yr)	1	1	1	1	1	1
15–24kg (4–8 yr)	2	2	2	2	2	2
25–34kg (9–14 yr)	3	3	3	3	3	3
>34kg (>14 yr)	4	4	4	4	4	4

The regimen can be expressed more simply for ease of use at the programme level as follows: the second dose on the first day should be given anytime between 8 and 12 hours after the first dose. Dosage on the second and third days is twice a day (morning and evening).

- **Malaria patients with HIV/AIDS should be managed according to the same regimen above.**
- **In children below 5kg (under 2 months of age), malaria is not a common cause of fever. Evaluation of other causes should be undertaken. Where malaria is diagnosed, the recommended treatment is oral quinine.**

20.3.2 COUNSELLING AND FOLLOW UP

For all patients the following counselling messages should be provided:

- Explain dosing schedule: Use probing questions to confirm patient's understanding.
- Emphasize that all 6 doses must be taken over 3 days even if patient feels better after few doses.
- Directly observe the first treatment dose.
- Repeated the dose if vomiting occurs within 30 minutes after drug administration.
- AAdvise that artemether-lumefantrine should preferably be taken with a meal.
- Advise patients to return immediately to the nearest health facility if their condition deteriorates at any time, or if symptoms have not resolved after 3 days.

20.3.3 SUPPORTIVE TREATMENT

- Fever management: In cases of hyperpyrexia (temp >39.5^{o}C) administer an antipyretic. The recommended options are paracetamol or ibuprofen.
- Encourage adequate fluids and nutrition: Caregivers should be encouraged to give extra fluids and where applicable to continue breastfeeding. Feeds and fluid should be administered as small quantities in frequent intervals, especially when the child is still very sick.

20.3.4 TREATMENT FAILURE

Treatment failure can be defined as a failure to achieve the desired therapeutic response after the initiation of therapy. Treatment failure is not synonymous with

drug resistance. Treatment failure may result from poor adherence to treatment, unusual pharmacokinetic properties in that individual, or drug resistance. Treatment failure could also arise because of a wrong diagnosis and thus initiating the wrong treatment. In evaluating a patient with treatment failure, it is important to determine from the patient's history whether they vomited previous treatment or did not complete a full treatment course.

Treatment failures should be suspected if patient deteriorates clinically at any time or if symptoms persists 3–14 days after initiating drug therapy in accordance with the recommended treatment regimen.

Development of symptoms 14 days after initiation of therapy where there has been prior clearance of symptoms should be considered as a new infection and be treated with the first line drug.

- **Remember that not all fevers are due to malaria. A fever that does not respond to adequate antimalarials may be due to other causes.**

20.3.5 SECOND LINE TREATMENT FOR ALL AGE GROUPS

The recommended second line treatment for uncomplicated malaria in Kenya is oral quinine. This is administered as a daily dose of 30mg/kg in 3 divided doses of 10mg/kg for 7 days (refer to Table 20.2).

Table 20.2: Dosing schedule for quinine tablets

Quinine sulphate 200mg		Quinine 300mg salt (sulphate, dihydrochloride, hydrochloride)	
Weight in kg	**No of tabs**	**Weight in kg**	**No of tabs**
4–7kg	1/4	6–11kg	1/4
8–11kg	2	12–17kg	1/2
12–15kg	3/4	18–23kg	3/4
16–23kg	1	24–35kg	1
24–31kg	1 2	36–47kg	1 1/2
32–39kg	2	48kg and above	2

For children below the lowest weight category, the dosage of quinine is 10mg/kg and the tablets should be reconstituted into syrup based on the weight of the patient.

20.4 Management of Complicated Malaria

20.4.1 EMERGENCY CARE (SEE PAEDIATRIC EMERGENCIES)

- **Airway, breathing, circulation**
- **Correct hypoglycaemia if present**
- **Treat convulsions if present**
- **Measures for unconscious patients**

Management – Specific

- IM quinine (see Figure 20.1 and Tables 20.3 and 20.4) 15mg/kg – loading dose 32–39kg
- Oral quinine: Can be used via NGT when parenteral quinine is not available

Figure 20.1: Management of complicated malaria

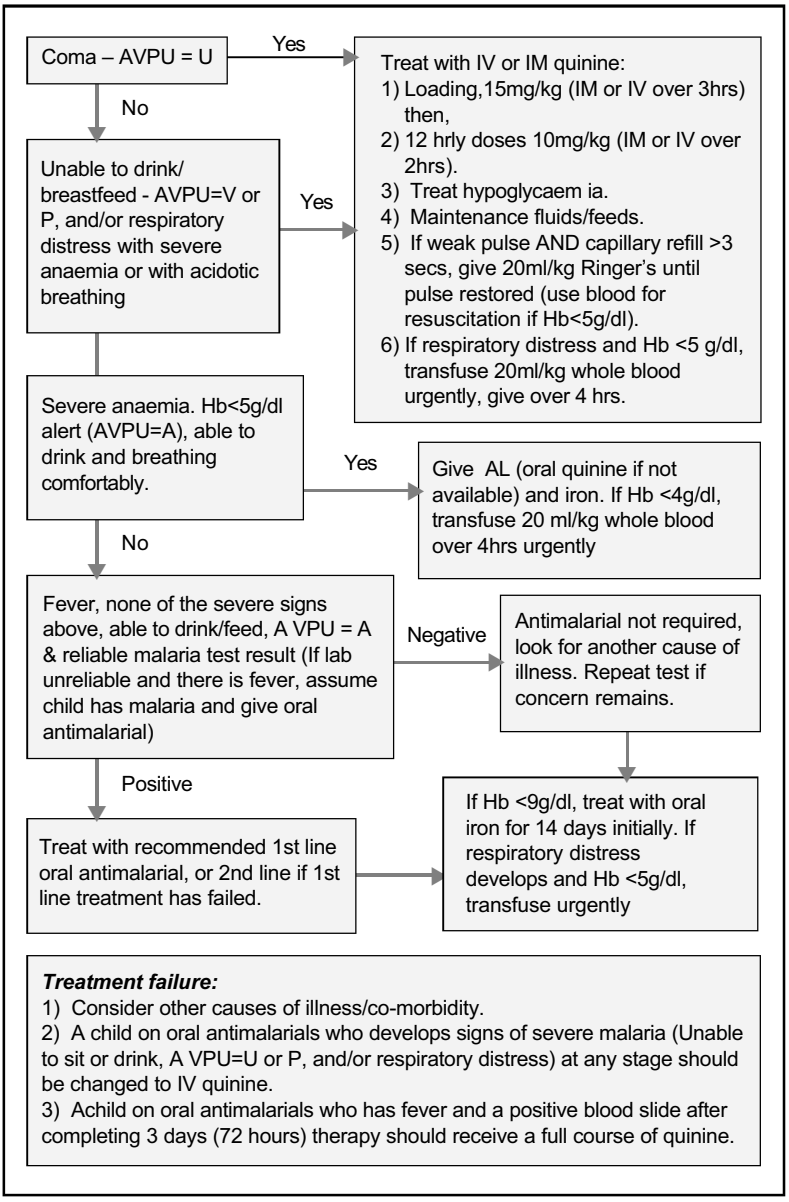


Table 20.3: Dosage of intra-muscular injection of quinine dihydrochloride (for younger children)

After dilution to 50mg/ml

Weight range(kg)	Volume of quinine injection (ml)	No. of injection sites
< 5	1.0	1
5– < 8	1.5	1
8– < 11	2.0	1
11– < 13	2.5	1
13–< 16	3.0	1
16–< 19	3.5	2*
19– < 21	4.0	2*
21– < 23	4.5	2*
23– < 26	5.0	2*
26– < 29	5.5	2
29– 30	6.0	2

* Inject half to each thigh

Table 20.4: Dosage of intra-muscular injection of quinine dihydrochloride (older children)

After dilution to 100mg/ml

Weight range (kg)	Volume of quinine injection (ml)	No. of injection sites
31– < 36	3.2	2
36– < 41	4.0	2
41– < 46	4.5	2
46– < 51	5.0	2
51– < 56	5.5	2
56– < 60	6.0	2
60 +	6.0	2

Notes: Dilution to 100mg/ml
Use 10ml sterile syringe.
Draw up 4ml of sterile water for injection. Then into the syringe, draw up 600mg (2ml) from an ampoule of quinine and shake. The syringe now contains 100mg quinine per ml.
NOTE: Each injection should not be more than 3ml per injection site. The maximum dose is 600mg.

20.4.2 MALARIA TREATMENT IN MALARIA ENDEMIC AREAS

If a high quality blood slide is negative, then only children in coma or those with severe anaemia should be treated presumptively for malaria.

20.4.3 MANAGEMENT OF COMPLICATIONS

☛ **Admit all patients with complications.**

- Coma: Exclude other causes especially meningitis. If in doubt and cannot do an LP then treat as meningitis in addition to malaria.
- Shock: Besides disturbed fluid electrolytes balance, this can be due to septicaemia. Again if in doubt give antibiotics.
- Severe anaemia: When Hb < 4g/dl transfuse. Do not use diuretics during transfusion as often these children are hypovolaemic.

- Renal failure (oliguria and rising blood urea and creatine): If persistent oliguria after correction of fluid electrolytes balance, refer to renal specialist.
- Refer or consult if:
  - Facility not able to manage complications.
  - Patient deteriorating despite presumed adequate care.
- Follow up:
  - Children with cerebral malaria may have residual neurological complications that may need rehabilitation depending on the disability.

20.5 Prevention of Malaria

20.5.1 CHEMOPROPHYLAXIS

- Anti-malaria prophylaxis should be given to the following groups:
  - All non-immune visitors to malarious areas use mefloquin or proguanil
  - Long-term residence >4 weeks
  - Short-term residence <4 weeks
- Use proguanil for:
  - Patient with sickle cell disease and thalassaemia
  - Patients with tropical splenomegaly syndrome or splenectomy
- Chemoprophylaxis regimes
  - Proguanil (daily dosing) non immune visitors: Start daily 1 week before arrival and continue for 4 weeks after leaving malarious area. Refer to Table 20.5 for dosage.
  - Others use indefinitely.

Table 20.5: Proguanil dosage schedule

Proguanil	Daily PO
1–4 yrs	50mg (½ tablet)
5–8 yrs	75mg (¾ tablet)
9–12 yrs	100mg (1 tablet)
Adult	200mg daily (2 tablets)

20.5.2 REDUCE CHANCES OF BEING BITTEN BY MOSQUITOES

- Use insecticide treated nets (ITNs): In high malaria areas it is recommended that all sleep under ITNs but especially children under age 5 years and pregnant women.
- Use wire mesh to reduce entry of mosquitoes into the house.
- Use insect repellants especially for visitors.
- Cover exposed skin in the evenings.

20.5.3 VECTOR CONTROL

- Encourage all households to clear bushes around the house, drain any stagnant water, and cover or avoid throwing away containers that may collect water.
- Participate in indoor residual spraying campaigns in epidemic prone areas.

20.5.4 PATIENT EDUCATION

- Seek early treatment for fever and to remember that not all fevers are due to malaria.
- Always seek medical care if the fever does not respond to antimalarials.
- If they take antimalarials, complete the dose as prescribed to prevent development of resistance.

21. Measles

Also called rubeola. It is one of the commonest childhood infectious exanthems. Measles is never subclinical, but the severity of the disease is related to the infective dose of the virus and the nutritional status of the child. Crowding tends to increase spread of the disease.

Clinical Features
Incubation 7–10 days. Fever. Catarrhal phase 2–3 days with cough, red eyes, and runny nose followed by maculopapular rash. Assess for danger signs, clouding of the cornea, or extensive mouth ulcers.

Complications
These must be looked for in all patients:

- Serious signs: Persistent fever with darkening of the rash ("black measles") and subsequent desquamation.
- Stomatitis and mouth ulcers: Compromises sucking and feeding.
- Laryngitis: Distinguish a benign prodromal laryngitis from that due to a secondary infection, which may be severe.
- Bronchopneumonia: Usually severe; Gram-negative organisms or staphylococcus.
- Diarrhoea: Either due to virus or from a secondary infection.
- Vitamin A deficiency: Keratoconjunctivitis. Measles increases the consumption of vitamin A and often precipitates xerophthalmia and subsequent blindness.
- Encephalitis: Caused by the measles virus itself; it occurs on about the 5th day of the rash, subacute sclerosing pan encephalitis (SSPE) is an important late complication.
- Malnutrition: Precipitated by anorexia, stomatitis, fever, vomiting, diarrhoea, and other complications.

Management

- Uncomplicated cases can be treated at home.
- Treatment with antibiotics is not recommended.
- Give an antibiotic only if pneumonia (Section 24.2) or otitis media (Section 27.1) are present. Consider staphylococcal pneumonia if the child has had prior antibiotic treatment for pneumonia
- Give two doses of oral vitamin A for treatment as follows: First dose in the clinic then give the mother 1 dose to give at home the next day:
  - 50,000 IU for young infants aged less than 6 months and <8kg

  - 100,000 IU for infants aged 6–12 months
  - 200,000 IU for children 12 months to 5 years
- Treat fever (temperature 39°C) if present with paracetamol.
- Careful skin and eye care should be provided. Give antibiotic eye ointment for conjunctivitis only if there is purulent eye discharge.
- Nutrition: Severe stomatitis/mouth ulcers may prevent feeding. Maintaining oral hygiene and, where there is candidiasis (thrush) in the mouth, application of gentian violet after cleaning it with salt water, is necessary.
- Supervised feeding: Expressed breast milk feeds and occasionally nasogastric tube feeding will be needed
- Assessment: Nutritional follow up is very necessary. Increasing the frequency of feeding (an extra meal per day over the usual feeding) after measles illness is very important to help the child regain lost weight adequately.
- Admit if the following are present:
  - A haemorrhagic rash
  - Stridor (from infection of the larynx and trachea; laryngotracheitis)
  - Pneumonia, dehydration, or severe under-nutrition
  - Great difficulty in drinking or eating
- For the hospitalized child, give supportive care.

Prevention

Immunization: Measles immunization is given to babies who are 9 months or above irrespective of whether they have suffered from measles/measles like illness. Measles immunization should be given to babies 6 months and above in the following circumstances:

- Siblings to a child with measles illness.
- Children living in crowded places, refugee camps, children's homes.
- Children admitted to hospital for any condition (age 6–9 months).
- Children in a locality with measles epidemic.

☛ **All children 6 months of age or older who are not immunized against measles and are brought to a health facility for any reason should be immunized and given Vitamin A supplements before leaving that facility.**

Advice to Mothers/Caregivers

- Ensure all her children are fully immunized.
- Child should attend under 5 years children clinic on discharge.
- Treat complications:
  - Conjunctivitis: With tetracycline eye ointment; review after 2 days. If improving ask mother to complete treatment. If not improved refer.
  - Acute otitis media: With cotrimoxazole or amoxicillin. Review after 5 days.
  - Mouth ulcers: With gentian violet or nystatin if has thrush.
  - Pneumonia: See Section 24.2, on pneumonia.
  - Malnutrition: Commonly follows an infection of measles. It is precipitated by anorexia, stomatitis, fever, vomiting, diarrhoea, and other complications. Also important are frequent harmful cultural practices that impose fasting upon a child with measles.

- Nutritional follow up is very necessary. Increasing the frequency of feeding (an extra meal per day over the usual feeding) after measles illness is very important to help the child regain lost weight adequately.

22. Meningitis

An acute inflammation of the pia and arachnoid coverings of the brain with spread into the cerebro-spinal fluid (CSF). It is important to diagnose and start treatment early in order to prevent complications. The predominant causative bacterial organisms (pyogenic meningitis) vary with the age of the child. Haemophilus influenzae commonly affects children under 5 years, while streptococcus pneumoniae (pneumococcus) tends to be more common after age 5 years. Hib immunization, however, is reducing the incidence of meningitis due to H. influenzae. Viruses (aseptic meningitis), Tubercle bacilli (Tuberculous meningitis), and fungi (fungal meningitis) also cause meningitis. Neisseria meningitidis (meningococcus) tends to cause meningitis in epidemics and affects all ages.

Predisposing factors for meningitis in children are:
- Low immunity,
- Prematurity,
- Septicaemia,
- Infections in the nose, sinuses, ears, throat and lungs
- Penetrating injuries of the skull and spinal column, and
- Congenital malformations of the brain and spine.

Clinical Features (Child >2 months)
Fever, refusal to feed, vomiting, repeated convulsions, irritability, altered level of consciousness, headaches, photophobia, neck stiffness and positive Kerning's sign. Young children may also have bulging anterior fontanelle and high pitched cry. Signs of increased intracranial pressure include sutural daistasis, increased head circumference, unequal pupils, focal neurological signs, and irregular breathing. Patients presenting late in the progression of the disease may have decerebrate rigidity or opisthotonos. For tuberculous meningitis, the onset is more gradual and non specific. Child may complain of headache, vomiting, and poor feeding for several days before features of meningitis appear. Gradually the child becomes stiff and loses consciousness.

Complications
These include subdural effusion, hydrocephalus, blindness, deafness, secondary epileptic fits, mental retardation and cerebral palsy. The child may also have retardation in their physical development.

Investigations
- Lumbar puncture (after fundoscopy to rule out papilloedema)
- Haemogram

- Blood glucose
- Chest x-ray
- Mantoux test, if there is history of contact with TB or fever lasting >7 days
- Indian ink staining in patients with HIV infection (cryptococcal infection)
- HIV test if not known

CSF Characteristics
- Refer to Table 22.1 for CFS charactisitcs.
- Always treat as pyogenic meningitis if the CSF is cloudy, blood stained, or cannot be obtained.
- Admit patient if meningitis is suspected. Initiate treatment immediately.

Table 22.1: CFS characteristics

Nature of CSF	Colour	Protein	Sugar	Cells
Normal	Crystal clear	Below 0.4g/L	Above 2.5mmol/L	0–5(x10/L)
Pyogenic	Cloudy	High	Low or NIL	Hundreds to thousands, mainly polymorph
Tuberculous	Clear OR opalescent	Moderately raised	Low	A few hundreds mainly lymphocytes
Viral	Clear OR opalescent	Moderately raised	Normal	A few hundreds mainly lymphocytes

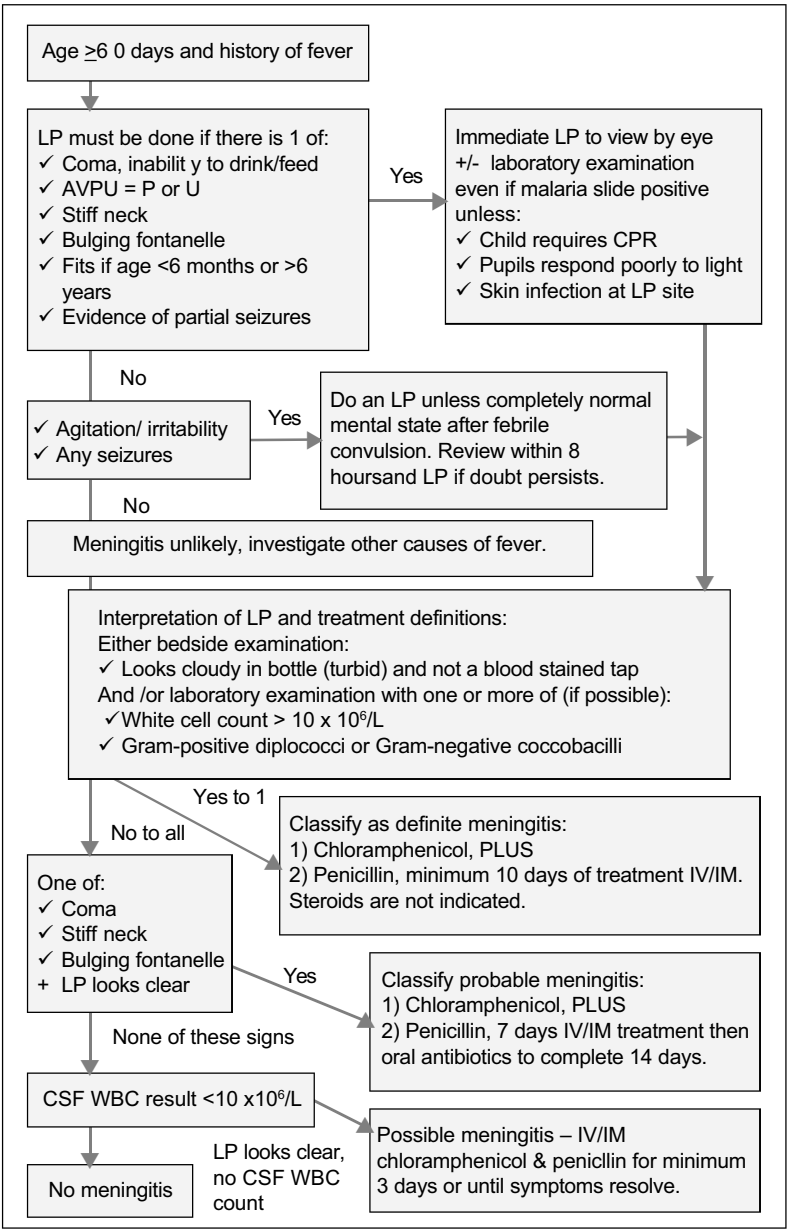
Management – General
- Follow the patient's progress:
  - For children up to 24 months do daily head circumference.
  - Monitor the condition (how "well" or "ill" child is).
  - Take the temperature and pulse.
  - Feel the fontanelle.
  - Assess neck stiffness/Kerning's sign.
  - Maintain fluid and electrolyte balance.
  - Ensure child is passing urine well.
  - Continue anticonvulsant if there were convulsions.
  - Ensure adequate nutrition for age.
- Treat for malaria if in malarious area.

Refer to Figure 22.1 for assessment and management of meningitis.

Management – Pharmacological

Antibiotics – Pyogenic Meningitis
- Give penicillin + chloramphenicol for children under 5 years; penicillin only for 5 years and above as follows:
  - Benzyl (crystalline) penicillin:
    - Under 1 year of age: 100,000 units/kg IV STAT, then 250,000 units/kg/24 hours IV in 4 divided doses

Figure 22.1: Flowchart for assessment and management of meningitis



  - 1–6 years of age: 1,200,000 units IV STAT then 2,500,000–5,000,000 units per 24 hrs IV in 4 divided doses
  - 7–12 years of age: 2,400,000 units IV STAT, then 5,000,000–10,000,000 units per 24 hours in 4 divided doses
- Chloramphenicol:
  - Up to 1 month of age: 25mg/kg IV STAT, then 50mg/kg 24 hours in 4 divided doses
  - Over 1 month of age: 50mg/kg IV STAT, then 100–150mg/kg 24 hours in 4 divided doses.
- After 2–5 days of intravenous therapy and provided there is satisfactory improvement, benzyl penicillin can be given IM and the chloramphenicol can be given orally in the same doses
- Treatment should continue for:
  - 5–7 days in meningococcal meningitis
  - 21 days in salmonella meningitis
  - At least 14 days in all other cases of pyogenic meningitis.

Tuberculous meningitis

See Section 28.8, on Tuberculosis.

Cryptococcal meningitis

- Fluconazole loading dose 10mg/kg (max 400mg), then 3–6mg/kg/24hours (max 12mg/kg/24 hours)
- Refer, re-evaluate, or consult if:
  - There is no improvement after 3–4 days of full treatment.
  - The condition is deteriorating.
  - Patient develops a widespread skin rash, or easy bleeding before or during treatment.
  - All children with complications as they will need specialized therapy according to the disability.
  - After full treatment, child is brought back with fits with or without fever.

Prophylaxis for Meningococcal Infections

- All close contact or household members
- Sulphadiazine 500mg–1g BD PO for 2 days (if the organism is susceptible)
  OR
- Rifampicin: Neonate – 10mg/kg/24hours; > 1 month 20mg/kg/24 hours; maximum 600mg BD PO for 2 days,
  OR
- Minocycline children over 8 years – 4mg/kg/dose maximum 200mg BD PO for 2 days
- Purified capsulate polysaccharide vaccine is available to control outbreaks but it must be administered within 3–7 days of case identification to prevent an epidemic. The vaccine is not suitable for children <2 years.

☛ **Notify the medical officer of health if meningococcal meningitis is diagnosed.**

23. Altered Consciousness or Convulsions

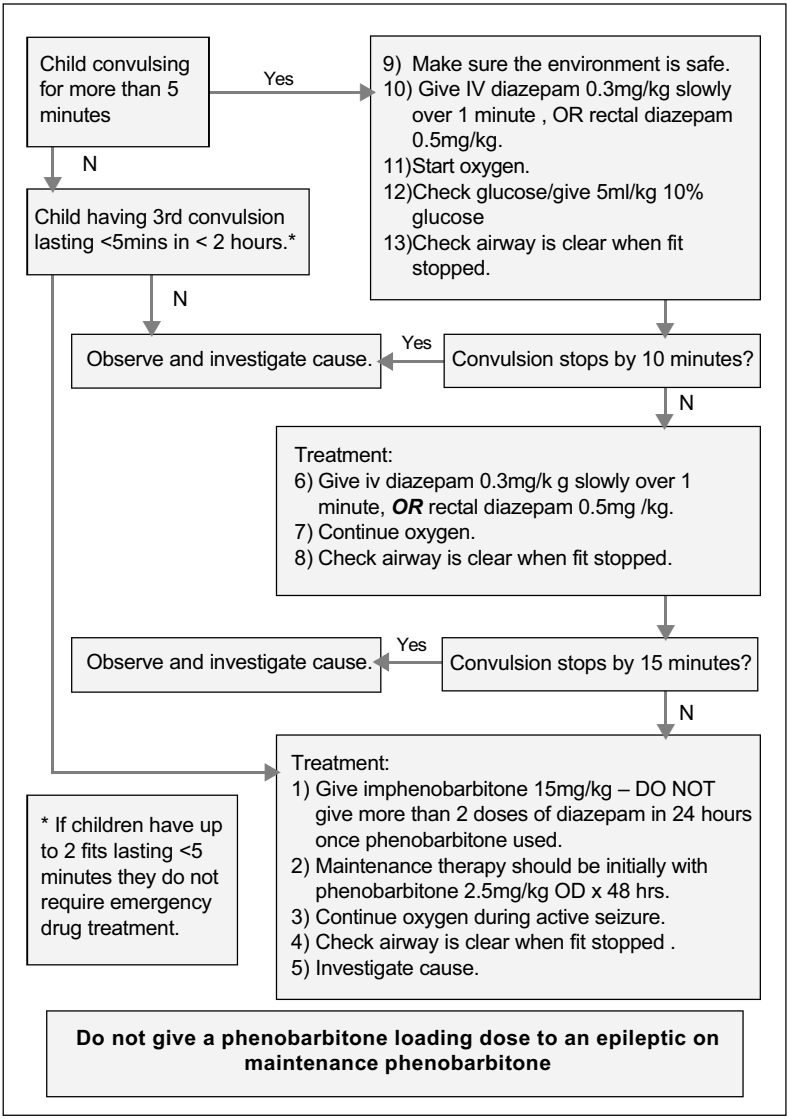
Aetiology
Infections (malaria, meningitis, encephalitis), trauma, tumours, cerebro-vascular accidents, complications of diabetes mellitus, epilepsy, liver failure, drug ingestion, poisoning and shock

Clinical Features
- A detailed history from parent or care giver to establish the cause and duration is crucial. The convulsion should be described in detail.
- The child should be put on the side to avoid aspiration.
- Clinically diagnostic abnormalities should be noted as the following emergency paediatric care is instituted:
  - Assess airway, breathing, and circulation.
  - Assess level of consciousness
- Children up to 5 years use the AVPU scale:
  - A = Alert; V = responds to Voice; P = responds to Pain; U = Unresponsive
  - Children older than 5 years can be assessed using the Glasgow coma scale
- If the child is convulsing:
  - Resuscitate as needed and give anticonvulsants if convulsing (see flow chart Figure 23.1).
  - Admit the child and examine all the systems fully to establish the cause of coma.

Investigations
- Full blood count
- Blood slide for malaria parasites
- Blood culture and sensitivity
- Blood sugar
- Lumbar puncture
- Urea electrolytes and creatinine
- Liver function tests if indicated
- Other tests according to suspected cause

Management
- Continue monitoring vital signs and level of consciousness.
- Ensure adequate ventilation and circulation.
- Monitor fluid and electrolytes.
- Feeding
- Treat the cause.
- Give antimalarials and antibiotic when indicated.
- Continue anticonvulsants if was convulsing.
- Turn patient 2 hourly to avoid pressure sores.
- Prevent contractures by regular daily passive exercises if condition becomes long-standing.

Figure 23.1: Flowchart for management of convulsing child



Refer or consult if:
- Patient does not respond to therapy or is deteriorating.
- Special investigation or treatment is needed that may not be available in your station.

Treatment of Convulsions
- Convulsions in the first 1 month of life:
  - Treat with phenobarbitone 20mg/kg STAT; a further 5–10mg/kg can be given within 24 hours of the loading dose (maximum 30mg/kg in 24 hours).
  - Give maintenance doses of 5mg/kg daily.

24. Respiratory Diseases

Acute respiratory infections are common and have varying severity. Severe forms are responsible for high mortality in children under 5 years. Early diagnosis and proper treatment of pneumonia is essential to reduce mortality.

24.1 Acute Upper Respiratory Tract Infections

24.1.1 COMMON COLD (ACUTE RHINITIS, CORYZA)

An acute, usually afebrile, viral infection of the respiratory tract with inflammation of all the airways including the nose, paranasal sinuses, throat, larynx, and often the trachea and bronchi.

Causes

These include rhinoviruses, influenza viruses, parainfluenza viruses, respiratory syncytial viruses, corona viruses, adenovirus, and coxackie viruses.

Clinical Features

Nasal obstruction, watery rhinorrhoea, sneezing, sore throat, cough, watery red eyes, headache and general malaise. Most children with these features do not present to health facility. Young infants may have difficulty breastfeeding due to blocked nostrils.

Management

Most colds resolve spontaneously in 7–10 days. The following is recommended.
- Avoid aspirin, which may increase the risk of Reye's syndrome in children
- Avoid cough and cold remedies in the form of antihistamines, cough suppressants, expectorants, and mucolytics.
- Treatment includes:
  - Analgesics, e.g., paracetamol if febrile
  - Adequate fluid intake

Patient Education
- The child's nose should be cleared regularly and the child should be returned to the health facility if their condition gets worse.

- The child should be kept warm and breastfed frequently; the nose should be cleared if it interferes with breastfeeding.
- The child should be brought back to the health facility if breathing is difficult or feeding becomes a problem.

☛ **Note: Antibiotics are of no value in viral infections.**

24.1.2 PHARYNGITIS AND TONSILLITIS

Acute inflammation of the pharynx and tonsils caused by streptococcus, viruses and occasionally diphtheria.

Clinical Features

Sore throat, painful swallowing, general malaise, fever, body aches, rhinitis. In children vomiting and abdominal pain may be present. Tender cervical or submandibular lymph nodes usually indicates streptococcal infection. Look for membrane in case of diphtheria.

Complications

Streptococcal infections include otitis media, rheumatic fever with or without carditis.

Investigations

- Full blood count
- Throat swab if possible

Management

If conjunctivitis is present, consider viral infection and treat symptomatically at home. If there are yellowish spots or membrane on tonsils or tender lymph nodes treat as streptococcal infection at home with amoxicillin. (If patient is allergic to penicillin use erythromycin.) Admit if:

- Patient deteriorates or goes on to develop peritonsillar or retropharyngeal abscess.
- There is a grey adherent membrane on tonsils and throat, exclude diphtheria by a throat swab. Barrier nurse a patient who may be toxic. Give crystalline penicillin 25,000 units/kg QDS for 7 days and antitoxin if available.

24.1.3 DEEP NECK INFECTION

These are infections (cellulitis or abscesses) in the potential spaces around the neck, e.g., peritonsillar space, retropharyngeal space, submandibular space and parapharyngeal space.

Management

Start on systemic antibiotics, e.g., amoxicillin or amoxicillin + clavulanic acid then refer because of the risk of airway obstruction.

☛ **Treatment with antibiotics for LESS THAN 7 days may NOT prevent rheumatic fever.**

24.1.4 DISEASES OF THE ADENOIDS

ADENOID HYPERTROPHY

Commonly occurs in children. It may be due to simple enlargement, to inflammation, or to both. It is the size of the mass relative to the nasopharyngeal space rather than the absolute size that is important.

Clinical Features

Nasal obstruction leading to mouth-breathing, difficulty in breathing and eating, drooling of saliva, snoring, and toneless voice. “Adenoid facies” may later develop. Eustachian tube obstruction leads to deafness, inflammatory process in the nose, sinuses, and ears. Other features are persistent nasal discharge, cough, cervical adenitis. Mental dullness and apathy may be marked due to poor breathing, bad posture, or deafness. Eustachian tube obstruction leads to deafness. Nocturnal enuresis, habit tics, and night terrors may be aggravated.

Investigation

Lateral soft tissue x-ray of the nasopharynx – shows narrowing of the nasopharyngeal air space.

Management

Conservative treatment – for patients with mild symptoms:

- Chlorpheniramine 0.4mg/kg/day (or other antihistamine)
- Antibiotics in presence of infection as for acute tonsillitis.

Refer to ENT if

- Failure to improve
- Refractory cases
- Features of chronic upper airway obstruction

24.1.5 SINUSITIS

This is usually a complaint following a URTI or is seasonal. It can be acute or chronic. It can be infective or allergic in origin.

Clinical Features

Child will have pain over affected sinus.

Management

- If the nasal discharge is watery, with nasal obstruction, sneezing and a pale/bluish nasal mucosa, treat with antihistamines.
- If the nasal discharge is purulent, with nasal obstruction, an early nocturnal cough and an inflamed nasal mucosa, treat with antibiotics for a week.
- Children, who have bilateral purulent nasal discharge of more than 10 days duration treat with amoxicillin for 7 days. If the purulent nasal discharge is unilateral, exclude foreign body especially in young children.
- Refer to ENT if there is failure of treatment, onset of complications, or need for surgical intervention.

24.1.6 ACUTE EPIGLOTTITIS

A severe infection of the epiglottis and surrounding tissues that may be rapidly progressive and fatal because of sudden airway obstruction by the inflamed tissues. Haemophilus influenzae type B is almost always the pathogen. Very rarely streptococci may be responsible. Infection through the respiratory tract extends downwards to produce a supraglottic cellulitis with marked inflammation. The inflamed epiglottis mechanically obstructs the airway. The work of breathing increases; resulting CO2 retention and hypoxia may lead to fatal asphyxia within a few hours.

Clinical Features

Onset frequently acute, fulminating. Sore throat, hoarseness, high fever and dysphagia developing abruptly. Respiratory distress with drooling, tachypnoea, dyspnoea and inspiratory stridor. Child may lean forward and hyperextend the neck. Deep suprasternal, supraclavicular, intercostal and subcostal inspiratory retractions.

Management

A ***This is an absolute emergency! Speed in treatment is vital.***

- Admit immediately if the diagnosis is suspected.
- Secure airway immediately (nasotracheal intubation or tracheostomy)
- Allow the child to remain in the position of comfort.
- Do not try to examine the throat.
- Avoid sedatives.
- Provide careful and skilled nursing care to remove secretions, which may cause obstruction even after intubation.
- IV chloramphenicol 50–100mg/kg in 4 divided doses in 24 hours.

Direct visualization of the epiglottis by a designated trained person may reveal a beefy red, stiff, and oedematous epiglottis. An airway should be placed immediately!!

☛ ***Remember that manipulation may initiate sudden fatal airway obstruction.***

24.1.7 CONDITIONS PRESENTING WITH STRIDOR

Stridor is a harsh sound heard during inspiration when there is narrowing of the upper airways, including oropharynx, subglottis, larynx, and trachea.
Conditions presenting with stridor include:

- Viral croup including that due to measles
- Retropharyngeal abscess
- Foreign body inhalation
- Diphtheria
- Pressure on the airways by masses in the neck or mediastinum
- Congenital laryngeal anomaly

Clinical Features

- Viral croup: Barking cough, hoarse voice, respiratory distress if obstruction is severe (tachypnoea, supraclavicular, suprasternal, subcostal and intercostal inspiratory retractions, cyanosis). Fever in 50% of children. Signs of measles if it is the cause.
- Retropharyngeal abscess: Swelling in the neck, difficulty in swallowing, drooling, fever.
- Foreign body: History of choking, sudden onset of respiratory distress.
- Diphtheria: Severe neck swelling, membrane on throat and tonsils.
- Congenital anomaly: Stridor from birth.
- Pressure on airways: Obvious masses in neck or mediastinum on x-ray.

Management

- Mild croup can be treated at home. Encourage adequate intake of fluids and feeding according to age.
- Ask the mother to bring child back immediately she notices difficulty in breathing or feeding
- Foreign body: This may be life threatening if main airway is blocked. Action should be immediate if the child is to survive (see Section 17.8, Choking, with the accompanying chart)
- Severe cases will need care in an intensive care unit:
  - Be prepared for intubation and/or tracheostomy
  - Administer O2
  - Nasotracheal intubation if signs of severe obstruction occur: Severe chest indrawing, agitation, anxiety (air-hunger) and cyanosis
  - Tracheostomy may be done if intubation is impossible.

24.2 Lower Respiratory Tract Infections: Pneumonia

Pneumonia in children ages 2 months to 5 years can be classified as

- Very severe pneumonia: Presence of any one danger sign or central cyanosis or severe respiratory distress. Auscultatory signs of pneumonia or presence of complications
- Severe pneumonia: Presence of one of the following – lower chest retraction, flaring alae nasi, grunting. Auscultatory signs of pneumonia, but no signs of very severe pneumonia.
- Non severe pneumonia: Child with fast breathing; signs of pneumonia on auscultation, but no signs of severe or very severe pneumonia.

☛ **Management of pneumonia depends on age and severity.**

24.2.1 PNEUMONIA IN CHILDREN AGED BELOW 5 YEARS

Clinical Features

Infant aged less than 2 months

Pneumonia, sepsis, and meningitis in infants less than 2 months of age can rapidly lead to the death of the infant. Specific symptoms may be lacking. These conditions should be suspected if any of the following are present:

- Stopped feeding well (if feeding well before)
- Convulsions
- Abnormally sleepy or difficult to wake
- Stridor in calm child
- Wheezing
- Fever (38°C or more) or low body temperature (below 35.5°C)
- Severe chest indrawing
- Fast breathing (60 per minute or more)
- Central cyanosis (of the tongue)
- Grunting
- Apnoeic episodes
- Distended and tense abdomen

Clinical features in child aged 2 months – 5 years

The following are important to find out about in history:

- Duration of cough or difficulty in breathing
- Chocking or sudden onset in a previously well child
- Exposure to someone with TB
- Known HIV infection
- Family history of asthma
- Presence and duration of fever

☛ **The following features are danger signs and their presence makes the illness very severe:**

- Not able to drink or breastfeed.
- The child had convulsions or is convulsing now.
- Abnormal sleepiness (lethargy) or difficult to wake (unconscious).

Examination should be carried out in a calm child to determine the following:

- Respiratory rate (breaths per minute)
- Lower chest indrawing
- Stridor
- Wheeze
- Severe malnutrition

Evaluate carefully to make a diagnosis of the cause of cough or difficult breathing, which might be caused by a number of conditions, including the following:

- Pneumonia and its complications (pleural effusion, empyema, pneumothorax)
- Malaria
- Cardiac disease with cardiac failure
- Severe anaemia
- Foreign body aspiration, and
- Tuberculosis infection

Investigations

- Full haemogram
- Blood slide for malarial parasites

- Chest x-rays for suspected cardiac disease, suspected TB, any pneumonia that does not respond to antibiotics within 48 hrs, suspected complications of pneumonia, children with HIV infection
- Blood culture and lumbar puncture in young infants

Management of Acute Respiratory Infection and Pneumonia
See ARI/pneumonia protocol for children aged 2 months to 4 years (Figure 24.1), and Table 24.1 for cut-off points for fast breathing.

NOTE: Presence or absence of either fever OR crepitations (rales) on auscultation are NOT reliable clinical features for diagnosing pneumonia in young children. The features listed above are more sensitive in identifying these diseases and facilitating their effective intervention.

Table 24.1: Fast breathing cut off points

Age	Fast breathing
Under 2 months (young infant)	60 breaths per minute or more
2 months – 12 months	50 breaths per minute or more
>12 months up to 5 years	40 breaths per minute or more

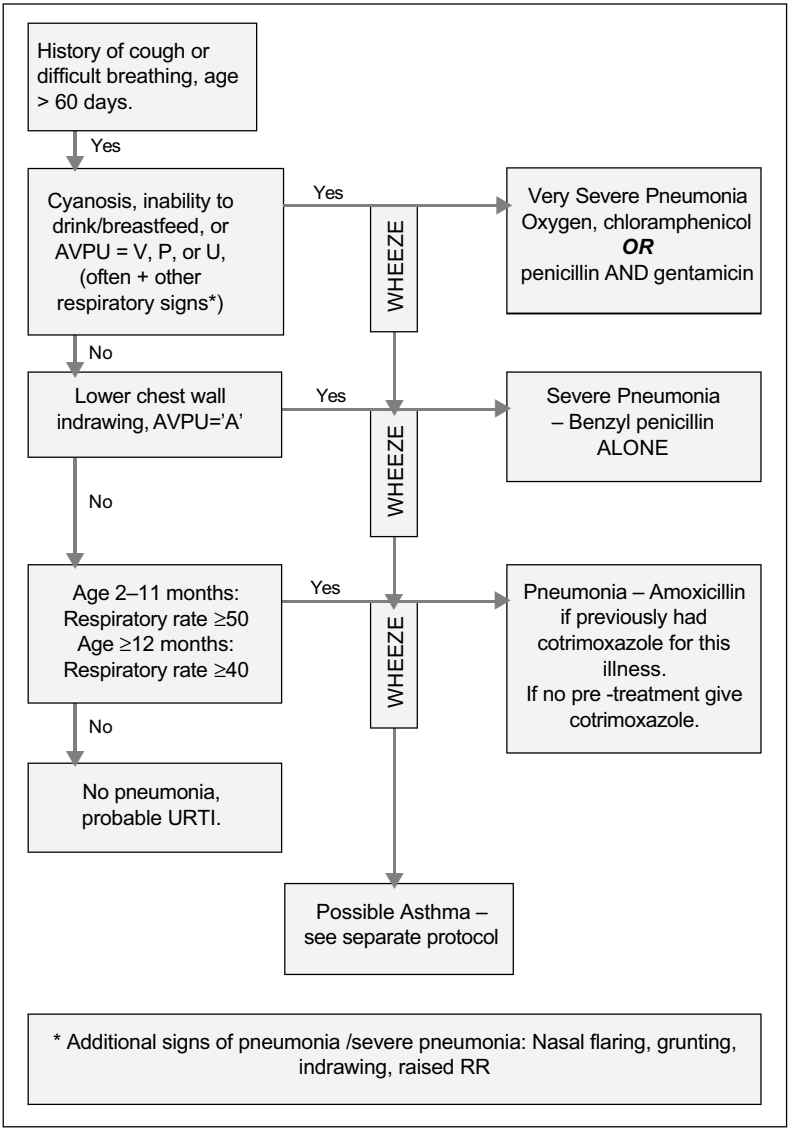
24.2.2 NON SEVERE PNEUMONIA IN CHILDREN OVER 2 MONTHS OF AGE

- Treat as outpatient – use amoxicillin 25–50mg/kg/day
- Give first dose of antibiotic in clinic
  - Instruct mother on how to give the antibiotic for the five days at home (or to return to clinic for daily procaine penicillin injection).
  - Ask mother to bring the child for review after 2 days or earlier if child gets worse (see danger signs).
- Advice to mothers if child can be treated as outpatient:
  - Feed the child:
    - Feed the child during illness
    - Increase feeding after illness
    - Clear the nose if it interferes with feeding
  - Increase fluids:
    - Offer the child extra drink
    - Increase breastfeeding

NO Pneumonia: Cough or Cold
A child classified as having *NO Pneumonia: Cough or Cold*, should be monitored at home on home treatment. However, the caregiver should be told to bring the child back to the health facility quickly if the child develops any of the following:
- Breathing becomes difficult
- Breathing becomes fast
- Child is not able to drink
- Child becomes more sick.

☛ **Admit all infants and children with severe disease and any child not responding to treatment.**

Figure 24.1: ARI/Pneumonia protocol for children aged 2 months to 4 years



Management of Children Admitted with Pneumonia

Management – Supportive (all children admitted)

- Give oxygen by nasal prongs or catheter until signs of hypoxia disappear (cyanosis or severe respiratory distress) or oxygen saturations are above 90% on pulse oxymetry
- Monitor vital signs 3 hourly
- Give paracetamol if temperature is > 38°C
- Clear mucus from nose and throat by gentle suction
- Maintain fluid and electrolyte balance use nasogastric tube if needed
- Feed as soon as possible
- Reassess response twice daily.

Management – Antibiotics

For those under 2 months:

First line antibiotics:

- Benzyl penicillin 50,000 units/kg IM Q12hr for first week of life, 50,000 units/kg IM Q6hr for infants 1 week to 2 months old and gentamicin 5mg/kg OD IV first week of life, 7.5mg/kg OD for infants 1 week to 2 months old.
- Treat for at least 5 days. Continue for 3 days after child is well.
- If meningitis suspected: Treat for at least 10–14 days. Using penicillin plus gentamicin chloramphenicol can be substituted for first choice drug: 12.5mg/kg Q12hr for infants 0–14 days, 12.5mg/kg Q12hr for infants 14 days to 2 months old. Do not give chloramphenicol to premature infants.

Second line antibiotics:

- Ceftazidime 90–150mg/kg/day Q8hr IV/IM or ceftrioxone 50–75mg/kg/day OD.

For those aged 2 months to 5 years:

☛ **Severe pneumonia**

First line antibiotics:

- Benzyl penicillin 50,000 units/kg IM/IV Q6hr. If no improvement after 48 hours, add gentamicin 7.5mg/kg IM/IV OD.

☛ **Very severe pneumonia**

First line antibiotics:

- Benzyl penicillin plus gentamicin. If no improvement after 48 hours or suspect Staphylococcal pneumonia use cloxacillin or flucloxacillin instead of penicillin.

Second line antibiotics:

- Ceftazidime or ceftriaxone
- Treatment of complications:
- Effusion, empyema, pneumothorax
  - Drainage is essential unless they are small and there is no respiratory embarrassment. If using syringe and needle, repeated aspiration will have to be done. It may therefore be preferable to insert a chest tube and do continuous underwater drainage.

Children with HIV or suspected HIV infection:

- It is preferable to carry out an HIV test on all children admitted with pneumonia to ensure adequate management.
- If proven HIV infection: First line therapy is penicillin/amoxicillin with gentamicin for 10 days. Change to ceftriaxone if child does not respond within 48 hours.
- In addition to above, give cotrimoxazole (high dose 8mg/kg TMP/40mg SMZ) for 3 weeks to all infants aged 2–11 months and older children who have clinical or radiological signs of PCP.

Counselling Parents

All parents should be informed about child's illness and what to do to prevent recurrence. They should be encouraged to seek medical attention early in the disease to prevent severe features, which are associated with poor outcomes and are more difficult and costly to treat. Admit ALL infants under 2 months of age with suspected pneumonia, sepsis or meningitis

24.2.3 PNEUMONIA IN CHILDREN OLDER THAN 5 YEARS

Children aged 5 years and older are less likely to suffer from pneumonia than the younger children, unless they have another underlying condition. In a previously well child, the causative organism in this age group is usually pneumococci leading to consolidation of the lung parenchyma (lobar pneumonia). Organisms vary if a child is immunocompromised, has chronic lung disease, developed pneumonia operatively or after aspiration, or is debilitated.

LOBAR PNEUMONIA

Breathlessness, cough with or without sputum (which may be rust coloured), fever, pleuritic chest pain, bronchial breathing, reduced chest movements, reduced breath sounds, tachypnoea, crackles, and percussion dullness.

NON LOBAR PNEUMONIA

The clinical features are similar to those of lobar pneumonia except that there is no bronchial breathing. Complications are similar to those for younger children.

MANAGEMENT – NON SEVERE PNEUMONIA

Outpatient management:

- IM benzyl penicillin STAT, then amoxicillin for 7 days.
- If penicillin allergy is present: Erythromycin for 7 days.
- Analgesics: Paracetamol ***OR*** aspirin.

Child should be reviewed after 5 days.
Meanwhile, parents should be instructed to bring the child back to the health facility earlier if condition worsens or there is no response after 2 days.

Admit the child if:

- Cyanosis is present.
- Respiratory distress (RR >25 per minute) is present.

- Heart failure or pleural effusion is present.
- More than one lobe is involved.
- There is poor response as outpatient.
- Patient is dehydrated.
- Child has additional problems.

Investigate to identify any underlying cause.

Inpatient management
First line antibiotic:
- IV/IM Crystalline penicillin Q6hr till response, then discharge and treat as outpatient.

Second line antibiotic:
- If failed outpatient treatment or immunocompromised – cefuroxime, ceftazidime or ceftriaxone. If staphylococcal pneumonia is suspected, consider cloxacillin or flucloxacillin.
- If atypical organisms are suspected (mycoplasma or Chlamydia) add erythromycin or clarithromycin.
- Consider PCP if HIV infected.
- Give oxygen if indicated.
- Ensure adequate fluid, electrolyte and food intake.
- Manage underlying condition.
- Carry out further investigations like haemogram and HIV test.

24.3 Conditions Presenting with Wheeze

A wheeze is a high pitched sound during expiration due to narrowing of the small airways. Infections or allergic reactions can cause narrowing of the airways.

Clinical Features
The following clinical features are commonly noted: Wheezing sound from the chest, prolonged expiratory phase of respiration, increased effort at expiration, diminished air entry on auscultation, lower chest indrawing, recurrent cough especially at night, hyper-inflated chest, and cyanosis in severe cases. When wheezy coughs occur repeatedly, the child is considered to have asthma. Wheezing may or may not be complicated by pneumonia of bacterial or viral aetiology.

Conditions That Present with Wheeze
- Bronchiolitis: Child less than 2 years of age. Seasonal outbreaks. Caused by respiratory syncytial virus in most cases. It is not relieved by rapid acting bronchodilators. Secondary bacterial infections are common.
- Wheeze associated with coughs and colds: Responds to bronchodilators.
- Foreign body: May have history of choking but may have occurred unnoticed. No response to bronchodilators.
- Pneumonia: Fever and crepitations in the chest.
- Asthma: Recurrent wheeze with or without upper or lower respiratory infections. Good response to bronchodilators.

Management

For children with first episode of wheeze:

- Give a rapid-acting bronchodilator – salbutamol via metered dose inhaler 2 puffs (200μg) with or without a spacer according to age. Spacer can be made using a 1 litre plastic container (Figure 24.2). If inhaler is not available use nebulizer 2.5ml salbutamol. If neither is available give adrenaline 0.05ml/kg of 1:1,000 solution subcutaneously.
- Assess response after 15 minutes. Signs of response are:
  - Less respiratory distress
  - Less lower chest retraction
  - Improved breath sounds
  - Manage according to the cause and severity
- Bronchiolitis: Classify and treat as for pneumonia under 5 years of age.
- Wheeze associated with cough or cold: Treat at home.
- Foreign body: Foreign body with partial airway obstruction will need removal via bronchoscopy.
- Pneumonia: See sections above on pneumonia.

Figure 24.2: Inhaler with a spacer. If unaffordable, use a plastic 750ml or 1 litre soft drink bottle

For a child with asthma (children with recurrent wheezing):

- First episode and no respiratory distress:
  - Treat at home with inhaler or oral salbutamol
- Respiratory distress or recurrent wheeze
  - Response to a rapidly-acting bronchodilator is an important part of the assessment of a child with recurrent wheezing to determine whether the child can be managed at home or should be admitted for more intensive treatment.
  - Rapid acting bronchodilator should be given as above and the child's condition should be assessed 30 minutes later. If respiratory distress has resolved – the child should be treated with inhaler at home. The mother should be taught how to use the inhaler. If inhaler is not possible, then oral salbutamol should be used.
- Table 24.2 presents drugs and dosages for treating a child with wheeze.

Admit the child if still distressed with or without cyanosis and:

- Give oxygen until cyanosis disappears or oxygen saturation >90%.
- Give first dose of prednisone 2mg/kg/day continue for 3-5 days. IV hydrocortisone 4mg/kg only if oral prednisone is not possible.

Table 24.2: Treatment of child with wheeze

Rapid acting bronchodilator		Oral salbutamol 3 times daily for 5 days		
		Age or weight	2mg tablet	4mg tablet
Subcutaneous epinephrine (adrenaline) (1:1,000 = 0.1%)	0.01ml/kg bodyweight	2–12 mon (10kg)	2	¼*
Salbutamol inhaler in a spacer 750–1,000ml	2 puffs per dose. 1 dose in 10 min.	12 mon to 5 yrs (10–19kg)	1	
Nebulized salbutamol 5mg/ml				
Under 1 yr	0.5ml salbutamol in 2.0ml sterile water			
>1 yr	1.0ml salbutamol in 2.0ml sterile water			

Note:
(a) In all cases use of inhaler is better and cheaper than nebulizer or oral salbutamol.
(b) Steroids should be used early. Oral steroids are as effective as parenteral ones.
(c) When this is done aminophylline is rarely needed.
(d) Fluids should be limited to two thirds of the daily requirement.
(e) Antibiotics should be given only if there are clear signs of infection.
(f) Adrenaline is only used if use of inhaler is not possible.

- Repeat rapid acting bronchodilator (preferably salbutamol inhaler) at hourly intervals for 3 doses.
- If not improved IV aminophylline 5mg/kg can be given slowly over 20 minutes.
- Monitor vital signs every 3hrs. Signs of improvement are:
  - Less respiratory distress (easier breathing)
  - Less chest retraction
  - Improved breath sound especially in a previously quiet chest.
  - When the patient stabilizes, discharge child on inhaler or oral salbutamol.

24.3.1 STATUS ASTHMATICUS

Clinical Features

This is a clinical diagnosis defined as increasingly severe asthma not responsive to usual drugs. Child is too breathless to feed or talk; there is severe chest retraction; tachypnoea.

- ***May have features of respiratory failure:***
  - Altered consciousness
  - Poor respiratory effort
  - Silent chest
  - Cyanosis

- ***Admit: Child may need ICU care***
  - Monitor vital signs every 15–30 minutes.
  - Keep propped up in bed.
  - Administer oxygen by intranasal catheter flow rate of 1–2 litres per minute.
  - Treat as per acute attack of asthma (see section on asthma above).
  - Look for and correct dehydration.
  - Avoid antibiotics unless specifically indicated.
  - Ventilate if necessary using bag and mask.

24.3.2 LONG-TERM AND HOME CARE OF ASTHMA

This depends on severity

- Mild intermittent: Daytime symptoms <2 per week and night <2 per month.
  - Care: short/rapid acting bronchodilators as needed.
- Mild persistent: Daytime symptoms >2 per week and <1 per day; night >2 per month.
  - Care: Long-term medication – low dose inhaled corticosteroids daily.
  - Attacks – Short/rapid acting bronchodilators
- Moderate persistent: Daily symptoms and night >1 per week
  - Care: Long-term medication – low to medium dose inhaled corticosteroids daily with or without long acting bronchodilator.
  - Attacks – Short/rapid acting bronchodilators.
- Severe persistent: symptoms continuous during day and frequent at night.
  - Care: Long-term medication – daily high dose inhaled corticosteroids and long acting bronchodilators with systemic steroids if needed.
  - Attack: Short acting bronchodilators.

Important to note:

- Clear and preferably written instructions on how and when to use the inhaler at home.
- Report immediately to a health facility when home treatment is ineffective.
- Avoidance or reduction of triggers/allergens in the home.
- Child in school with exercise induced attacks should use the inhaler before exercise.

24.4 Children Presenting with Chronic Cough

Definition: Cough lasting 14 days or more

Clinical features

General signs include fever, poor weight gain, or weight loss. Other features depend on the specific cause. The following conditions are associated with chronic cough:

Tuberculosis

- Asthma
- Foreign body aspiration, usually children under 5 years: Parents may not remember history of choking. Unilateral wheeze, or pneumonia with poor response to antibiotics suggests diagnosis.
- HIV infection: In addition, these children have chronic chest signs with clubbing of fingers and toes but usually no cyanosis.
- Bronchiectasis: Purulent sputum, bad breath, finger clubbing.
- Lung abscess: Reduced breath sounds over affected part.
- Heart disease: Either due to congestive failure or recurrent pneumonias.

More details for respective clinical features are found in the respective sections for the diseases listed above.

Investigations
- HIV test
- Mantoux test
- Chest x-ray

Management
Management is specific to the underlying disease. Refer/consult as needed.

25. Poisoning

Accidental poisoning is common in children under 3 years of age. Usually a previously well child suddenly falls sick. For the older child, especially the adolescent, it may be a suicide attempt. Common poisons include: Paracetamol, aspirin, pesticides (organophosphates), and kerosene (paraffin). Other poisons include drugs being taken by any member of the family.

General Principles of Management
Parent /caregiver is encouraged to try to identify the type of poison the child has taken. If possible, carry the container to the health facility. Do not give the child anything to drink and do not make the child vomit. In the case of insecticides like diazinon, remove the child's clothing and give the child a bath. In all cases, parents should be encouraged to take the child to a health facility as soon as possible.

Note that most childhood poisoning is preventable by putting drugs and dangerous chemicals out of reach for children. Take full history and try to identify the poisoning agent. Severe poisoning requires hospital admission for appropriate management.

Decontamination
- Stomach: Do not induce vomiting. A gastric lavage is possible if poison was ingested within an hour of presentation to the health facility. Activated charcoal if available can be given. Gastric decontamination is contraindicated in unconscious patients or those who have ingested corrosives or kerosene.
- Skin: Remove clothing and wash thoroughly
- Eyes: Irrigate with water or saline.
- Give specific antidote if indicated.

25.1 Clinical Features and Treatment of Common Poisonings

25.1.1 PARACETAMOL POISONING

Clinical Features
There are four stages of paracetamol poisoning that are recognized if a child has ingested 140mg/kg or more:

- Stage 1: First 24 hours – Anorexia nausea and vomiting
- Stage 2: 24–48 hours – Signs of hepatic dysfunction – jaundice, bleeding
- Stage 3: 72–96 hours – Peak liver dysfunction with possible hepatic encephalopathy
- Stage 4: 4 days–2 weeks – Resolution of liver dysfunction

Management
Treatment can only be done in hospital so admit all children.
Treatment: Give N-acetylcysteine IV or oral within 8 hours of ingestion. Loading dose 150mg/kg in 3ml/kg 5% dextrose IV infusion over 15 minutes. Then 50ml/kg 5% dextrose over 4 hours. Then 100mg/kg of 5% dextrose over 16 hours.

25.1.2 KEROSENE (PARAFFIN)

Clinical Features
Features depend on amount ingested and if there is aspiration. Aspiration results in severe respiratory distress due to pulmonary oedema. Absorbed kerosene leads to encephalopathy with varying degrees of altered consciousness.

Management
Admit all children and monitor as follows:
- Vital signs
- Urine output (1–2ml/kg/hr); catheterize if necessary
- Level of consciousness

☛ **Watch for complications and treat accordingly.**

25.1.3 ORGANOPHOSPHATES (E.G., DIAZINON)

Clinical Features
Headaches, weakness, vomiting, colicky abdominal pain, profuse cold sweating, hypersalivation, muscular twitching, fasciculations, diarrhoea, tenesmus, convulsions, dyspnoea with bronchoconstriction, constricted pupils (meiosis), bilateral crepitations.

Management
- Decontaminate skin (see above)
- Gastric lavage
- IV atropine 0.05mg/kg over 15 min. Repeat every 15 min until full atropinization and maintain on SC atropine 4–6 hours x 24–48 hours.
- If muscle weakness: Pralidoxime 30mg/kg IV infusion repeat 4 hourly, 12–24 hours depending on response.
- Refer/consult if not sure how to manage.

25.2 Prevention of Home Accidents and Poisoning

Every parent is encouraged to keep dangerous items including kerosene and drugs out of reach of young children. Protect children from fires. Avoid leaving small children locked up in houses. Do not store potentially poisonous compounds in soft drink bottles.

26. Neonate and Young Infant (0–2 Months)

26.1 Routine Care at Delivery

Dry the baby with a clean cloth. While drying observe breathing, muscle tone, and colour. If all normal remove the wet cloth, wrap baby in a dry one and give to mother to initiate breastfeeding. Cover baby well to prevent over-cooling. If not breathing, initiate resuscitation as shown in the chart below.
For babies not requiring resuscitation do the following:

- Initiate breastfeeding within an hour of birth.
- Wrap in dry linen.
- Weigh the baby.
- Keep warm next to mother (skin to skin is the best way of keeping baby warm).
- Instill tetracycline eye ointment within 1 hr in both eyes and given only once.
- Examine carefully to exclude congenital malformation.

26.2 Postnatal Care of the Normal Newborn

The infant should join the mother as soon as possible. The following are important:

- Breastfeeding should start within the first hour of life to ensure good positioning and attachment
- Encourage exclusive breastfeeding (no water).
- Babies should be fed on demand at least 8–12 times/24 hours.
- HIV positive mothers who have chosen not to breastfeed should be encouraged to cuddle their babies.
- Observe cord for bleeding and keep it clean.
- Give OPV '0' and BCG.
- On discharge: Counsel the mother on cord care and breastfeeding at home and tell her to bring the baby back immediately if she notices a problem, e.g., poor feeding or jaundice.

What to Teach the Mother
All expectant mothers should be taught about cord care. They need to know that babies often acquire infection through the cord. If they deliver in the community, cutting of the cord with clean instrument is needed. After delivery harmful practices need to be discouraged. Mothers should keep the cord dry until it drops off.

26.3 Neonatal Asphyxia and Resuscitation

A newborn who fails to establish regular breathing and appears blue and/or pale is likely to have asphyxia. Anticipate asphyxia in all high risk pregnancies or if there is irregular foetal heart, foetal bradycardia or tachycardia and meconium stained liquor during labour. Occasionally asphyxia occurs unexpectedly.

☛ ***All persons conducting deliveries should be able to resuscitate a baby at birth. Always be prepared to resuscitate.***

Refer to Figure 26.1 for the correct positioning of the baby's head for opening up the airway and of the caregiver's hands to cardiac massage.

Figure 26.1: Positioning for neonate resuscitation

Correct head position to open up airways and for bag ventilation. Do not hyper extend the neck.

Correct position of hands for cardiac massage in a neonate. The thumbs are used for coompression of the sternum.

Clinical Features

- Assessment is best done following the ABC as in paediatric emergencies (see Figure 26.2).
- APGAR scoring (Table 26.1) can also be used for assessing the degree of asphyxia.

APGAR Scoring
A: Appearance or colour
P Pulse rate
G: Grimace or response to some stimulus
A: Activity (muscle tone)
R: Respiration

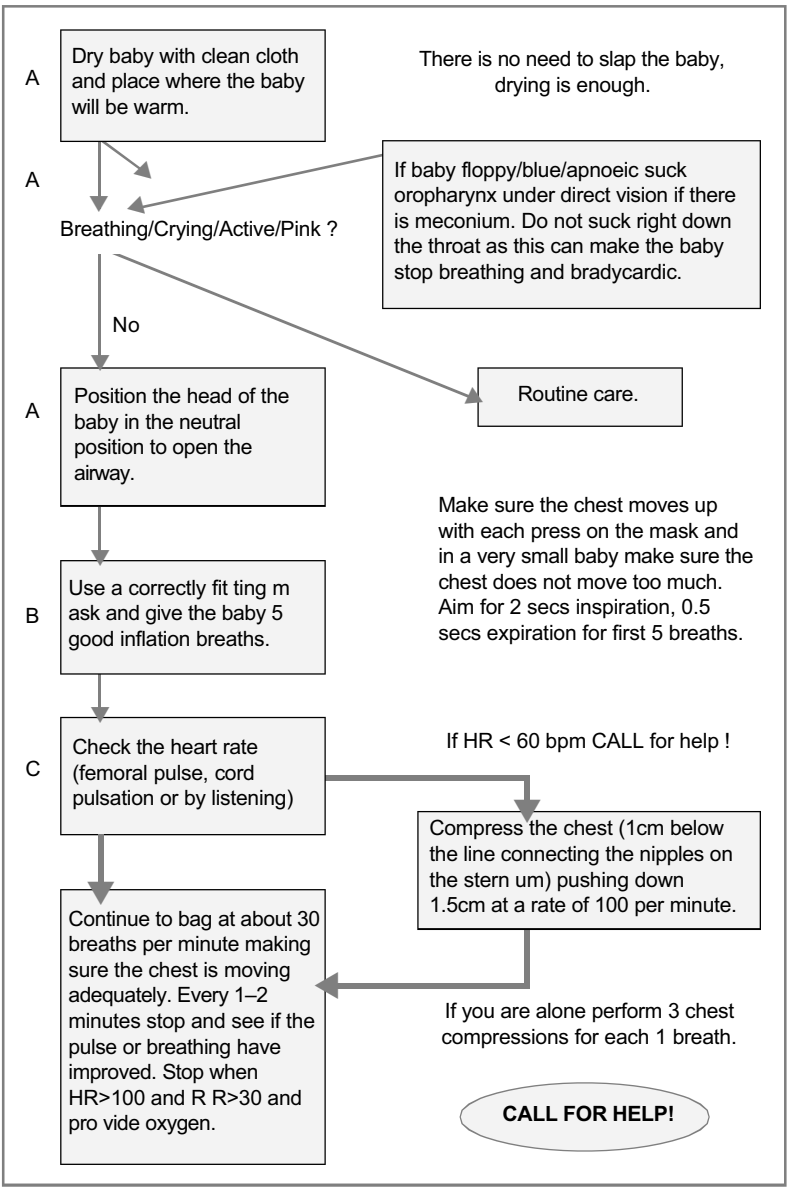
Management

- Management is dependent on the APGAR of the baby. The management recommended at the various APGAR scores is indicated below:
  - APGAR score 7–10: None. Do not suction baby.
  - APGAR score 5–6: Give oxygen.
  - APGAR score 0–4: Initiate resuscitation with bag and mask.
- If the mother had received pethidine: Give naloxone 0.01mg/kg/IV STAT.

Table 26.1: APGAR scoring

Clinical features	Score 0	1	2
Heart rate (per minute)	Absent	Less than 100	Over 100
Respiration effort	Absent	Irregular, slow	Regular
Muscle tone	Limp (floppy)	Some flexion of arms, legs	Well flexed, active motion
Reflex irritability (nasal catheter)	No response	Some motion, grimace	Cries
Colour	Blue, pale	Pink body, blue extremities	Completely pink

Figure 26.2: ABC's of neonatal resuscitation – Call for help!



Harmful practices in a baby who is not breathing include slapping the baby, holding baby upside down, and pouring cold water. These should not be practiced. The act of drying the baby is enough stimulation.
After resuscitation refer the baby to a facility that can deal with complications. Keep the baby warm throughout the journey by using Kangaroo Mother Care.

Complications
The following complications are known to occur:
- Convulsions
- Apnoea or irregular breathing
- Respiratory distress
- Poor feeding
- Floppiness
- Cerebral palsy if still neurologically abnormal at 1 week of age.

☛ **Admit all babies with complications.**

26.3.3 MANAGEMENT OF COMPLICATIONS
- Convulsions:
  - These tend to be atypical and therefore easily missed. They may involve the face (e.g., chewing movements, facial twitches), or twitching of the limbs. They can partial or generalized. Most often they appear within 24 hours of birth.
  - Treatment: Give IV phenobarbitone. Loading dose 20mg/kg/dose. Maximum for 24 hours 30mg/kg. Always give maximum dose before giving another anticonvulsant if the convulsions are not controlled. Addition of phenytoin may sometimes be necessary given in the same doses as phenobarbitone.
- Breathing problems:
  - Give oxygen as needed.
- Feeding:
  - Use NG tube if needed and baby is able to tolerate enteral feeds. Otherwise give IV fluids.
- Floppiness and neurological damage:
  - Start physical therapy as soon as baby stabilizes. Mother to be shown how to feed the baby, how to and stimulate and do passive movements. This may need to be continued after discharge (see cerebral palsy). Counsel the mother all the time. She needs a lot of support and understanding.

26.4 Birth Injuries

Difficult deliveries may lead to birth injuries

Clinical features
- Common injuries requiring no treatment include:
  - Caput succedaneum – Oedema over presenting part.
  - Massive oedema of scalp.
  - Conjunctival haemorrhage.

  - Subgaleal/aponeurotic haemorrhage – Fluctuant swelling on the head not limited by suture lines. Can be extensive to cause anaemia and jaundice.
  - Cephalohaematoma – Firm but fluctuant swelling limited by suture lines. Takes very long to resolve.
- Nerve injuries
  - Erb's palsy – Injury to the upper roots of the brachial plexus: Affected limb held extended at the elbow and forearm pronated.
- Fractures
  - Clavicle – Mother notes the baby cries on being lifted and after a few days swelling along the affected clavicle.
  - Femur or humerus – Affected limb swollen and very painful on movement. There is pseudo paralysis.
- Less common but serious injuries include the following:
  - Intracranial: Can be subdural or intracerebral. Baby is lethargic with signs of raised intracranial pressure and may have convulsions.
  - Intrathoracic: Presents with respiratory distress.
  - Intrabdominal: Usually ruptured liver either subcupsular or haemoperitoneum. If severe, baby shows features of hypovolaemic shock without obvious evidence of external bleeding; consider intrabdominal haemorrhage.

Investigations
- Full blood count if there is pallor
- X-ray of affected limb
- Ultrasound for cranial or abdominal injuries

Management
- Caput succedenum and massive oedema of scalp: Do not need any special treatment.
- Severe scalp bleed: Requires no specific treatment; never aspirate as this predisposes to infection. If anaemia is severe, transfusion may be needed.
- Nerve injuries: Rest the baby for a few days then start passive movements. Most injuries will recover fully. Inform the mother and ask her to lift the baby carefully in order to prevent further injury. Involve an occupational therapist or physiotherapist.
- Fractures: Align the affected limb and immobilize. Usually healing occurs within 3 weeks.
- Intracranial: Refer for drainage if subdural is present.
- Intrathoracic and intrabdominal injuries: Refer for surgery.

26.5 Born before Arrival (BBA)

This is a baby born either at home or on the way to the health facility. Most mothers will not have had a skilled attendant at delivery. Sometimes when the delivery was at night there may be several hours before presenting to the health facility.

Management
Weigh the baby and assess for danger signs (see below). Then do the following, if the baby is stable:
- Keep baby warm if cold.
- Ensure the cord is properly clamped and not bleeding.
- Do a thorough physical examination.
- Clean the cord with spirit.
- Apply 1% tetracycline ointment in both eyes once.
- Initiate breastfeeding unless the baby is unable to breastfeed.
- Treat any underlying condition.

26.6 Organizing Care of Sick Baby 0–2 Months

- **All small babies should not wait in the queue**
- **Arrange for babies to be seen quickly**
- **Assess baby for danger signs before general administrative procedures**
- **Manage the danger signs**

26.6.1 DANGER SIGNS AND THEIR MANAGEMENT

Place the baby in a warm environment, weigh the baby, establish IV access and manage accordingly:

RESPIRATION

- Not breathing (apnoea) or gasping (respiratory rate <20/minute): Start resuscitation immediately.
- Respiratory distress – rate >60/minute, chest retraction, grunting, central cyanosis: Give oxygen by nasal prong or nasal catheter.

SHOCK

Shock can be due to severe blood loss at birth, or dehydration through failure to feed, vomiting or diarrhoea. Dehydration is covered in Section 18, on diarrhoea. For the baby who has lost a lot of blood there will be severe pallor in addition to signs of shock. Signs of shock: cold hands and feet; capillary refill >3 seconds (this may be difficult to elicit in a baby with severe blood loss because of severe pallor); altered consciousness.

For both causes restore circulating blood volume by giving normal saline or Ringer's lactate at 20ml/kg intravenously as rapidly as possible. Reassess and if still in shock repeat the dose. For the baby that has bled, get blood as quickly as possible and transfuse.

UNCONSCIOUS/CONVULSING/SPASMS

These could be due to serious bacterial infection, birth asphyxia, neonatal tetanus or bilirubin toxicity. Establish the cause through history and treat accordingly. Control convulsions using phenobarbital preferably IV 10–20mg/kg; give slowly while watching breathing.

UNABLE TO BREASTFEED

Causes include: serious bacterial infection, birth asphyxia, or low birth weight (preterm baby). Give dextrose 10ml/kg IV or nasogastric tube to prevent or treat hypoglycaemia immediately. This can be followed by giving breast milk as soon as possible according to the condition of the baby.

VERY OR EXTREMELY LOW BIRTH WEIGHT

Refer or admit urgently for specialized care. If referring, "Kangaroo Mother" position can be used to keep baby warm during the journey; pass a nasogastric tube and give expressed breast milk to prevent hypoglycaemia. All babies with danger signs will need admission to a unit that can treat them. Transfer by the quickest means available preferably by ambulance so that you can administer oxygen if the baby has breathing problems.

26.7 Serious Bacterial Infections and Meningitis

Clinical Features

There may be history of maternal fever, prolonged rupture of membranes, and foul smelling amniotic fluid. There may be danger signs and the infant may also have deep jaundice, abdominal distension, or extensive septic skin lesions.

☛ **Note: Up to 30% of neonates with late onset sepsis will have meningitis without the obvious features of bulging fontanelle or neck stiffness.**

Investigations

- Full blood count; ask for a film and count of immature neutrophils. An immature to total ratio of >0.2 signifies infection.
- C-reactive protein (CRP) if available very useful for early diagnosis
- Blood culture
- Lumbar puncture
- Pus swab of any obvious septic area, e.g., umbilicus, skin

Management

Admit the child.

Supportive Care for All Babies

- Thermal environment:
  - Keep dry and well wrapped; you may need extra heat either heating the room or keeping baby in incubator according to size of the baby (minimum room temperature 26°C).
- Fluid/nutrition:
  - Encourage breastfeeding if the baby is able or otherwise feed by tube. Volumes will depend on baby's weight and age.
  - If not able to tolerate enteral feed, then give IV fluid. On day 1 give 10% dextrose. Thereafter give maintenance electrolytes. Parenteral nutrition should be considered if baby is starving for longer than 3–4 days.
- Oxygen therapy:

- Give oxygen by nasal prongs or nasal catheter as needed. Do pulse oxymetry if available to monitor saturation. Oxygen can be discontinued once baby has saturations >90% in room air.

- High fever:
  - Avoid antipyretics; control the environment instead. Uncover the baby for short period then cover. If baby is in incubator reduce temperature.
- Convulsions:
  - Control if present; see section under convulsions.

Management –Specific

- Give IV penicillin and gentamicin; use cloxacillin instead of penicillin if there are skin lesions.
- If not improving in 2–3 days, change to second line: ceftazidime or ceftrioxone with amikacin ***OR*** according to sensitivity of isolated organism
- Duration of therapy: depends on response can be 7–14 days of parental therapy. For meningitis treat for 21 days

26.7.1 COMPLICATIONS OF MENINGITIS

The following neurological sequelae occur:

- Hydrocephalus
- Blindness
- Mental retardation
- Hearing loss
- Motor disability
- Abnormal speech patterns

Prevention

The following preventive measures are important:

- Increased and improved prenatal care.
- Clean and atraumatic delivery.
- Regular cleaning and decontamination of equipment.
- Sound hand-washing principles by all personnel handling babies.
- Regular surveillance for infection.
- Early exclusive breastfeeding.

26.7.2 OTHER INFECTIONS

- Skin:
  - May have few to extensive skin lesions.
  - If few lesions, they tend to occur in flexures and are easily missed.
  - If few lesions, treat as outpatient with either amoxicillin or cloxacillin.
  - Admit if lesions are extensive; treat as for serious bacterial infection.
- Eye infection:
  - Treat with tetracycline eye ointment for 5 days.
- Umbilical sepsis:
  - Presents with pus discharge, foul smell and redness around the umbilicus.
  - If child has no systemic signs treat as outpatient:
- Clean the umbilicus with antiseptic and show mother how to clean at home.

- Review baby after 5 days or earlier if systemic signs develop.
  - If there is periumbilical redness, the baby needs to be treated with antibiotics. Give amoxicillin 50mg/kg/day for 5 days. If baby has systemic signs, refer for admission.

26.8 Respiratory Distress

Respiratory distress occurs when there is failure to maintain adequate exchange of oxygen and carbon dioxide by the lungs for a variety of reasons. It is characterized by: Respiration rate of 60/minute or more (tachypnoea), expiratory grunt, chest or subcostal recession, cyanosis, and flaring of alae nasi. The causes of respiratory distress include:

- Respiratory distress syndrome (RDS),
- Pneumonia,
- Aspiration of meconium or feeds,
- Transient tachypnoea of newborn,
- Congenital heart disease, and (rarely)
- Congenital anomalies of the oesophagus, airways or diaphragm.

Clinical Features That May Assist in Diagnosis

- Respiratory distress syndrome (RDS) is most common in premature babies, but can occur in infants of diabetic mothers and following caesarian section.
- Pneumonia: may be suspected with a history of prolonged rupture of membranes (more than 12 hours) and maternal fever, offensive liquor, or vaginal discharge. These are features of sepsis in the mother.
- Meconium aspiration: Meconium stained liquor and staining of skin, nails, and cord.
- Transient tachypnoea of newborn: Difficult to differentiate from RDS but usually in term/near term babies. Resolves within 24 hours.
- Cardiac lesion: May or may not have murmurs depending on the defect.

Investigations

- Full blood count
- Blood culture
- Chest x-ray
- Special tests according to suspected problem

Management

- Admit.
- Treat danger signs if present.
- Supportive therapy as in sepsis.
- Antibiotics: An infection cannot usually be excluded.
- Note: A baby who has pneumonia that does not respond to usual antibiotics could be having Chlamydia trachomatis infection. If this is so, the baby will respond to erythromycin 50mg/kg/day for 14 days
- Reevaluate or consult if not improving within 2–3 days of treatment.
- Refer to specialists as needed to deal with any complex problem for further management.

26.9 Apnoeic Attacks

These are cessation of breathing for 15–20 seconds, often accompanied by bradycardia. Apnoeic attacks are most commonly due to prematurity, but may accompany sepsis, hypoglycaemia, hypoxaemia, hypothermia, hyperthermia.

Clinical Features
Apnoea, bradycardia and cyanosis. Features of the predisposing condition.

Investigations
- Screen for sepsis – full blood count, blood culture
- Blood glucose levels

Management
- Reestablish breathing by gentle stimulation. If poor response ventilate using bag and mask.
- For apnoea of prematurity give caffeine citrate 20mg/kg orally or IV over 30 minutes. If caffeine is not available use IV aminophylline 10mg/kg over 15–30 minute. Maintenance doses should be given at 5mg/kg/day. Avoid rectal aminophylline; it may not achieve therapeutic levels. In all cases monitor heart rate.
- IV fluids according to the daily needs.
- Avoid oral feeding to prevent aspiration
- Treat the cause if known.
- If frequent give continuous oxygen by nasal catheter.
- In recurrent cases continuous positive airway pressure (CPAP) may be useful. This can be done in a neonatal intensive care unit (NICU)
- Monitor frequently.

26.10 Low Birth Weight and Preterm Infant

Definitions
- Low birth weight: Weight less than 2,500g at birth.
- Very low birth weight: Weight below 1,500g at birth.
- Extremely low birth weight: Weight below 1,000g at birth.
- Preterm: An infant who has not finished 37 weeks of intrauterine life at birth.

Problems Associated with Prematurity
- Poor thermal regulation, hypothermia
- Respiratory problems: RDS, apnoeic attacks, aspiration
- Feeding problems leading to hypoglycaemia
- Infections
- Hyperbilirubinaemia
- Anaemia of prematurity
- Congenital malformations

General Management

- Babies with weight 2,000–2,499g can be cared for as normal weight babies. Some of them may have feeding difficulties. Observe for a day or two before discharging from maternity ward.
- Babies of weight 1,750–1,999g need extra care. Kangaroo Mother care will provide enough warmth unless the baby has another problem. They should be able to breastfeed adequately, but some may tire quickly and may need tube or cup feeding.
- Babies with weight below 1,750g are at increased risk of respiratory distress, infection, apnoea, and hypothermia, and are usually not able to feed especially if very low birth weight. They need to be admitted to a specialized area that will cater for their needs. For these babies treat any intercurrent problem and when they stabilize, start Kangaroo Mother care.

Thermal environment

- Keep baby dry and well wrapped and nurse away from open windows
- Avoid unnecessary exposure
- Keep the room warm (at least 25°C)
- Kangaroo Mother care
- Incubators

Note: Incubators are extremely expensive and thus not always available but useful for care of very sick babies needing oxygen and IV fluids. Kangaroo Mother care (KMC) is cheap and easy to carry out in many facilities. Use KMC when you have a stable LBW baby irrespective of weight

Kangaroo Mother Care (KMC)

KMC consists of:

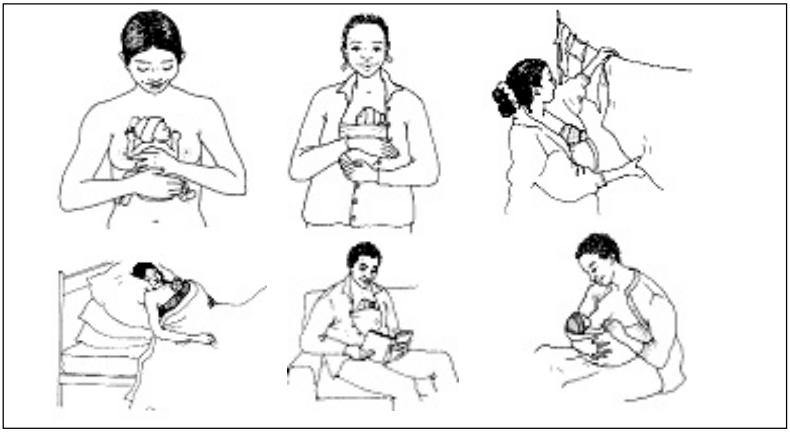
- Kangaroo position – Skin to skin contact between mother's breasts or those of any other adult female.
- Breastfeeding.
- Follow up to ensure adequate growth and development.

Procedure for KMC (see Figure 26.1):

- Mother wears a dress that opens at the front.
- Baby wears nappy/diaper, cap, and socks.
- Let the mother sit comfortably on a chair.
- Mother opens the dress .
- Place the naked baby in frog like posture on mother's chest between her breasts.
- Secure baby firmly but not too tight with a cloth round mother and baby.
- Breastfeed frequently. Top up with cup if baby is not able to suck adequately.
- Mother in recliner position during rest and sleep.

☛ **Monitor growth at least 3 times per week.**

Figure 26.3: Kangaroo mother care



Fluid and Feed Management

- Encourage mother to breastfeed frequently if baby is able. Check positioning and attachment.
- Ensure adequate intake by calculating the requirement per day.
- Record all intake (oral and IV) and check every 6 hrs to see if the desired ntake is achieved.
- Feeding should be done within the first hour of birth to avoid hypoglycaemia.
- Introduce feeds as soon as possible; preferably no later than 24 hours after birth. Begin with 3ml for infants <1,500g and 6ml for those >1,500g. Increase by the same volume until the required volume for the day is reached. For infants on IV fluids, reduce gradually so that the total intake per day does not exceed daily requirements.
- Calculation of feeds/fluids: Start with 60ml/kg/day on day 1. Increase by 20–30ml per day to a maximum of 180–200ml/kg/day if using breast milk. For formula or IV fluid do not exceed 180ml/kg. Refer to Table 26.2 for amounts.
- Give micronutrients:
  - Multivitamins a preparation containing 400IU of vitamin D as soon as enteral feeding is established.
  - Iron supplement 6mg/kg/day after age of 4 weeks.
- Monitor weight at least 3 times a week. Weight gain after the first week is 15g/kg/day.

26.10.1 ANAEMIA OF PREMATURITY

This refers to anaemia occurring after the first week and often much later. It is due to a number of factors which include:

- Deficiency of haematinics.
- Blood loss associated with repeated investigation.
- Intracranial haemorrhage.
- Erythropoietin deficiency.

Table 26.2: Feeding chart for preterm and low birth weight babies: Amount of milk to give every 3 hours (ml)

Birth weight (KG)	Age in days 1	2	3	4	5	6	7	8 or more
1.0–1.4	8	10	15	20	25	30	30	35
1.5–1.9	10	15	20	25	30	40	45	50
2.0–2.4	15	20	30	35	40	50	55	65
2.5–2.9	20	25	35	40	50	60	70	75
3.0–3.4	20	30	40	50	60	70	70	75
3.5–3.9	25	35	45	60	70	80	80	80

Note: Introduce feeds as soon as possible; preferably no later than 24 hrs after birth. Monitor weight at least 3 times a week. Weight gain after the first week is 15g/ kg/day.

Management

- Treat with iron and folic acid.
- Transfuse if:
  - Symptomatic: Poor weight gain, recurrent apnoea, congestive cardiac failure, or
  - Hb <8g/dl

Prevention

Limit blood loss; give prophylactic iron starting from 4 to 6 weeks of age.

26.11 Infants of Diabetic Mothers

Clinical Features

Size at birth will depend on the degree of diabetic control in the mother as well as the stage of foetal development. Hence the baby may be large, appropriate, or small for gestation.

Complications

These include:

- Perinatal asphyxia and injury,
- Hypoglycemia (most likely in babies who are either large or small for their gestation age),
- Hypocalcaemia,
- Hyperbilirubinaemia,
- Respiratory distress syndrome (RDS),
- Polycythaemia, and
- Feeding problems.

Investigations

- Blood sugar
- Bilirubin if indicated
- Haemoglobin or haematocrit if plethoric
- Others as indicated

General Management

Diabetic mothers should deliver in hospital, where problems of the baby can be dealt with. Appropriate management of such mothers include:

- Close cooperation between obstetrician and paediatrician.
- Maintenance of normoglycaemia in the mother [see diabetes in pregnancy].
- Decision on timing of delivery is made in consultation with the obstetrician.
- During delivery:
  - Manage as for routine care of all babies.
  - Obtain cord sample for blood sugar.
- In nursery:
  - Feed within an hour of delivery and then 3-hourly.
  - Monitor blood sugar at admission and then 3-hourly for 24 hours.
- Treat hypoglycaemia:
  - If blood glucose remains low (blood sugar <2.2mmol/L) despite feeding, establish an IV line and give 2ml/kg of 10% dextrose over 5 minutes and continue with 10% dextrose at the volume requirement per day. Repeat blood glucose after 30 minutes. If stabilized, then measure sugar 3-hourly. When the baby's blood glucose is normal on 2 more readings, gradually reduce the infusion as you increase the feeds.
- Treat hypoglycaemia: Calcium levels should be determined at 6, 12, 24, and 48 hours if possible.
  - If hypocalcaemic (serum calcium <7mg/dl), give 3 ml/kg of 10% calcium gluconate IV slowly.
- Treat anaemia: Estimate haematocrit at 1 and 24 hours.
  - If haematocrit >65% do partial exchange transfusion 10–20ml of fresh plasma/kg.
- Treat hyperbilirubinaemia: Estimate serum bilirubin levels at 24 and 48 hours.
  - If bilirubin elevated, treat as needed (see Section 26.12, Neonatal Jaundice).
- Refer if congenital malformation(s) is/are present.

26.11.1 DISORDERS OF GLUCOSE METABOLISM

Hypoglycaemia is a common problem but there are no specific clinical features. Hypoglycemia should be suspected in low birth weight infants, infants born small for gestational age, infants of diabetic mothers, and any sick infant especially if the infant is not feeding well.

26.11.2 NEONATAL DIABETES

This is rare but responds to continuous insulin infusion 0.02–0.125 units/kg/hr, adjusted according to blood glucose levels. Usually resolves within 4–6 weeks.

26.11.3 HYPERGLYCAEMIA IN PRETERMS

Usually iatrogenic when glucose infusions exceed 10mg/kg/hr. Baby rapidly become dehydrated and will be noted to pass a lot of urine.

Management

- Reduce infusion rate to 6–8mg/kg/hr.
- Monitor blood sugar 3-hourly.
- Rarely insulin therapy, as in neonatal diabetes, may be needed.

26.11.4 HYPOGLYCAEMIA

There are no specific clinical features. Ideally all at risk neonates should have regular (3 hourly) blood sugar monitoring especially in the first 24 hours of birth. This condition is common in:

- Low birth weight infants
- Small for gestational age
- Infants of diabetic mothers
- Any sick infant especially if not feeding

Prevention

- Ensure early and adequate feeding for all babies.
- Give IV 10% dextrose 5ml/kg, repeat blood sugar in 30 minutes and give more dextrose and feed the baby to help maintain normal level. If not able to maintain blood sugar by feeding, continue with IV dextrose.

26.12 Neonatal Jaundice

Refer to Figure 26.4 for a guide to the assessment of neonatal jaundice.

26.12.1 PHYSIOLOGICAL JAUNDICE

Many babies have some jaundice in the first week of life. This is referred to as physiological jaundice and has the following characteristics:

- Appears on about the third day.
- Reaches peak levels 5–8mg/dl (85–135mmol/L) occur in term babies; reduces to normal in about a week.
- Reaches peak levels of 10–12mg/dl (170–205mmol/L) in preterm babies; falls to normal about 10 days.

☛ **Serum bilirubin levels >12mg/dl in term babies and >15mg/dl (>255ìmol/L) in preterms require investigation.**

Management

If a mother notices that her baby is yellow she should bring the baby to a health facility as soon as possible for assessment. If jaundice is physiological, only observation is required. Ensure adequate feeding and hydration.

26.12.2 ACUTE NON-PHYSIOLOGICAL JAUNDICE

This is common and is caused by:

- ABO incompatibility: Mother group O, baby is A or B or AB
- Rhesus incompatibility: Mother Rh-negative, baby Rh-positive
- Sepsis

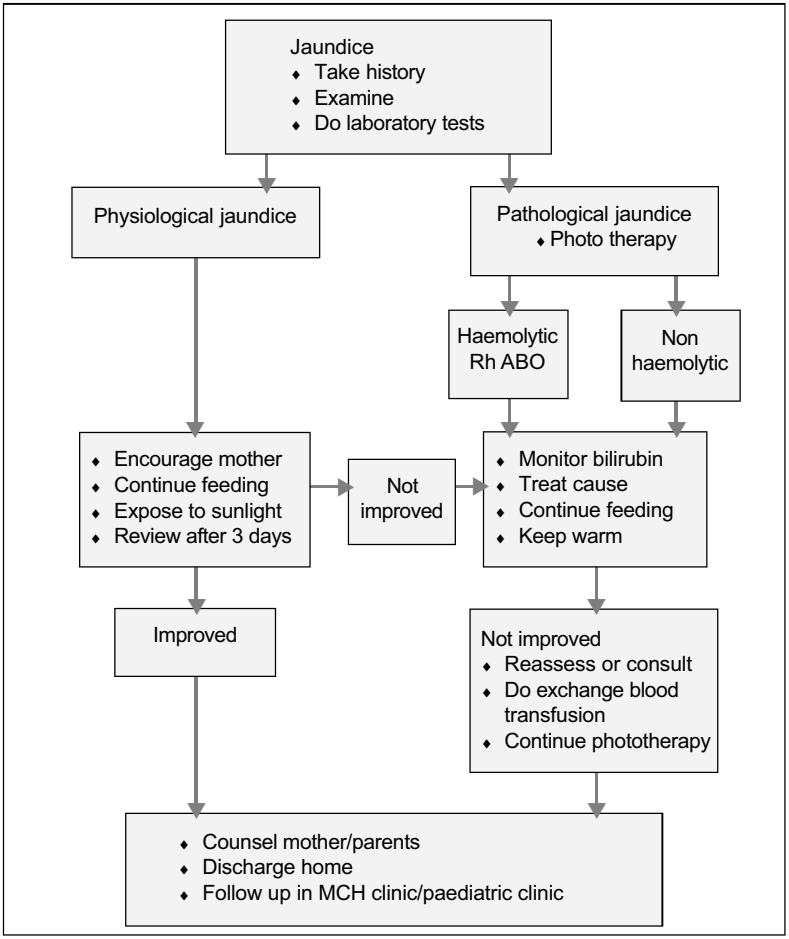
In ABO and Rhesus incompatibility, jaundice may appear from the first day, whereas in sepsis it may appear any day. It is most likely in babies who are large or small for their gestational age.

Complications

Bilirubin toxicity (Kernicterus): Brain damage due to deposition of bilirubin in the brain. It presents with lethargy, poor feeding and vomiting, opisthotonos, seizures, and coma. Death may result from bilirubin toxicity. If the baby survives, mental retardation, cerebral palsy, hearing loss, and learning disorders are known sequalae. Factors that predispose to development of bilirubin toxicity include:

- Sepsis
- Prematurity
- Acidaemia
- Hypothermia
- Hypoglycaemia

Figure 26.4: Assessment of neonatal jaundice



Investigations
- Full blood count include peripheral blood film (PBF)
- Determine mother's and baby's blood group(s)
- Serum bilirubin levels; direct and indirect
- Appropriate cultures if sepsis suspected
- Coomb's test

Management
All jaundiced babies with blood group or Rhesus incompatibility should be started on phototherapy. The exchange transfusion should be carried out over 45–60 minutes period using aliquots of 20ml of blood in and out for larger babies and 5–10ml for sick and premature infants. The goal should be an exchange of approximately twice the blood volume of infant (2x85ml/kg). Ensure aseptic environment. Refer to Table 26.3 and Figure 26.5 for treatment protocol.

Table 26.3: Treatment of jaundice based on bilirubin levels

Age of baby at review in days	Management by phototherapy		Management by exchange transfusion	
	Healthy term baby **µmol/l (bilirubin)**	Sick LBW baby **µmol/l (bilirubin)**	Healthy term baby **µmol/l (bilirubin)**	Sick LBW baby **µmol/l (bilirubin)**
Day 1	Any visible jaundice	Any visible jaundice	260	220
Day 2	260	220	425	260
Day 3	310	270	510	340
Day 4	340	290	510	340

Note: Sick very low birth weight babies (<1,500g) may not fit in this table as bilirubin toxicity can occur at much lower levels. In this case the clinician uses own discretion.

26.12.2 PROLONGED NEONATAL JAUNDICE

Prolonged neonatal jaundice is due to hepatitis or biliary obstruction. In obstructive jaundice the stools are pale and urine very dark. Hepatitis may be due to Hepatitis B viral infection, congenital syphilis, or cytomegalovirus, among other causative organisms. The baby may show features consistent with the specific infection.

Investigations
- Bilirubin
- Test for syphilis
- Hepatitis B surface antigen
- Serum transaminases
- Alkaline phosphatase
- Abdominal ultrasound

Management
Refer to a specialist urgently. For biliary atresia, surgery is best done within 6 weeks of birth to prevent hepatic damage. Figure 26.6 guides the management of sepsis and other common conditions in the young infant as well as jaundiced babies.

Figure 26.5: Management of Rhesus incompatibility

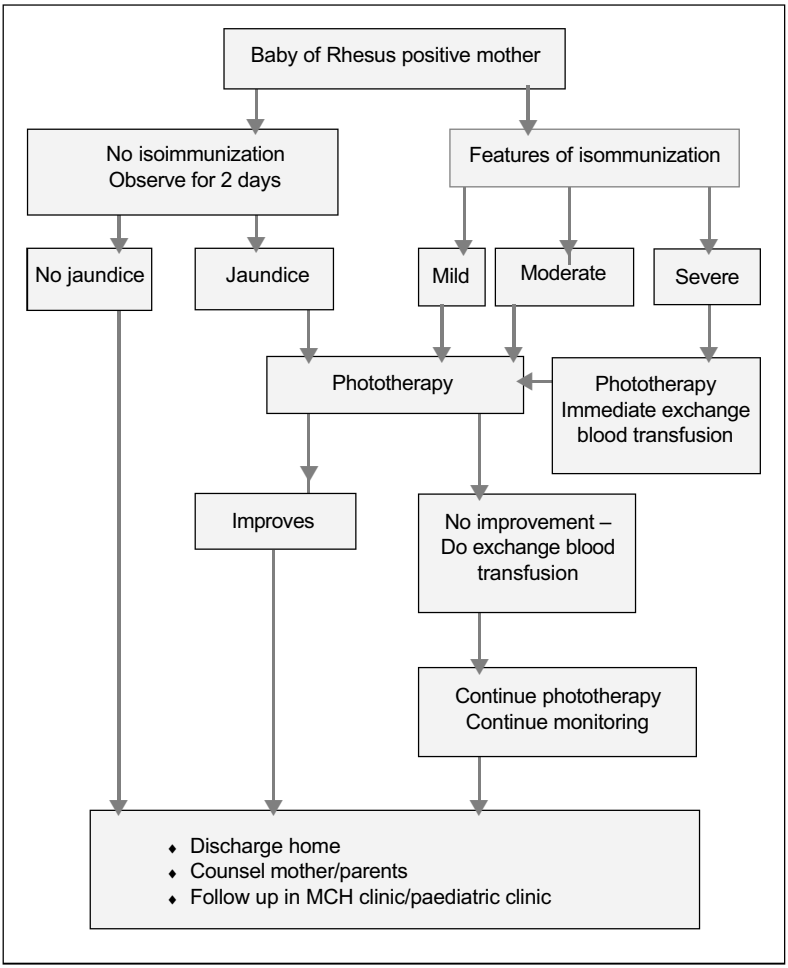
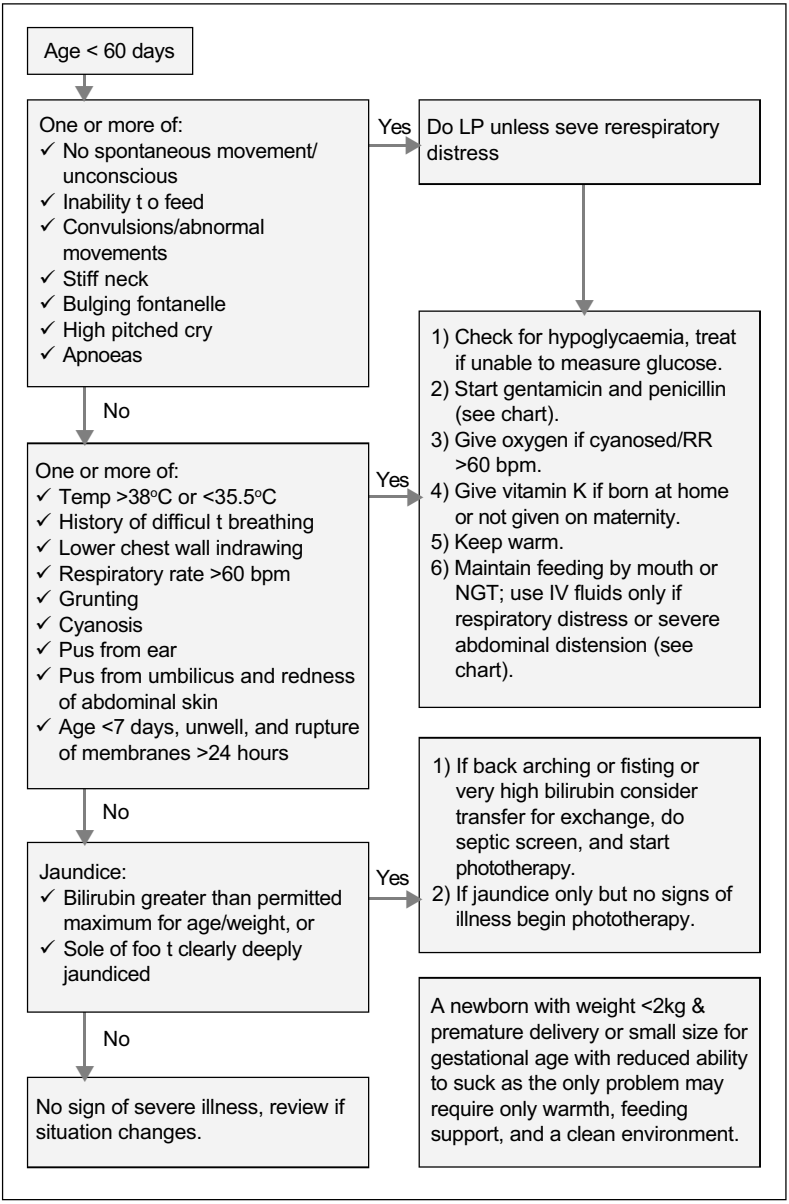


Figure 26.6: Management of neonatal sepsis and jaundice



26.13 Congenital Anomalies

26.13.1 HYDROCEPHALUS

This is an increase in the volume of cerebrospinal fluid (CSF) within the ventricular system and may be communicating or non-communicating.

Clinical Features

There is a uniform enlargement of the head before birth causing obstructed labour or developing insidiously after birth. There are prominent dilated scalp veins, and wide, bulging, and tense fontanelles. Brow overhangs the roof of orbit, there is a "cracked-pot" sound when the head is percussed (McEwen's sign), a clear margin of sclera beneath the upper lid (setting sun sign), and wide sutures. Nystagmus is common and transillumination is positive later. In isolated hydrocephalus there is usually no neurological deficit. But if there was intrauterine infection then it may be accompanied by other defects. Note: Some of these features develop over a period depending on the rate of increase in the head size.

Investigations

- Skull x-ray is useful
- Cranial ultrasound
- CT scan where possible
- Screen for congenital infections if necessary

Management

In order to prevent brain damage, early evaluation and diagnosis is essential. The baby therefore needs to be referred as soon as possible to a specialized unit.

Management – Operative (Specialized Neurosurgical)

- A shunt from the ventricle to the peritoneal cavity is inserted in a specialized centre.
- Contraindications for referral (Surgery)
  - Multiple congenital abnormalities.

26.13.2 NEUROTUBE DEFECTS

Clinical Features

These are the commonest CNS anomalies. The defect can occur in any part of the CNS starting from the head and down the spine. The abnormalities vary from the extreme anencephaly, through encephalomyelocoele and encephalocoele, to spina bifida with or without myelocoele or meningomyelocoele.

HEAD DEFECTS

Anencephaly is the complete absence of the brain apart from the brain stem, while encephalocoele and encephalomyelocoele are most commonly occipital but can be frontal.

SPINE DEFECTS

Spina Bifida

This results from failure in the development of vertebral arches and is frequently associated with mal-development of the spinal cord and membranes. There are two main types: Spina bifida occulta and spina bifida cystica.

Spina Bifida Occulta

Many cases are asymptomatic and are undiagnosed. There may be tell-tale signs on the back such as lipoma, dimple, tuft of hair (hypertrichosis), naevus, and telangiectasia. In other cases, the patient may present with nocturnal enuresis, foot-drop, persistent urinary tract infections due to neurogenic bladder, and recurrent meningitis due a communicating dermal sinus.

Investigations

- X-ray of full spine will show absent lamina on one side or bilaterally.
- Myelogram may be useful to rule out associated conditions such as diastematomyelia.
- A CT scan can also show the associated anomalies.

Management

This focuses on any complication noted. Excision of a communicating sinus is important in the prevention of recurrent meningitis.

Spina Bifida Cystica

In addition to the defect in the spine, there is an obvious mass on the back. This may be a a meningocoele (a bulge of the meninges usually covered with skin), or meningomyelocoele (a bulge of the meninges that contain neural tissue). As a consequence, there is paralysis below the level of the lesion with or without incontinence of stool and/or urine.

Investigations

- Cranial ultrasound or CT scan
- Abdominal ultrasound to exclude intrabdominal anomalies especially the kidney
- Echocardiogram if indicated

Management

Management requires a multidisciplinary team approach including surgeons, paediatrician, and physical therapists. The patient should therefore be referred to a specialized centre for care.

Appropriate sterile dressing of open lesions is necessary to prevent infection. Counsel the parents carefully so as to accept the child and be aware of what can be done.

Prevention

Pre-pregnancy folate supplementation is known to reduce chance of recurrence.

26.13.3 CLEFT LIP AND PALATE

Clinical Features

- Cleft lip results from abnormal development of the medial nasal and maxillary processes. This may present as unilateral, bilateral, or median cleft lip (rare). The clefts may be complete or incomplete.
- Cleft palate results from a failure of fusion of the two palatine processes. These again may be unilateral, bilateral, or median.
- Cleft lip and cleft palate may occur singly or in combination.
- Cleft lip and palate may also be part of syndromes such as Trisomy 15 or 18.

In this case it is almost always associated with multiple congenital anomalies, with the prognosis depending on the associated anomalies. Effects on functions/ complications include:

- Sucking and swallowing are greatly affected. This predisposes a child to malnutrition.
- Speech development is impaired.
- Hearing may be impaired because of recurrent acute or chronic otitis media.

Management

Counsel the parents that the defects can be repaired and explain when repair will be done. If part of a syndrome counsel the mother clearly with respect to the implications of the associated
anomalies.

☛ **Refer all children with cleft lip to a specialist.**

Timing of repair

Operations for cleft lip may be done soon after birth or between 6 and 12 weeks. Cleft palate repair is best at 12–15 months. If repair is delayed it is important to ensure adequate nutrition. The baby with isolated cleft lip may be able to breastfeed but one with bilateral cleft lip and palate has difficulties in swallowing. Teach the mother how to feed the baby without choking. Isolated cleft palate can be fitted with a prosthesis while waiting
for repair

Purpose of treatment

The aim of treatment is to prevent or diminish complications and hence achieve:

- Normal appearance
- Well aligned teeth
- Normal sucking and swallowing
- Normal speech and normal hearing.

26.13.4 TRACHEOESOPHAGEAL FISTULA (TOF)

This is an anomaly in the development of the oesophagus in which there is usually a proximal atresia with a distal tracheoesophageal fistula. ***This condition is an emergency***. It must be diagnosed within the first 24 hours of birth. Diagnosis is best done before the baby is fed to prevent aspiration of feeds.

Clinical Features

- Tracheoesophageal fistula is suspected:
  - When there is history of polyhydramnios.
  - When saliva drools continuously from the mouth.
  - Where there is respiratory distress
- For such a baby exclude TOF before feeding is initiated. If feeding is inadvertently started in such a baby:
  - Attacks of coughing and cyanosis (choking) are likely to occur.
  - The abdomen is likely to be distended especially at the epigastrium (due to swallowed air in the stomach).

Investigations

Insert nasogastric tube and with a tube in-situ, do x-ray that includes the neck, chest, and abdomen.

Management

Once diagnosis is made, do the following:

- DO NOT feed the baby enterally.
- Keep the baby warm.
- Institute intermittent suction/continuous drainage using the N/G tube to clear the secretions from the pouch.
  - Turning the baby to the side if possible to facilitate drainage.
  - Placing the baby in the head-up position to prevent gastric juice reflux.
  - Initiating intravenous infusion with 10% dextrose solution.
- Arrange for urgent transfer to a specialist centre that is equipped for this type of operation.
- Transport the baby should under the above circumstances. It is important to communicate on telephone with the respective surgeon before any movements are made.

Note: There are certain congenital abnormalities that are commonly associated with TOF. These are vertebral, anal, trachial-oesophageal, and renal abnormalities, generally referred to as Vater syndrome.

Surgery may be carried out immediately after birth in a well baby. In some other cases gastrostomy is necessary to allow time for correction of intercurrent conditions. Adequately counsel the parents or guardians with respect to this.

26.13.5 ANORECTAL MALFORMATIONS

Anal atresia (imperforate anus)

Clinical Features

The child is born without an anal opening. This should be detected during the routine examination of a newborn. The mother may also report failure of the baby to pass stool. Congenital abnormalities are frequently multiple; a careful general examination of the baby is an important prerequisite.

Investigations
- It is urgent and important to determine whether the abnormality is high or low. Do an x-ray (Invertogram) 6 hours after birth (air has collected in the large intestine). This x-ray may have to wait for 24 hours for rectal gas to collect.
- Procedure for doing the Invertogram:
  - Strap a coin on the site of anus.
  - Hold the infant upside down for 3–5 minutes.
  - Put the thighs together and parallel to one another.
  - Take a radiograph and measure the distance between the metal coin and the shadow in the rectum. If the distance is over 2.5cm the abnormality is high; or draw a line on the radiograph from the tip of coccyx to the pubic crest (pubo-coccygeal line). If the gas shadow is above the line, the abnormality is high.

Management
For high abnormalities, do the following:
- Nasogastric suction
- Intravenous fluids
- Keep baby warm
- Refer to a specialized centre for surgery.

Low abnormalities are easy to diagnose, simple to treat, and the outlook is good. There are 4 types of low imperforate anus:
- The *stenosed anus:* The opening is in the normal position but very minute. The first treatment is careful dilatation with well lubricated hegar dilators and thereafter digital dilatation. The mother is taught how to dilate the anus.
- The *ectopic anus:* The anus is situated interiorly and opens into the perineum in boys or vagina in girls.
- A careful search will reveal the low subcutaneous opening. This should be distinguished from the high vaginal opening or fistulae. The treatment is a pull through operation.
- The *covered anus:* The treatment is as for stenosed anus
- The *membranous anus:* Treatment is a cruciate incision.

27. Ear, Nose, and Throat Conditions

27.1 Acute Otitis Media

An acute inflammation of the middle ear, usually suppurative, occurring after an upper respiratory tract infection, rhinitis, or sinusitis. The commonest organisms are Streptococcus pneumoniae and H. influenzae.

Clinical Features
This is most common in children under 5 years. There is pain in the ear, loss or impairment in hearing, with or without ear discharge. There is also loss of

appetite and fever. Examination shows signs of URTI, fever, and hyperemic oedematous tympanic membrane with loss of normal contours. Purulent discharge with perforation (central) may be present.

Complications
These include:
- Mastoiditis
- Meningitis

Management
This includes:
- Analgesics: Paracetamol 10mg/kg 8 hourly for 5 days.
- Antibiotics: Amoxicillin 25–50mg/kg 8 hourly for 5 days OR erythromycin 30–50mg/kg for 5 days.
- If there is perforation, treat as in chronic otitis media.
- Review after 5 days if not improved continue antibiotic for 5 more days.

Admit if:
- There are signs of complications (meningitis, mastoiditis) and treat according to the guidelines found in their respective sections.

27.2 Chronic Suppurative Otitis Media (CSOM)

Clinical Features
Discharging of pus from one ear or both ears for more than 2 weeks following untreated or unresolved acute otitis media with a central perforation. The discharge is usually not foul smelling. There is also impaired hearing. Recurrent ear discharge usually occurs after URTI. Secondary infection may be present with Gram-negative bacteria, yeast, and fungi. Complications include:
- Impaired hearing.
- Cholesteatoma.

Investigation
HIV test

Management
- If no antibiotics were administered recently, treat with antibiotics as in acute otitis media.
- Dry the ear by wicking. Show the mother how to dry the child's ear by wicking:
  - Roll a piece of clean absorbent cloth or cotton wool into a wick and insert it gently into the child's ear.
  - Roll the wick in the ear, then remove it and replace it with a clean wick.
  - Watch the mother repeat this until the wick is dry when it comes out.
- Tell the mother to continue to dry the ear by wicking at home at least 4 times a day, until the wick stays dry and the perforation closes. Tell her that nothing should be left in the ear between treatments. The child should not go swimming until the ear heals.

- Reassess the child weekly. If the mother needs assistance in keeping the ear dry, reassess more frequently.
- Do not syringe such ears.
- Refer to ENT specialist if:
  - The patient develops mastoiditis.
  - There is no improvement after 4 weeks.
  - The patient has hearing impairment; they will benefit from tympanoplasty.
  - Patient complains of headache, earache, vertigo or facial paralysis: This indicates complications.

27.3 Mastoiditis

Infection of the mastoid air cells and mastoid bone occurring as a complication of acute otitis media or chronic otitis media.

Clinical Features
A painful swelling above the ear in children under 2 years of age. A painful swelling behind the ear in older children. There may be preceding otitis media and mastoid tenderness, with fever. There may be sagging of the posterosuperior meatal wall.

Complications
These include facial nerve palsy, meningitis, and brain abscess.

Management
- Admit.
- Give antibiotics: IV/IM chloramphenicol and benzyl penicillin till improvement, then discharge on oral chloramphenicol for total course of 10 days.
- Refer to ENT specialist if:
  - The swelling points and/or bursts to discharge pus.
  - The child develops a squint in the eye or facial palsy
  - The child develops signs of meningitis [see Chapter 12.4, Meningitis] or brain abscess.

27.4 Otitis Externa

Inflammation of external ear most commonly due to bacteria, but may also be due to fungi, e.g., Candida (whitish) or aspergilla (blackish) or Herpes zoster virus. It may also occur in generalized allergic and seborrhoeic states. The commonest bacterial organisms responsible are Streptococcus pneumoniae, Staphylococcus aureus, Ps. pyocyanea, B. proteus, and E. coli.

Clinical Features
Fever is uncommon. There is pain and tenderness accentuated by movement of the tragus. Pre or post auricular or cervical lymphadenitis may be present. Obliteration of the canal lumen may occur from the inflammation, causing deafness. There may be ear discharge with or without itching.

Management
- Admission is NOT necessary.
- Relieve pain; give analgesics such as paracetamol.
- In severe cases, e.g., a boil/furuncle, give antibiotics:
  - Benzyl penicillin 50,000 units/kg IM STAT followed by oral amoxicillin for 5 days.
  - Instil gentamicin ear drops or 2% acetic acid ear drops.
- Fungal otitis externa (otomycosis is treated with fungicides, e.g., Clotrimazole 1% drops applied 8 hourly for at least 10 days.
- Allergic (eczematous) otitis externa is treated with antihistamine drugs and hydrocortisone ointment or drops:
  - Chlorpheniramine 0.4mg/kg/day BD in children.
  - Hydrocortisone ointment or drops apply BD.

27.5 Epistaxis

Clinical Features
Bleeding through the nose (usually 90% from a plexus of veins in Little's areas) due to nose-picking, trauma (fall in games, assault, etc.), nasal and paranasal neoplasms, nasal infection, systemic derangements, e.g., acute fevers, hypertension, renal disease with uraemia, abnormalities of blood clotting, and foreign bodies in the nose.

Investigations
Usually none unless systemic disease is suspected.

Management
- Immediate: Sit the patient up (to avoid aspiration); pinch the nose for 10–20 minutes. This is usually sufficient to stop bleeding.
- Apply ice or cold packs on the bridge of the nose.
- To pack the nose, remove clots with suction catheter. Apply xylocaine nasal spray then pack (preferably using Tiley's forceps) with ribbon gauze or narrow strip of gauze impregnated with liquid paraffin (mineral oil). Start packing from the floor of the nose towards the roof: The pack should fit lightly to be effective. Do not use adrenaline.
- Remove the paraffin pack within 24–48 hours.
- Admit if:
  - Bleeding is uncontrolled (patient may have a bleeding disorder).
  - Patient requires fluid replacement or blood transfusion.
  - Patient requires inpatient management of the underlying causative factor.

27.6 Foreign Bodies or Other Substances in Nose and Ears

Young children may push any object in the nose or ears. If a parent notices this, the best thing to do is not to struggle with the child as this may push the object

even further in. Sometimes the object is noted several days after it was inserted, in which case there may be a nasal or ear discharge. Refer the child to a health facility that has health workers who are capable and equipped to remove the object without causing injury to the child.

27.6.1 FOREIGN BODIES IN THE EARS

The types of foreign bodies inserted include metallic pieces (hair clips, smooth pellets, needles, etc.), wooden pieces (e.g., match sticks), vegetable matter (e.g., seeds), or insects.

Clinical Features

There is obvious history of foreign body insertion into the ear, i.e., someone saw it happen. The child may have conductive deafness, ear pain, or discharging from the ear, and may experience disturbing noise (if insects involved) and bleeding from the ear (especially following traumatic insertion of a foreign body by the child). Complications include:

- Conductive deafness.
- Vegetable material is hygroscopic and leads to inflammatory reaction in the canal walls, leading to otitis externa. Beans, maize, and other seeds may sprout if they stay long enough.

Management

- Most foreign bodies can be removed fairly easily with crocodile forceps, a hook, an ear probe, or by suction and gentle syringing with warm, clean water.
- Rounded objects may be pushed further into the ear and rupture the eardrum.
- Do not attempt to remove a foreign body from the ear if you have difficulty doing so.
- Refer to ENT specialist if:
  - At any stage there is difficulty in removing the foreign body.
  - Perforation of the ear drum or foreign body in the middle ear is suspected.
  - The foreign body is deeply seated in the external auditory meatus.
- In general anaesthesia will be required:
  - In uncooperative patients.
  - When a foreign body is embedded in granulation tissue (easily bleeds).
  - When foreign body is posteriorly placed.
  - In suspected foreign bodies that cannot be easily be found.

27.6.2 FOREIGN BODIES IN THE NOSE

Occur usually in children. The foreign bodies include animate objects (e.g., maggots, regurgitated roundworms) and inanimate ones like vegetable (peas, beans, nuts), non-vegetable materials (pencils, paper, sponge, buttons, beads, pebbles, nuts, screws), traumatic objects (bullets, shrapnel, arrow heads).

Clinical Features

There may be pain, sneezing, and epistaxis or unilateral nasal discharge with nasal obstruction. There may also be pyrexia or headache especially with animate foreign bodies.

Unilateral purulent nasal discharge in children should be regarded as due to foreign body until proven otherwise. Careful nasal examination is crucial for diagnosis of this condition.

Management
- For animate foreign bodies: remove with forceps.
- For inanimate foreign bodies: if visible, attempt removal.
- Refer to ENT specialist if foreign body is difficult to remove.

27.6.3 WAX IN THE EAR
- Advise patients and parents to leave wax to come out of the ear on its own instead of attempting to remove with ear buds because these attempts may cause impaction of the wax in the ear.
- Rarely if the wax is causing impaired hearing it may need removal. Refer if hearing impairment occurs.

27.7 Foreign Body in the Oesophagus

The commonest objects are coins in children, and fish bones or meat in any age. Psychiatric patients may have many more types of foreign bodies in the oesophagus.

Clinical Features
Patients present with pain in retrosternal area and/or in the back, dysphagia, drooling of saliva in the mouth, regurgitation of food, dyspnoea, hoarseness if there is laryngeal oedema from compression by the foreign body, and localized tenderness in the lower part of the neck.

Investigations
Plain x-rays, anteroposterior and lateral views, may show opaque objects. Radiolucent objects are not seen on x-rays. However, an increase in the prevertebral soft tissue exceeding 1/3 of the anteroposterior distance of the patient's vertebral body is highly suggestive of the presence of a foreign body.

Management
Refer patient for oesophagoscopy and removal of the foreign body.

27.8 Laryngotracheal Trauma

These can be blunt or penetrating injuries. The priority is to secure and maintain an airway. Then refer urgently to an ENT specialist for endoscopy and repair.

27.9 Allergic Rhinitis

This is IgE-mediated rhinitis and is characterized by seasonal or perennial sneezing, rhinorrhoea, nasal congestion, pruritus, and often conjunctivitis and pharyngitis. Symptoms vary in severity from day to day or hour to hour.

Management
- Avoid the allergen (precipitating factor).
- Give the following medications to the patient:

Antihistamines: e.g., chlorphenamine 0.35mg/kg in children in 4 divided doses.
  - Sodium cromoglycate nasal sprays as prophylaxis given 4 hourly.
  - Topical steroids, which are safe and effective.
- Refer to specialist if:
  - There is gross nasal obstruction (hypertrophied inferior turbinates).
  - There are polyps.
  - There is sinusitis.
  - There is deviated nasal septum.

27.10 Parotid Masses

These may be true parotid swellings (e.g., parotitis, parotid abscess, cysts, tumours, etc.) or pseudoparotomegaly due to swellings in nearby structures (e.g., hypertrophy of the masseter, jaw swellings, parapharyngeal masses, lymph node enlargement, facial nerve tumours, etc.). Parotid swellings may also occur in other systemic conditions (e.g., malnutrition, diabetes mellitus, HIV/AIDS). Infective masses may be associated with other features of infection like fever, pain, local inflammation, or discharge from the opening of the parotid duct. In children the commonest infection is mumps, which presents with pain and swelling.

☛ ***Most parotid swellings are painless unless infected or malignant. Presence of facial nerve palsy is highly suggestive of a malignant process.***

Investigations
- Haematological tests, e.g., WBC counts, ESR, serum protein, HIV, etc.
- Fine needle aspirate (FNA) for cytology.
- Open biopsy is contraindicated because of:
  - Risk of seeding of tumour in neoplastic conditions.
  - Risk of injury to the facial nerve or its branches.
- Should FNA report not be conclusive, then superficial or total parotidectomy (depending on suspected condition) is done to obtain the excisional biopsy.

Management

Viral parotitis may not require more than analgesics and bed rest. In the presence of bacterial infection, give amoxicillin. Refer the patient if:
- An underlying systemic disease is the causative factor for paroto-megaly.
- There are masses that may require surgical intervention.

27.11 ENT Manifestations of HIV/AIDS

In children chronic otitis media and parotid enlargement are the commonest manifestations. Other manifestations include:

- Infections: These can be viral, bacterial, or fungal, for example rhinitis, sinusitis, pharyngitis, glossitis, tonsillitis, laryngitis, parotitis, deep neck space cellulitis, abscesses, otitis externa, otitis media, and labyrinthitis.
- Tumours: There is an increase in head and neck cancers associated with HIV/AIDS, especially Kaposi's sarcoma and lymphomas.
- Other manifestations: For example, adenoid hypertrophy, oropharyngeal and oral ulcers, atrophic rhinitis, lymphadenopathy, parotid cysts, otitis media with effusion, vertigo, deafness, tinnitus, and cranial nerve palsies.

Management
Is directed at the presenting condition, after confirming that the patient has HIV/AIDS infection.

27.12 Hearing Impairment

In the paediatric age group, pay special attention to children born prematurely, those with low birth-weight, difficult delivery, and yellowness of eye (neonatal jaundice), whose mothers who had febrile illness during pregnancy, and those treated for meningitis. Do not ignore parents' complaint of a child not hearing or a child who is slow to develop speech. Use changing voice intensity to assess grossly the state of hearing. If there is suspicion of hearing loss, refer at whatever age. A child who does not hear can be helped at any age but the earlier the better.

28. Infections (Selected) and Related Conditions

28.1 Septicaemia

This is suspected when there is fever with no localizing signs. Causes include infections by Staphylococcus aureus, Meningococcus and Salmonella group. Severity may vary and some children affected by this condition may be severely ill. Diagnosis is that of exclusion by doing the following investigations:
- Full blood count (shows leucocytosis and neutrophilia)
- Blood smear for malaria (negative)
- Urinalysis (negative)
- Blood culture (positive)

Management
Give benzyl penicillin and gentamicin or chloramphenicol. In suspected Staphylococcus aureus infection, give cloxacillin or flucloxacillin instead of penicillin. If there is no response after 48–72 hours consider using ceftazidime or ceftriaxone.

28.2 Septic Arthritis and Osteomyelitis

Infections of the bone or joints are often seen in children. They commonly follow septicaemia although occasionally may result from a penetrating injury. In children with sickle cell disease, more than one bone may be affected.

Clinical Features
The affected child looks sick and may be toxic. There is fever and limitation of movement of the affected limb. The affected limb is hot and extremely tender. The child may resist examination because of pain. Delay in treatment will result in bone or joint destruction. In the case of osteomyelitis a chronic discharging sinus may develop.

Investigation
- Full blood count
- Blood culture
- X-ray of affected limb
- Joint aspirate for culture and sensitivity

Management
- Admit.
- Give analgesics.
- Start antibiotic, penicillin and gentamicin, duration 4–6 weeks.
- Place limb in position of comfort.
- Refer to surgeon if
  - Need to aspirate under anaesthesia.
  - Chronic osteomyelitis if need to remove dead bone (sequestrum).

28.3 Salmonella Infections

The organisms Salmonella typhi and Salmonella paratyphi A, B, and C, commonly cause enteric fever or typhoid fever, while Salmonella enteritis causes gastroenteritis.

28.3.1 TYPHOID FEVER

This is a systemic disease and is caused by Salmonella typhi. Salmonella bacilli are shed in the faeces of asymptomatic carriers or in the stool or urine of those with active disease.

Transmission
Transmission of the Salmonella bacilli occurs via contaminated food or water. This may occur through:
- Direct contamination by faeces or urine
- Flies from faeces to food
- Through healthy carriers especially if they are food handlers
- Health personnel through inadequate hygiene when changing soiled linen.

Clinical Features
The patient may have high fever, headaches, anorexia, weight loss, diarrhoea, constipation, abdominal tenderness, changes in sensorium, splenomegaly, relative bradycardia and Rose spots (blanching lesions). A high index of suspicion is required when handling any patient with unexplained fever. The clinical picture tends to be atypical in infants, who may develop shock and hypothermia.

Complications
The complications of typhoid fever include intestinal haemorrhage, convulsion, coma, shock, perforation with resultant acute abdomen, and "chronic carrier status".

Investigations
- Full haemogram: Relative leucopaenia in relation to the fever
- Cultures: Positive in blood in first week, stool and urine cultures become positive in the third week.
- Widal test: A four fold rise of O antigen titres suggest S. Typhi infection significant. NB: Only titres of O antibody of 1:320 or more are significant. The gold diagnostic standard should be isolation of bacilli in cultures.
- Abdominal x-ray in suspected perforation: Erect/decubitus, which may show pneumoperitonium or multiple fluid levels.

Management
- Treat all patients for 14 days using:
  - Chloramphenicol: 50mg/kg/day
    OR
  - Ciprofloxacin 20–30mg/kg/24 hours BD (max 1.5g/24 hours)
- Refer for
  - Surgical intervention if signs of perforation.

Prevention
Preventive measures for typhoid fever include the following:
- Using wholesome drinking water (water boiled for 10 minutes or chlorinated).
- Using pasteurized milk.
- Screening food handlers for typhoid and treating those infected, including healthy carriers.
- Ensuring proper hygiene while preparing or/and handling foods.
- Ensuring hygienic waste disposal.
- Vaccination.

28.4 Fever of Unknown Origin

This refers to fever of more than 3 weeks duration, the cause of which is still unknown in spite of at least 1 week of intensive investigations. Assessment of such a patient should include observation of the fever pattern, detailed history and physical examination, laboratory tests, and non-invasive and invasive

procedures. This definition excludes common conditions of shorter duration and/or where the cause of the fever has already been determined within 3 weeks.

28.4.1 COMMON CONDITIONS MANIFESTING AS FEVER OF UNKNOWN ORIGIN

Most cases of prolonged obscure fever are due to well known diseases. Aggressive diagnostic effort is recommended as most of them are treatable. Do not just shift from one antibiotic to another as this confuses the picture even more. It may be better to stop every treatment and watch for a few days.

INFECTIONS

- Tuberculosis: This is the commonest cause of pyrexia of unknown origin in Kenya. Miliary tuberculosis may not be visible on chest x-ray until the disease is well advanced. Tuberculosis in other body sites like the central nervous system or abdominal lesion may be difficult to diagnose early.
- Infections due to some bacterial infections, without distinctive localizing signs, such as salmonellosis and brucellosis.
- Deep seated bacterial: Abscesses like intracranial, intra-abdominal, and hepatic abscesses may present as fever of unknown origin.
- Infective endocarditis.
- Some slow viruses, the commonest of which is HIV.
- Visceral leishmaniasis.

NEOPLASMS

Lymphomas are the commonest among the neoplastic causes of PUO. Diagnosis may be difficult if lesions are deep seated retroperitoneal nodes.

IMMUNOLOGICAL DISORDERS

These include:

- Juvenile rheumatoid arthritis and
- Systemic lupus erythematosus.

Investigations

Routine investigations as set out under these immunological disorders, including a chest x-ray. In difficult cases it is worthwhile to consider the following:

- Repeated history taking and examination may detect new clinical features that give a clue or old clinical signs previously missed or overlooked.
- New tests can include:
  - Immunological: Rheumatoid factor (Rh factor), antinuclear antibody (ANA)
  - Ultrasound
  - Computerized axial tomography (CT) scans
  - Echocardiography
  - Specific according to suspected diagnosis
  - Bone marrow aspirate cytology and culture
  - Very rarely invasive procedure, e.g., laparatomy

Management

- Treat all diagnosed conditions in accordance with the diagnosis.
- Refer or consult if:
  - Patient deteriorates rapidly.
  - Tests described above are not available in your centre.
  - Invasive procedure that needs more skill is required.

28.5 Guidelines for Use of Antibiotics in Bacterial Infections

Bacterial infections are a leading cause of morbidity and mortality. Accurate diagnosis and appropriate, cost-effective treatment are essential. Incorrect and over use of antibiotics facilitates the development and growth of drug resistant bacteria, which are in turn difficult to treat. Specific treatments for the various infections are discussed under their respective headings. Generally the following should be taken into account:

- The organisms responsible for infections depend on the age of the victims.
- The management of the infections depend on their severity.
- Underlying conditions like immune depression determines the bacterial infections involved and the type of treatment required.
- The organisms and the treatment for community acquired infections differ from hospital acquired ones.
- Antibiotic dosage and the side-effects vary with age.
- Drug sensitivity to antibiotics is constantly changing.
- Treatments should be given using correct doses for the various conditions and compliance with drug administration should be encouraged for complete treatment.
- Leftover drugs should be discarded to avoid poisoning.
- In some conditions you may need to start with what is labelled as second line or switch very quickly to second line if the patient is deteriorating fast. These patients should be managed in hospital.
- Penicillin refers to narrow spectrum penicillin such as benzyl penicillin, procaine penicillin, and phenoxymethyl penicillin. Benzyl penicillin is used in moderate to severe infections where high blood levels are required, and because of its short half-life is given 4–6 hourly. Procaine penicillin is given by intramuscular route and is used in uncomplicated pneumonia.
- Gentamicin doses should be adjusted according to renal function.
- Chloramphenicol's oral absorption is excellent and peak plasma levels are reached at the same time whether given intravenously or orally. Fatal toxicities include aplastic anaemia (not dose related) and grey baby syndrome (dose related).

28.6 Paralysis (Acute Flaccid)

Common differential diagnoses include:

- Poliomyelitis

- Acute transverse myelitis
- Spinal cord injury
- Guillaine-Barré syndrome
- TB spine (not always acute)
- Neoplasms of spine or cord

All of the above except poliomyelitis will have sensory loss.

28.6.1 POLIOMYELITIS

Clinical features

- About 195 out of every 200 infections are asymptomatic.
- Abortive poliomyelitis: This presents as a brief febrile illness with malaise, anorexia, nausea, vomiting, sore throat, constipation, coryza, cough, and diarrhoea.
- Non-paralytic poliomyelitis: This form presents with the symptoms of abortive poliomyelitis with more intense headache, nausea, and vomiting, with bladder paralysis and constipation that are both transient.
- Paralytic poliomyelitis: Occurs in 0.5% of infections. The symptoms are similar to those of non-paralytic polio with additional weakness and pain of one or more muscle groups. Flaccid paralysis may involve one or more limbs as well as respiratory muscles. Transient bladder paralysis and bowel atony are common. Paralysis may be precipitated by IM injection.

After the acute phase muscular atrophy ensues due to denervation. There is no sensory loss.

Investigations

Stool specimen for viral culture and typing. The stool should be kept and transported to KEMRI laboratory under vaccine temperatures.

Management

Avoid IM injections during epidemics or in suspected cases.

- Admit all paralytic cases and give supportive therapy. During early phase give:
  - Analgesics
  - Limb support for comfort and to prevent deformities
  - Respiratory support if bulbar or respiratory muscles are involved
  - Nutrition
- After acute phase (2 weeks):
  - Start rehabilitation: Initially gentle exercises of affected limbs. Continue even after discharge. Eventually child will need special shoes and calipers for mobility.

Prevention

- Immunization: On routine and National Immunization Days (NIDs)
- Active surveillance and mopping up
- It is hoped that polio will be eradicated in the near future with intensified childhood immunization combined with successful disease surveillance.

☛ **For purposes of polio eradication, notify the local Medical Officer of Health of any acute flaccid paralysis.**

28.7 Tetanus

Neurological disorder characterized by muscle spasms due to endotoxin produced by Clostridia tetani. Tetanus occurs in several clinical forms including generalized, neonatal, and localized disease.

Clinical Features
These features include inability to open the mouth (trismus, or lock jaw), generalized muscle spasms initially on stimulation but may subsequently be spontaneous. There may also be opisthotonos (rigid arching of back muscles), dysphagia, laryngospasm with difficulty in breathing and there is no loss of consciousness. The port of entry for the infection in neonates is the umbilicus while in older children it can be thorn pricks, cuts or burns

Management
- Admit urgently.
- On arrival maintain adequate airway (intubate if necessary).
- When airway and breathing are ensured, give IV diazepam.
- While the child is heavily sedated insert a nasogastric tube for nutrition and drug administration.
- Eliminate toxin production:
  - Crystalline penicillin 50,000 IU/kg/day. Neonates Q12hr, older children Q6hr.
  - Clean the umbilicus thoroughly /surgical toilet of the wound.
- Neutralize toxin: Give neonates 500IU, older children 2,000IU of human tetanus immunoglobulin IM if available along site of wound. Horse serum is an alternative.
- Maintain fluid balance and nutrition, preferably enterally.
- Monitor for and treat intercurrent infections.
- Nurse in a dark, quiet isolation.
- Control spasms:
  - Diazepam is the drug of choice singly or in combination with phenobarbitone or chlorpromazine depending on the severity of the spasms.
  - Dose and frequency as shown in Table 28.1.
  - Give all medications IV to minimize frequent disturbance of the patient.
  - It may be necessary to give the drugs by infusion.
- Refer patient with refractory spasms needing admission to the ICU.

Table 28.1: Guidelines for drug administration for tetanus

Drug to be administered	Time for drug administration in hours from admission								
	0	3	6	9	12	15	18	21	24
Diazepam 0.5mg/kg/6 hourly	+		+		+		+		+
Chlorpromazine 5mg/kg/day 6 hourly		+		+		+		+	
Phenobarbitone 6mg/kg/day 24 hourly	+								+

- Frequency of drug administration should be titrated against the clinical condition. Optimum level of sedation is achieved when patient remains sleepy but can be aroused to follow commands.

Prevention

- Against neonatal tetanus:
  - Pregnant mothers should receive tetanus toxoid 2 doses at least 4 weeks apart as early as possible in pregnancy. They should then receive one booster dose at every subsequent pregnancy for a total of 5 doses.
  - Mothers with a baby with neonatal tetanus should be given neonatal toxoid immunization.
- People with open wounds should be given adequate surgical toilet and should also in addition receive 2 doses of tetanus toxoid at least 4 weeks apart. Only 1 dose of tetanus toxoid is given if patient was immunized during the last 3 years and adequate surgical toilet.
- All patients who recover from tetanus should be immunized.

28.8 Tuberculosis

Tuberculosis is caused by Mycobacterium tuberculosis, which is also referred to as acid-alcohol fast bacilli (AAFB) because of its staining properties. Transmission is by droplet infection through coughing and sneezing. Children almost always get infected from an adult living in the same household. The incidence of TB is on the increase and this is partly due to its association with HIV/AIDS, poverty, malnutrition, and overcrowding, which are all increasing.

28.8.1 CLINICAL FEATURES OF TB

Most cases of tuberculosis in Kenya (80%) are pulmonary. Features of pulmonary tuberculosis include cough for 2 weeks or more, chest pain, fever, night sweats, weight loss and breathlessness. A persistent cough may be the earliest indication of TB infection.

Extra pulmonary tuberculosis is common in children. Its symptoms depend on the organs that are affected. Consequently the symptoms include TB adenitis (or lymphadenopathy), TB arthritis (with painful swollen joints), TB meningitis (with signs of meningitis), TB peritonitis (with ascites), and TB involving the pleura (with pleural effusion).

28.8.2 DIAGNOSIS OF TUBERCULOSIS IN CHILDREN

The key elements for diagnosis of TB in children include:

- A history of contact with an adult who has TB or a long-standing cough is useful.
- Smear microscopy (3 specimens – spot, early morning, and spot) for those children who can produce sputum. Sputum induction should be carried out for those who cannot.
- Sputum for AAFB culture and sensitivity (before the start of treatment in suspected resistant cases).

- Gastric lavage for AAFB in children (taken early morning).
- Tuberculin skin testing (Mantoux test)
- Chest x-ray
- HIV testing
- Lymphnose biopsy

A high index of suspicion is important in diagnosing TB in children, as they seldom produce sputum and often have non-specific symptoms. Use of Jones criteria to assist in diagnosis is shown in Table 28.2.

Table 28.2: Paediatric tuberculosis score chart

a.) Scoring

(Circle box and write score in the right-hand column)

Clinicalfeature	Score for each feature			Total
	0	3	1	
Duration of illness	Less than 2 weeks	More than 4 weeks	2–1 weeks	_____
Nutritional status (weight for age)	More than 80%	Less than 60%	Between 60 and 80%	_____
Family history of tuberculosis	No family history	Sputum positive and family history	Reported by family history	_____

b.) Diagnosis of tuberculosis in children

Feature	Score
Positive sputum smear	7
Family history positive for TB	2
Tuberculin test result 15mm or more (in unvaccinated child)	3
Enlarged painless lymph nodes, sinus present	3
Night sweats, unexplained fever	2
Abnormal chest x-ray	2
Malnutrition not improving after 4 weeks treatment	3
Angle deformity of spine	4
Firm, non fluid, non traumatic swelling of joint	3
Unexplained abdominal swelling or ascites	3
Change in temperament, seizures or coma	3

c.) Interpretation of the score

Score obtained	Interpretation	*Action required*
3 or less	TB unlikely	No action needed
3 to 4	TB probable	Further investigation recommended
5 to 6	TB likely though not definite	Initiate TB treatment;further investigations recommended
Over 7	TB definite	Institute treatment

28.8.3 PREVENTING TB IN CHILDREN

BCG Vaccination Although not totally protective, BCG reduces the risk of severe/complicated TB.

Preventing Tuberculosis in Exposed Children

- TB in children is always contracted from an adult in close contact with the child. All children in households where an adult has been diagnosed to have TB should be screened for TB and appropriately managed. In addition, all adults from households where a child has been diagnosed to have TB should be screened for TB and appropriately managed.
- A healthy newborn with a mother who is still sputum positive should be started on isoniazid prophylaxis immediately and the prophylaxis continued for 3 months. If a repeat sputum evaluation for the mother is found to be negative for TB, isoniazid should be stopped and the baby given BCG. If the sputum is found to be still positive, isoniazid prophylaxis should be continued for 9 months. It should be ensured that the mother is taking the drugs.

If a parent on treatment for tuberculosis has a child under 5 years of age, the child should have a Mantoux test carried out on them. If the Mantoux is positive the child is infected and should receive full treatment for tuberculosis. If the Mantoux is negative, the child should be started on isoniazid prophylaxis at 10mg/kg body weight for 3 months. The Mantoux test should be repeated at 3 months. If the Mantoux test is more than 5mm, the child should receive prophylaxis for a further 3 months. If the test is negative, isoniazid prophylaxis should be stopped and the child given BCG vaccination after 3 days.

Management

The success of tuberculosis treatment depends on strict adherence to treatment. WHO's DOTS (directly observed treatment short-course) can be used if adherence is uncertain.

General Guidelines on TB Management

The following are the general guidelines for TB Management:

- Follow National Guidelines.
- Ensure adequate supply of drugs.
- Use correct regimens and dosages.
- Ensure regular patient attendance.
- Always supervise initial phase of treatment.
- Trace defaulters promptly.
- Maintain accurate patient information and clinic attendance records.

Management - Pharmacologic

In order to provide optimum treatment to patients with tuberculosis, such patients are classified into groups.

Classification of TB Patients

Patients are classified into the following groups for epidemiological and treatment purposes depending on the site, microbiology, severity of disease, and history of previous treatment. These classifications are also in the TB register for reporting.

- New (N): Patient who has never been treated before.
- Relapse (R): Patient who has received treatment and was declared cured but now has TB again.

- Transferred in (TI): Patient who was registered in another district/clinic initially and has now reported to continue treatment.
- Treatment resumed (TR): Patient who interrupted his/her treatment, and was declared “out of control”, but is now resuming treatment.
- Other (O): Other types of patients e.g. failure cases put on re-treatment.

Short Course Chemotherapy (SCC)

SCC is given to all TB patients registered by the National Leprosy and Tuberculosis Programme (NLTP). Different SCC regimens are used for the different categories of tuberculosis patients. Treatment in the first 2 months (initial phase of treatment) should be administered under direct observation of either a health care provider in a health facility or a member of the household or community. Drugs and tools for registration and reporting should be available before treatment is started. Patient is admitted if very ill or DOTS cannot be ensured. The continuation phase (4–6 months duration) in principle is (or should be) available in all government and NGO health facilities. The patients should collect a supply of drugs enough for 4 weeks, for daily self-administration at home. The patient should return to the health facility for evaluation and supply of more drugs before the drugs run out, at 4-week intervals for self-administration at home.

Treatment Regimens and Drug Dosages

Table 28.3 shows the treatment regimen for new adult smear-positive patients and other seriously ill cases of TB, e.g., TB meningitis, miliary TB, and TB of vital organs: 2ERHZ/6EH.

Table 28.3: Treatment regimen for new/seriously ill adult TB patients: 2ERHZ/6EH

Phase	Intensive phase	Continuation phase
Duration	Two months; supervised daily	Six months: dailyself-administration
Drugs used	Ethambutol (E), Rifampicin (R) Isoniazid (H), Pyrazinamide (Z)	Ethambutol (E), Isoniazid (H)

Table 28.4 shows re-treatment regimen for relapse (R), treatment failure (F), or treatment resumed (TR) with active TB disease and who have a positive sputum smear or culture result: 2SRHZE/1RHZE/5RHE

Table 28.4: Re-treatment regimen for relapse (R), treatment failure (F), or treatment resumed (TR): 2SRHZE/1RHZE/5RHE

Phase	Intensive phase		Continuation phase
Duration	Daily supervised for two months	Daily supervised for one month	Daily self- administration for 5 months
Drugs used	Streptomycin (S) , Ethambutol (E) Rifampicin (R), Isoniazid (H), Pyrazinamide (Z)	Ethambutol (E), Rifampicin (R), Isoniazid (H), Pyrazinamide (Z)	Ethambutol (E), Rifampicin (R), Isoniazid (H),

Tables 28.5 and 28.6 show treatment regimens and dosages for children under 15 yrs of age.

Table 28.5: Treatment regimen for new TB patients younger than 15 years: 2RHZ/4RH

Phase	Intensive phase	Continuation phase
Duration	Daily for 2 months (once a week supervised)	Daily self-administration for 4 months
Drug used	Rifampicin (R), isoniazid (H), pyrazinamide (Z)	Rifampicin (R), isoniazid (H)

Table 28.6: Treatment dosages for children under 15 years of age

Drug	Initial phase (2 months) mg/kg/day (maximum)	Continuation phase (4–6 months)
Isoniazid	5–10 (300)	5mg/kg/day
Rifampicin (R)	10–20 (600)	10mg/kg/day
Pyrazinamide (Z)	25–40 (2,000)	
Streptomycin (S)	15–20 (1,000)	

Drug dosages	Formulation	Pre-treatment weight		
		Over 55kg	40–54kg	30–39kg
Streptomycin	IM injection	1g	0.75g	0.50g
Rifampicin 150mg, Isoniazid 75mg, Pyrazinamide 400mg	Combination tablet	4	3	2
Rifampicin 150mg, Isoniazid 75mg	Combination tablet	4	3	2
Ethambutol 400mg, Intensive phase	Tablet	22–3	12–2	12
Ethambutol 400mg, Isoniazid 150mg	Combination tablet	2	2	2

☛ ***CAUTION:*** Pregnant mothers and patients older than 40 years should not be given more than 0.75g of streptomycin per daily injection. Ethambutol should not be given to children (see side effects). Do not exceed 600mg of rifampicin per day.

Tuberculous Meningitis

Treatment in the initial phase consists of 4 drugs, including streptomycin. The duration of treatment is 9 months.

Follow Up

Review the patient 2 weeks after initiation of therapy and at end of intensive phase. Thereafter, reviews should be carried out monthly. Each review evaluates symptoms, adherence, side effect and weight gain. A child not responding should be referred for further evaluation.

28.8.4 TREATMENT OF TB IN HIV/AIDS PATIENTS

HIV increases a person's susceptibility to infection with Mycobacterium tuberculosis. In individuals infected with M. tuberculosis, HIV is a potent cause of progression of tuberculosis infection to disease. In HIV infected children, dissemination of TB is common. TB meningitis, miliary tuberculosis and widespread tuberculous lymphadenopathy occur. Diagnosis of TB in HIV infected children can be very difficult as the clinical features of the two diseases are almost identical. There are several chest conditions that may mimic TB, and the tuberculin test may be negative despite TB infection. When in doubt, treat for TB but non response may mean it was not TB in the first place. Do not keep the child on TB drugs indefinitely.

☛ **Check that drugs used for HAART are compatible with TB drugs.**

28.8.5 ACQUIRED DRUG RESISTANT TB

Acquired drug resistance results from inappropriate use of one drug or poor adherence to treatment. This suppresses the growth of organisms susceptible to the drugs but encourages the multiplication of isolated strains with spontaneous drug resistance.

28.8.6 MULTIPLE DRUG RESISTANT TB (MDR -TB)

This is resistance to both rifampicin and isoniazid as a consequence of poor adherence to recommended treatment regimens by clinicians and patients. This resistance is further associated with increasing poverty and the HIV/AIDS epidemic. MDR-TB is confirmed on culture and sensitivity. MDR-TB can be prevented by:

- Strengthening TB programmes.
- Ensuring directly observed therapy whenever rifampicin is used.
- Using fixed dose combination tablets containing rifampicin.
- Referring all drug-resistant TB patients to a TB specialist for confirmation and management.

28.9 Rabies

Although not common, rabies is a devastating disease and is almost universally fatal once clinical features appear. It is therefore important to prevent onset of symptoms. The incubation period is 10 days to 1 year with an average of 1–2 months. This period is adequate to allow immunization.

Clinical Features

Initially, there is restlessness and paraesthesia at the site of the wound. Subsequently, the patient develops maniacal behaviour and may demonstrate violent behaviour; the patient also develops dysphagia and hydrophobia. Finally, repeated convulsions develop with hyperpyrexia and flaccid paralysis that ends in death in about 5 days from onset of symptoms.

Management
Rabies has no cure. The management is basically supportive and includes:
- Strict barrier nursing.
- Avoid bites from the patient.
- Sedation.
- Administration of fluids and feeding.

Since even supportive care cannot be given on an outpatient basis, the patient should be referred for admission to provide such management. Part I, Section 1.4.2, contains management details.

28.10 HIV Infection in Children

HIV infection is now a common problem in children. The majority of children acquire the infection from the mother either during pregnancy or delivery or through breastfeeding (mother to child transmission), but a few are infected sexually through rape and still fewer through blood transfusion. The rate of progression of HIV children once infection has occurred is in two forms: one form progresses rapidly and the patients die within 2 years from birth (these are termed rapid progressors) while the other form progress slowly over a few to several years before becoming symptomatic (these are termed slow progressors). There are now several programmes in the country that address HIV/AIDS disease. People should be encouraged to use voluntary counselling and testing centres to know their status so that appropriate interventions can be instituted at an early stage for those who are infected so as to reduce morbidity and mortality.

28.10.1 PREVENTION OF MOTHER TO CHILD TRANSMISSION (PMTCT)

Without intervention, 20–45% of mothers infected with HIV transmit the infection to their babies. However, appropriate intervention can reduce HIV transmission from mother to child to 5% or even less. Prevention of HIV/AIDS centres around:
- Diagnosis of infection in the parents: Routine testing of all parents is recommended.
- Good quality obstetric care:
  - Ensuring adequate maternal nutrition in pregnancy.
  - Staging the degree of immunosupression for pregnant women so that those with a CD4 count of <350 or in clinical stage 3 or 4 are started HAART; this is important for their own health and that of the foetus.
  - Avoiding prolonged rupture of membranes (>4 hours).
  - Ensuring a clean, a traumatic delivery.
  - Giving mother ARV during pregnancy and/or labour, and postnatally to the baby. The drugs currently in use are zidovudine and nevirapine. It is important to use the currently recommended ARVs.
- Counselling on feeding options for the baby. Counselling is best done antenatally to allow parents to choose the best option according to their socio-economic situation and other social factors.

28.10.2 FEEDING OPTIONS FOR HIV INFECTED WOMEN

EXCLUSIVE BREASTFEEDING FOR 6 MONTHS

In this method of feeding, seropositive mothers breastfeed their babies exclusively for 6 months. Then the baby is tested for HIV infection using PCR if possible. If the baby is not infected, advise the mother to wean the baby over several days. The baby can then get other types of milk with complementary feeding. If the baby is infected, she can continue breastfeeding together with complementary foods. If a mother stops breastfeeding and cannot afford any other milk for her baby after 6 months it will be necessary to teach her how to heat treat her breast milk. Otherwise the baby will develop malnutrition

REPLACEMENT FEEDING

This refers to mothers who are tot breastfeeding but using another type of milk exclusively for 6 months and introducing other feeds at 6 months while continuing the milk. The present WHO recommendation is that when replacement feeding is acceptable, feasible, affordable, sustainable, and safe (AFASS), then mothers should avoid breastfeeding. If this is not possible mothers should be counselled on how to safely breastfeed. Recent studies from Africa, however, indicate that replacement feeding is associated with increased morbidity and mortality even when formula milk is provided by the government. In light of findings from these studies, it appears that it is in the best interest of child and their survival to breastfeed rather than use formula milk. All mothers should be counselled to avoid mixed feeding, i.e., combining breast milk with other milks, liquids, or food unless they heat treat the breast milk.

28.10.3 CARE OF HIV EXPOSED INFANTS

Care of an infant exposed to HIV consists of the following:

- Initiating cotrimoxazole prophylaxis at 6 weeks.
- Continuing feeding counselling at all visits.
- Ensuring immunization according to KEPI schedule.
- Giving vitamin A according to national guidelines.
- Monitoring growth: The growth curve should be evaluated: if the baby is not gaining weight appropriately despite nutrition counselling, the baby may have been HIV infected and should be referred to a facility that can carry out the tests to confirm infection (PCR or CD4 counts).
- Testing for HIV infection:
  - A negative PCR test for HIV for non breastfeeding baby done at 6 weeks of age and when repeated at 3 months suggests that the baby is most probably not infected. For a breastfeeding baby, breastfeeding has to be stopped and the test done 6 weeks to 3 months later. If the test is negative, the baby is not infected. However, the baby needs to be followed up till 12 to 18 months of age.
  - An HIV antibody test is done between 12 and 18 months and if it is found negative, the child is followed up in the normal MCH clinic. If the test is positive, however, the child should be referred to nearest HIV comprehensive care centre.

28.10.4 CARE OF HIV INFECTED CHILDREN

Unfortunately most mothers do not know their HIV status in pregnancy and consequently the diagnosis of HIV in children tends to be made late. Early signs of HIV infection are also often missed by the primary health care provider. Many of the severe illnesses that occur as complications of HIV/AIDS disease are also the common causes of illness in non infected children. Thus, health workers do not realize that they might be occurring as complications of HIV/AIDS.

Diagnosis

Diagnosis of HIV infection is made by an antibody test, in the form of a Rapid test or an Elisa test for all children aged above 18 months. Diagnosis can also be made by virological (antigen) test using the PCR; this is a confirmation test for infection in children below 18 months. Ideally, all children attending MCH should be tested for HIV to facilitate early intervention and appropriate management. All children requiring admission should be tested to minimize missing of infected children and to facilitate optimum care. HIV infection can be suspected in the presence of the following:

- Chronic otitis media.
- Persistent parotid enlargement.
- Slow growth or weight loss that fails to respond to adequate nutrition.
- Non specific skin rashes.

In more advanced disease, the following features are usually noted:

- Recurrent serious infections, e.g., pneumonia.
- Persistent or recurrent fevers.
- Severe and recurrent oral thrush.
- Recurrent and persistent diarrhoea.
- Herpes zoster.
- Neurological dysfunction, either delayed or regressed milestones.
- Failure to thrive.

It is advisable to encourage all adults with HIV and on treatment to bring their children for testing even if they think the children are not infected.
It is necessary to refer the patient if:

- HIV infection cannot be confirmed.
- Child diagnosed to have HIV, so that they can be taken care of in a comprehensive care centre, where CD4 counts can also be done.

Management

Mother and child and any other infected family members should access care preferably in the same setting. If the clinic only caters for children then adult members must be referred to an appropriate clinic

Nutrition for Affected Children

Ensure adequate diet for age of the child. Their energy needs are higher than those of non HIV infected children. Many infected children have poor appetite, thus the parent or caregiver should vary and experiment on foods offered. Nutritional supplementation may be necessary, especially micronutrients.

28.10.5 HIV STAGING

Two approaches are taken to determining the phase or stage of HIV infection, WHO's clinical criteria, given below, and an immunological approach. The immunological approach, based on age specific CD4 counts, is summarized in Table 28.7.

WHO Clinical Staging

Stage 1:

- Asymptomatic
- Persistent generalized lymphadenopathy

Stage 2:

- Skin eruptions that include recurrent/extensive lesions that may be infections due fungi or Molluscum contagiosum virus, or may be immunological like seborrheic dermatitis (eczema) and any non specific dermatitis.
- Herpes zoster
- Recurrent or chronic upper respiratory and/or ear infections
- Parotid enlargement
- Recurrent oral infections
- Hepatosplenomegaly

Stage 3:

- Moderate malnutrition (-2SD or Z score) not responding to therapy
- Unexplained persistent diarrhoea
- Oral candidiasis (outside neonatal period)
- Unexplained persistent or recurrent fevers
- Severe recurrent pneumonias (>2 episodes in 12 months)
- HIV related chronic lung disease
  - Symptomatic lymphoid interstitial pneumonitis
  - Pulmonary or lymph node TB
  - Systemic varicella infection
  - Unexplained anaemia, neutropaenia, thrombocytopaenia

Stage 4:

- For a child <18 months of age: 2 or more of the following: oral candidiasis, severe pneumonia, failure to thrive or sepsis
- For a child of any age:
  - Severe wasting, stunting, or malnutrition not responding to therapy
  - Pneumocystis jiroveci pneumonia (PCP)
  - Extra pulmonary TB
  - Candidiasis of oesophagus, trachea, or lungs
  - HIV associated cardiomyopathy, or nephropathy, or encephalopathy
  - Kaposi's sarcoma or other lymphomas
  - Unusual bacterial, fungal, or viral infection

Table 28.7: Immunological stages: Based on age specific CD4 counts

Stage	<12 months (%)	12–35 months (%)	36–59 months (%)	5 years & above (Cells/Cm)
Not significant	>35	>30	>25	>500
Mild	30–35	25–30	20–25	350–499
Advanced	25–34	20–24	15–19	200–349
Severe	<25	<20	<15	<200 or <15%

28.10.6 PREVENTION OF PNEUMOCYSTIS CARINII PNEUMONIA WITH DAILY COTRIMOXAZOLE

Pneumocystis carinii pneumonia (PCP) should be prevented in all HIV infected children by administering daily cotrimoxazole in the dosages shown in Table 28.8.

Table 28.8: Daily cotrimoxazole dosages to prevent PCP

Weight (kg)	Syrup 240mg/5ml	Tablet 480mg	Tablet 960mg
1–4	2.5ml	¼ tab	-
5–8	5ml	2 tab	¼ tab
9–16	10ml	1 tab	2 tab
17–30	15ml	2 tabs	1 tab
>30	20ml	2 tabs	1 tab
Adolescent/Adult	2 tabs	1 tab	

28.10.7 TREATMENT OF INTERCURRENT CONDITIONS (OPPORTUNISTIC INFECTIONS)

Patients with any complications or coexisting disease should be treated for the condition using the recommended guidelines for the condition. Those more severely ill or with various complicating illnesses should be appropriately referred for management.

- In oropharyngeal candidiasis:
- Give ketoconazole 3–6mg/kg in 2 doses for 7 days or fluconazole 10mg/kg STAT then 3–6mg/kg per day for 2 weeks. In tuberculosis:
  - Manage as given under guidelines for tuberculosis.
- In Cryptococcal meningitis:
  - Give amphotericin B, 0.7–1mg/kg daily or fluconazole 400mg daily for 6–10 weeks then 200mg OD for life.

PNEUMOCYSTIS JIROVECI PNEUMONIA (PCP)

Clinical Features

The following clinical features are shown by children with Pneumocystis carinii pneumonia:

- Low grade fever
- Severe respiratory distress
- Normal auscultatory findings
- Poor response to standard antibiotics
- Severe hypoxaemia

Management
- Admit.
- Give oxygen.
- Give prednisone 2mg/kg/day for 7–14 days; taper off if treatment was over 7 days.
- Give cotrimoxazole (TMP/SMX) IV 20mg TMP/kg/day IV 6 or 8 hourly for 21 days. Use same dose orally if IV preparation is not available.

TOXOPLASMOSIS
Children with this condition have features of encephalitis.

Treatment
- Give a combination of :
  - Pyrimethamine 2mg/kg/day (max 50mg) for 2 days then 1mg/kg/day (max 25mg).
  - Sulphadiazine 50mg/kg/ every 12 hours.
  - Folic acid 5–20mg 3 times per week.
- Treat for 1–2 weeks after resolution of symptoms.

28.10.8 ANTIRETROVIRAL THERAPY (COMPREHENSIVE CARE CENTRE)
This is indicted when the child is in clinical stage 3 or 4 irrespective of immunological stage, or the child has severe immunosupression irrespective of the clinical stage. Tables 28.9 and 28.10 summarize the treatment regimens for first and second line ARVs, respectively, but before starting the medication the child must be given a battery of tests and the parents counselled on the use of the drugs.

Before Starting ARVs
Before ARVs are started the following investigations need to be carried out:
- Full blood count
- Liver function tests (alanine transferase)
- Renal function (creatinine)
- CD4 count
- Viral load if possible

Before a child is started on ARVs, adherence counselling is done to help the parent or guardian understand:
- The treatment that is required and side effects of the treatment.
- Correct administration of the drugs and the need to give the drugs every day
- That treatment is for life.

TREATMENT FAILURE
☛ **Treatment failure can be considered only when a child has been on treatment for at least 6 months (24 weeks).**

The following features constitute treatment failure:
- Clinical: Poor growth or weight loss after gaining, recurrence of severe infections, neuro-developmental delay or regression.
- Immunological: Drop in CD4 count below level for age, >50% peak or below baseline.
- Virological: Failure to achieve significant suppression load or progressive increase in viral load after significant suppression.

It is important to note the following:
- Second line therapy should not be introduced in a rush.
- Adherence to the first line drugs should always be determined.
- First line therapy should not be discontinued before second line drugs are available.

Table 28.9: First line ARVs

Child characteristics	Recommended regimen
A. No previous exposure to NVP	
Age < 3 years & weight < 10kg	AZT + 3TC + NVP
Age> 3 years & weight > 10kg	AZT + 3TC + NVP OR EFV
B. Child exposed to single dose NVP	
All ages	AZT + 3TC + LPV/r

Note: Use d4T instead of AZT for a child with haemoglobin< 8g/dl.
Children on TB therapy stop NVP and give ABC if < 3 years or EFV if > 3 years. If the diagnosis of TB is made before start of ARVs, treat the TB first unless the clinical or immunological stage is very advanced. Monitor response by clinical and laboratory parameters, adherence, and side effects.

Table 28.10: Second line therapy

1st line regimen	2nd line regimen
AZT + 3TC + NVP or EFV	ddI + ABC + LPV/r
d4T + 3TC + NVP or EFV	ddI + ABC + LPV/r
d4T + ddI + NVP or EFV	ddI + ABC + LPV/r
ABC + 3TC + AZT	NNRTI + LPV/r + ddI

DISCONTINUATION OF ARVS

Sometimes it may be necessary to stop ARVs. This may be required in the following situations:
- When adherence is a problem despite repeated counselling.
- When there is drug toxicity.

28.10.9 COUNSELLING AND PSYCHOSOCIAL SUPPORT

This should be ongoing to address the parent and child's concerns. As the child gets older it is important to work towards disclosure. Children need to understand their condition and how to deal with problems such as stigma especially in school. As they approach adolescence they need to be taught how to look after themselves and to assume responsibility for taking their own

medicines. With adequate care perinatally, infected children are reaching adulthood. If they were attending a strictly paediatric clinic, they would graduate to an adult clinic just like any other children who have chronic diseases.

28.10.10 PREVENTION OF HIV TRANSMISSION IN HEALTH FACILITIES

HIV does not spread through casual contact, hence patients with HIV infection may be nursed in open wards. Eating utensils need not be handled in a special way. However, health workers who handle HIV-contaminated blood or certain body fluids are at risk. Precautions against transmission of HIV in the health facility include:

- Decontaminating surfaces that have been soiled by blood or other body fluids with sodium hypochlorite 0.25% (e.g., Jik).
- Soaking instruments in glutaraldehyde solution.
- Washing hands and other contaminated parts of the body with soap and water.
- Soaking in bleach (e.g., Jik), for 30 minutes, all soiled bed linen and clothing before general washing.
- Wearing gloves and taking care in all situations involving the possibility of direct exposure to blood and body fluids, e.g., wound dressings, surgery and other invasive procedures, collection of laboratory specimens, cleaning surfaces contaminated by body fluids.

28.10.11 HANDLING OF ACCIDENTAL EXPOSURE TO CONTAMINATED BLOOD OR NEEDLE STICK INJURY

These include immediate measures, post-exposure care and post-exposure prophylaxis. They consist of the following:

Immediate measures:

- If the exposure is to the skin:
  - Decontaminate skin by washing thoroughly with soap.
  - Squeeze the wound and let blood flow freely.
  - Apply iodine, methylated spirit, betadine or other virucidal agents.
- If exposure is to the eye
  - Rinse thoroughly with sterile saline, eye irrigant and clean water splash.
- If exposure is to the mouth/nose;
  - Clean water rinse flush.
  - Apply oral disinfectants.

Post exposure care:

- Allay anxiety.
- Discuss safer sex/third party risks.
- HIV pre- and post-test counselling.

Serological testing:

- Carry out baseline HIV screening at injury.
- Repeat testing at 6 weeks, at 3 months and also at 6 months.

- Post-exposure prophylaxis: This is carried out as soon as possible. It consists of AZT 300mg or d4T (30mg if weight is <60kg, 40mg if >60kg) + 3TC 150mg twice a day for 28 days.
- For high risk exposure add LPV/r.

29. Nutrition, Growth, and Development

All children from conception require adequate nutrition for their growth, development and normal function. Both under and over nutrition are undesirable and lead to disability. Currently 31% of Kenyan children aged below 5 years are stunted. There is little information on nutritional status of children 5–18 years of age. What is known is that poor nutrition leads to poor school performance. Nutritional needs vary according to the rate of growth, and both are highest in utero, followed by the first year and gradually reducing until the adolescent growth spurt.

☛ **It is worth noting that stunted children will result in stunted adults and also that damage that occur in foetal and early childhood cannot be reversed later in life.**

29.1 Foetal Nutrition

Foetal nutrition depends on the mother's nutrition, so that good nutrition of the mother contributes to the good nutrition of the foetus. It is preferable that a mother be well nourished before conception and that she continues to get adequate nutrition through pregnancy and lactation. Foetal under-nutrition predisposes to adulthood diseases such as diabetes and obesity, while micronutrient deficiency predisposes to congenital defects. It is therefore essential to ensure adequate maternal nutrition. All programmes of maternal and reproductive health should have a component on maternal nutrition.

29.2 Infant and Young Child Feeding

This is centred on exclusive breastfeeding for 6 months and timely and adequate complementary feeding with continued breastfeeding up to 24 months. All infants should be breastfed unless there is medical contraindication. The national guidelines need to be followed to ensure prevention of malnutrition, which is the main underlying cause of death in children aged below 5 years. Community support for appropriate breastfeeding is needed. Figures for 2003 indicated that only 2.6% of women at that time practised exclusive breastfeeding for the recommended 6 months. Although the recommendations for feeding in this section are strictly for ages 0–2 years, they can be extended to older children up to 3 years. Mother should be prepared and counselled for breastfeeding during antenatal and postnatal periods.

Compliance with the feeding recommendations for infants and young children can be achieved by the help of support groups, which could have a number of additional activities on other aspects of health in the community. Children aged 2–5 years are often on an adult diet and this may not be sufficient for their needs. Consequently, families need to know how to feed these children adequately. Some of these children may have started nursery school and may thus fit in the existing early childhood development (ECD).

29.2.1 RECOMMENDED FEEDING FOR YOUNG CHILDREN

Age	Type of Feeding Recommended
Birth to 6 months	Exclusive breast milk. Breastfeed as often as the child wants day and night, at least 8 times in 24 hours. There should be no other food or milk or fluid offered (including water) for healthy babies except medicines including ORS when indicated.
6–12 months	Breastfeed on demand. If not breastfeeding, give 500ml of milk. Introduce enriched complementary foods like *uji* mixed with milk, sugar, or oil, Along with mashed green vegetables and proteins (plant or animal sources). Also give fresh fruit juice or mashed fruit. Feed 3 times a day if breastfed and 5 times a day if not breastfed.
13–24 months	Breastfeed on demand. Continue energy rich foods, giving at least 5 times a day.

29.2.2 NATIONAL POLICY ON INFANT AND YOUNG CHILD FEEDING PRACTICES

Summary Statement

Every facility providing maternal and child health (MCH) services should:

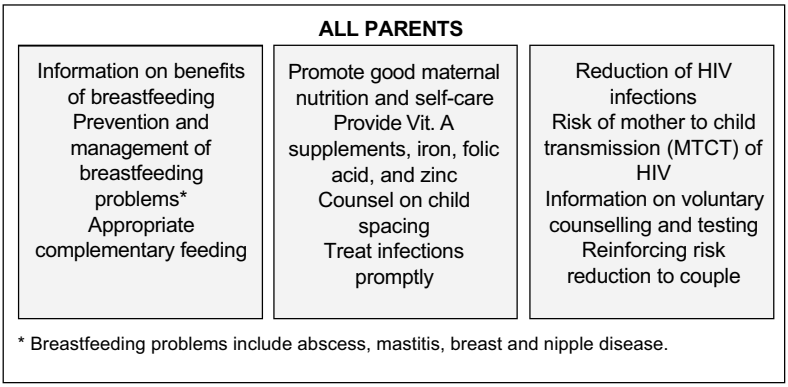
1) Adhere to the National Infant Feeding Policy, which should be routinely communicated to all health staff and strategically displayed.
2) Train all health care staff in skills necessary to implement this policy.
3) Provide information to all pregnant and lactating mothers and their partners on the benefits and management of breastfeeding.
4) Assist mothers to initiate breastfeeding within the first 30 minutes of birth.
5) Give newborn infants no food or drink other than breast milk unless medically indicated (see specific guidelines on infants of HIV infected mothers).
6) Show mothers how to breastfeed and to maintain lactation even if they should be separated from their infants.
7) Practice rooming-in, allow infants to remain together with the mother 24 hours a day.

8) Encourage breastfeeding on demand.
9) Encourage and actively promote exclusive breastfeeding for infants up to 6 months.
10) Provide information and demonstrate to mothers how to introduce and prepare appropriate and nutritious complementary foods for their infants after 6 months.
11) Encourage mothers to breastfeed for at least 24 months (see guidelines for HIV infected mothers).
12) Foster the establishment of breastfeeding support groups and other support groups and refer mothers to them on discharge from hospital or clinic.
13) Not accept any free samples and supplies of breast milk substitutes.
14) Not allow any publicity by the manufacturers or agents of breast milk substitutes.
15) Not give any feeds using bottles or teats.

29.2.3 HIV AND INFANT FEEDING PRACTICES GUIDELINES

Figures 29.1 and 29.2 illustrate the links between voluntary counselling and testing (VCT) and infant feeding. Figure 29.1 shows the various types of information that VCT opens up, while Figure 29.2 provides a schematic representation of the value of VCT as it affects mothers' infant feeding options. When mothers know their status, they can make informed choices about how to feed their babies.

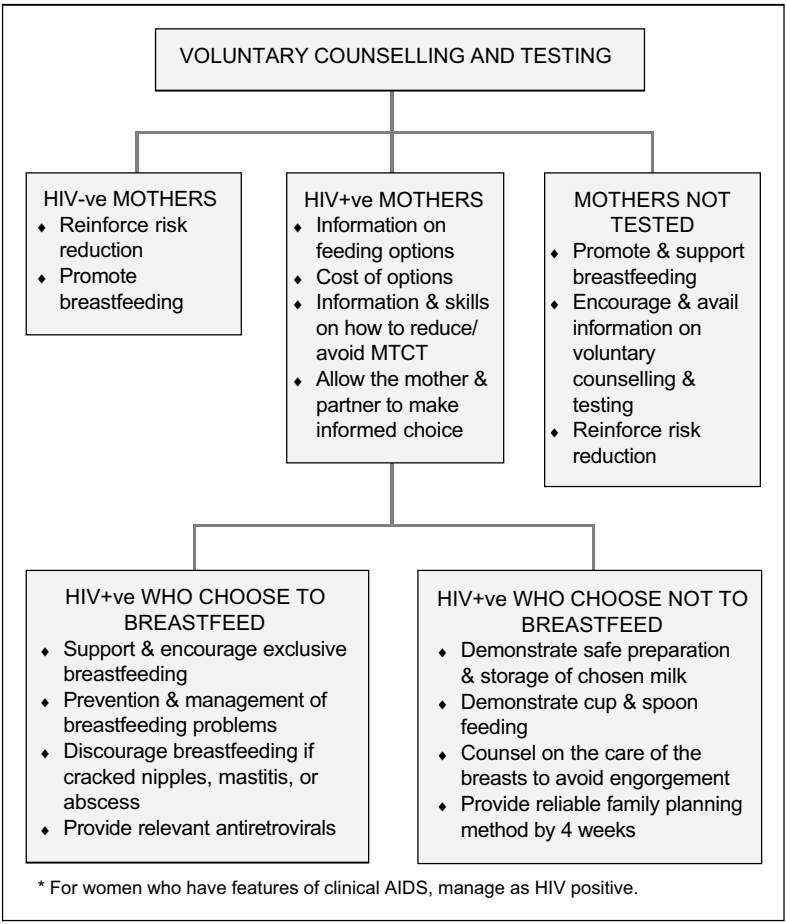
Figure 29.1: Information links between VCT and infant feeding



29.3 Healthy Feeding through Childhood

Eating habits are established during the first 2 years. By this time the child is eating family foods. Encourage child to eat, but respect the child's appetite and do not force to eat. Adequate and balanced diet need to be followed. Up to age 5 years nutritious snacks are essential.

Figure 29.2: VCT and the HIV-positive mother



Organized feeding through the school years may help to prevent hunger, which affects the child's learning. In the low cost school parents may offer food or service for the children. In high cost schools food and snacks sold in school shops/canteens should be healthy. Parents and teachers are responsible for this.

29.4 Growth Monitoring and Growth Promotion

- ***Rates of growth:*** Rate of growth is highest in the first year of life and gradually reduces thereafter until child reaches puberty when there is another growth spurt that lasts 2–5 years.

- ***Weight gain:*** Term neonate aged 0–2 months gains 30g per day; an infant aged 2–6 months gains 20g per day. A child doubles birth weight at 5–6 months and triples birth weight at 12 months.
- ***Increase in height:*** Infants increase their height by about 25cm in first year and 10cm in second year.
- ***Head growth:*** Head is measured by head circumference. At birth head circumference ranges between 33cm and 37cm. Thereafter, it increases by 2cm per month for the first 0–3 months; by 1cm per month from 3 to 6 months of age; and lastly by 0.5cm per month from 6 to 12 months of age. These increments add to a total of 12cm at the end of the first year. Eighty percent of the brain growth occurs in the first 2 years of life.
- ***Interpretation of changes in weight and height:*** Weight loss leads to wasting and is usually a sign of recent food shortage or illness. On the other hand, inadequate gain in height or length leads to stunting and is a sign of chronic lack of food or illness.
  - Body mass index (BMI) = weight in kg / (height in metres)^2. Children with BMI above the 85th percentile are overweight, while those above the 95th percentile are obese.
  - Head circumference below that expected for age is microcephaly and above expected is hydrocephaly or macrocephaly.

29.4.1 GROWTH MONITORING

Serial weight and height measurement and recording on the growth chart should be done as part of the Maternal and Child Health (MCH) programme. All children have their own individual growth curve, but if they deviate from the curve the reason should be investigated.

Growth monitoring after 9 months is generally inadequate as parents and health care providers tend to associate clinic attendance with immunization. So after the measles vaccine at 9 months few mothers see the need to come to clinic unless the child is unwell. Also as the child grows bigger and maybe the mother has a new baby, the older child is no longer priority. Growth monitoring at community level has been in existence for a long time in Kenya, but is probably not widespread.

It is necessary to make growth monitoring an important community activity. Growth monitoring is important throughout childhood to detect not only failure to grow well but also features of over-nutrition like obesity Poor growth is detected by the regular use of the growth chart. As soon as a slowing growth is detected action must be taken. The advice given to a mother depends on the age of the child. The advice must be practical and the mother must be able to do what she is told.

The community health workers can be trained and supported to do this. They together with the parents need to visualize the growth of children and seek help if the child is not growing appropriately. All children up to age 5 years should be weighed regularly – preferably monthly weighing up to 5 years. To do this they need weighing scales and tools for length/height measurement. Currently, charts are readily available only for children up to 5 years.

When a Child Does Not Grow Well: Assess Nutritional Status
The following classifications are important for parents to know about their children to assist them to avoid malnutrition:

Classification	Signs
Normal	No low weight for age and no other signs of malnutrition
Very low weight	Very low weight for age Poor weight gain
Severe malnutrition	Visible severe wasting, "baggy pants" sign Oedema of both feet

When a child does not grow well:
- Assess the child's feeding.
- Ask what the child is fed on.
- Ask how many times the child is fed in a day.
- Counsel the mother on feeding. Review the recommendations in Table 29.1 against the child's growth chart, and discuss with the mother about any necessary changes.

Follow up programme for child:
- Review the progress of the child in 5 days.
- Re-assess feeding.
- Counsel mother about any new or continuing feeding problems.
- If child is very low weight for age, ask the mother to return 14 days after the initial visit to monitor the child's weight.
- Encourage the mother to continue the feeding programme until the child gains appropriate weight for age if after 14 days the child is no longer very low

Table 29.1: Feeding recommendations children with poor growth or lack of growth

Age	Growth chart shows	Recommendations
0–6 months	Poor or no weight gain for 1 month	Breastfeed as many times as possible, day and night. Check that mother is breastfeeding properly and that her diet is adequate.
	Poor or no weight gain for 2 months	As above. In addition, the mother should be encouraged to eat and drink enough. Refer child for investigation. Child may have hidden illness.
7–12 months	Poor or no weight gain	Breastfeed as often as child wants. Give adequate servings of enriched complementary feed at least 3 times a day if breastfed and 5 times if not breastfed.
13–24 months	No/poor weight gain for 1 month	Continue breastfeeding. Check diet composition and how much child takes. Advise on how to enrich the food. Feed 3 main meals. Give snacks at least 2 times between meals.
	Poor or no weight gain for 2 months	Continue feeding as above. Take history and refer.
24 months and over	Poor or no weight gain	Child should eat half as much food as the father. Child should be encouraged to eat with other children, but should have an adequate serving of food served separately. Take history and refer.

weight for age. And then advise her to maintain feeding the child an adequate nutritious, well balanced diet.

Refer all children for further evaluation if:

- Weight has not increased in the last 2 months even though the mother/ caregiver says they are following the advice on feeding practices.
- Sick children are not gaining weight adequately. (Sick children may need to be referred immediately for other reasons).
- Child continues to lose weight (consider TB, HIV infection among other problems).
- Child's weight is well below the bottom line on the chart.
- Child has any sign of swelling of the feet and face (Kwashiorkor) or severe wasting (marasmus).

Advice to mothers should be:

- Well babies less than 6 months old need no other milk or food apart from breast milk.
- Adding oil, margarine, or sugar, and milk, egg, or mashed groundnuts makes uji and other foods energy rich and helps young children grow well.
- Feed often – like 5 times a day: small children have small stomachs.
- Feed older children at least 5 times a day.
- Feed sick children at least one extra meal per day and continue for 1–2 weeks after they recover.
- Continue to take interest in what the child feeds on even in the school years.
- Mothers should know that the children are likely to have poor school performance if not fed well.
- Avoid over feeding and limit non nutritious snacks, especially if the child is overweight.

29.5 Development

Besides nutrition children need appropriate stimulation in order to reach their development potential. Both parents and health workers need to know the normal developmental milestones.

Table 29.2: Developmental milestones

Developmental milestone	Normal limits
Can lift head when prone	4 weeks
Social smile	4–6 weeks
Good head control	3–6 months
Turns to origin of the sound	2–3 months
Extends hand to grasp a toy	2–3 months
Sitting without support	5–9 months
Standing	7–13 months
Walking	12–18 months
Talking	9–24 months

Any child whose milestones are delayed needs careful assessment to identify the cause and offered appropriate therapy. If you cannot deal with the problem refer.

Children need simple culturally appropriate toys to play with. Parents can be taught how to make simple toys with materials available in the home. Encourage parents to spend time with their young children. Encourage parents to talk to their children often, even the babies; they won't understand the words, but they will learn about interaction.

30. Nutritional Disorders

30.1 Micronutrient Deficiencies

30.1.1 IRON DEFICIENCY

The commonest sign of iron deficiency is anaemia, which is discussed in Section 34.1. Iron deficiency negatively affects cognitive function. A school going child performs poorly at school long before iron deficiency anaemia manifests. Iron deficiency also increases risk of infection.

Prevention

Diet should consist of iron rich foods like dark green leafy vegetable (whose iron is poor absorbed), meat, liver, and other animal sources (whose iron is easily absorbed)

30.1.2 IODINE DEFICIENCY

Iodine deficiency leads to deficiency of thyroxine because iodine is involved in the production of thyroxine. The thyroid gland may become enlarged in an effort to produce more thyroxine, leading to goitre.

Prevention

Consumption of iodized salt is adequate prevention against iodine deficiency.

30.1.3 VITAMIN A DEFICIENCY

Vitamin A is a retinol ester that can be either ingested or synthesized within the body from plant carotene. It is important in maintaining the integrity of skin and membranes, immunity, and night vision. Deficiency of vitamin A results in increased rate of infection, as well as increased mortality. In Kenya about 75% of children aged below 5 years have vitamin A deficiency. Worldwide, vitamin A supplementation has been shown to result in 23–34% reduction of all childhood mortality (6–59 months), 50% reduction in measles mortality, and 33% reduction in diarrhoeal disease mortality. Vitamin A deficiency is a major cause of illness and blindness among poor communities worldwide.

Eye Manifestations of Vitamin A Deficiency
- Early signs include reversible dry cornea and night blindness.
- Later signs include irreversible damage of cornea – rupture and scarring, Bitot's spots (white areas on lateral parts of the sclera) and blindness also develops as a consequence of vitamin A deficiency.

Prevention of Vitamin A Deficiency
- Encourage families to consume vitamin A rich foods, which include:
  - Animal products, for example liver, milk and kidneys.
  - Plant products, for example dark green leafy vegetables, yellow fruits and vegetables (carrots, pumpkin, pawpaw).
- Give vitamin A supplementation together with immunization.
- Give vitamin A supplementation routinely in the presence of the following conditions:
  - Malnutrition
  - Diarrhoea
  - Malaria
  - Tuberculosis
  - Pneumonia
  - Worm infestation
  - Fever
  - Measles

☛ **For children aged below 5 years, it is important to ensure that they have not received vitamin A in the last 1 month.**

Treatment for Xerophthalmia
Affected children are given vitamin A on day 1 and 2 and a third dose 1–4 weeks after second dose. Children suffering from measles should be treated as if they have xerophthalmia.

30.1.4 VITAMIN D DEFICIENCY

Although there are no data from national surveys, vitamin D deficiency is common in many parts of the country, usually starting during the second half of the first year. For children who were born premature, the deficiency is diagnosed much earlier.

Clinical Features
Children present with poor growth, delayed or regressed milestones, recurrent pneumonias, widening of the wrists, and prominence of costo-chondral junctions (rickety rosary)

Investigation
- X-ray wrist – cupping of radius and ulna
- Serum calcium, phosphate
- Alkaline phosphatase
- Urine to exclude renal causes

Management

- Give vitamin D2 at 2,000–5,000 IU per day for 6–12 weeks or D3 at 0.05μg/kg/day.
- Supplements of calcium and phosphate will also be beneficial. Advise parents to expose their children to sunshine as a preventive measure against rickets.

Prevention

Children should be exposed to sunlight with minimal clothing for 30 minutes a day. For infants born preterm, supplementation with vitamin D at a dose of 4,000 IU/day is recommended. In addition, there should be provision for calcium and phosphate in the diet, which is usually adequate from milk for the infant and young child.

30.2 Macronutrient Malnutrition

Macronutrient malnutrition presents as protein energy malnutrition (PEM). PEM is a common disorder which covers a wide spectrum of deficiency in nutrition ranging from mild or underweight to severe forms like marasmus and kwashiorkor. The first sign of PEM is poor weight gain.

Clinical Features

The clinical features of the two severe forms of malnutrition, kwashiorkor and marasmus, are itemized in Table 30.1. Each of the features varies from mild to severe. A child may have combination of features for both kwashiorkor and marasmus, and then be diagnosed to have marasmic kwashiorkor.

Table 30.1: Clinical features of the two severe forms of malnutrition

Kwashiorkor	Marasmus
Pedal oedema	Very low weight for age
Low weight	Gross loss of subcutaneous fat
Apathy	"Wise old man look"
Poor appetite	Good appetite (if no complications)
Muscle wasting	Severe muscle wasting
Flaky paint dermatosis	
Hair changes (thin, sparse)	

Classification

"Weight for height" rather than "weight for age" is now used for classifying malnutrition for the sake of deciding on management options because weight is affected by stunting. It is known that a child who is less than 60% for their "weight for age" may be so mainly because of stunting and such a child does not need hospital treatment. Mid upper arm circumference (MUAC) can also add value.

Consequently, the following classifications are available for children with macronutrient malnutrition:

- Mild malnutrition: Child <5 yrs who is failing to gain weight for 2 months.

- Moderate malnutrition: Weight for height Z score between > -3SD and < -2SD, MUAC >11.0cm and < 12.5cm.
- Severe malnutrition: Weight for height Z score < -3SD, MUAC <11.0cm with or without oedema. If weight for height is not available, "visible severe wasting" is used to make a judgement.

Children with macronutrient malnutrition may have the following additional features or complications in varying degrees and combinations:
- Anorexia
- Lower respiratory infections
- Fever
- Hypothermia
- Vomiting
- Diarrhoea with or without dehydration
- Altered consciousness
- Severe anaemia

Investigations
- Mantoux test
- HIV test
- Blood sugar
- Haemogram
- Chest x-ray

Management
If clinically "well", that is has good appetite and is alert, treat as outpatient with ready to eat therapeutic food. Advise mother to keep the child warm. Teach her how to feed the child at home. Review weekly until weight for height Z score is >-2, MUAC >11.0cm, and there is no oedema. If not well or if any of the complications listed above are present, admit urgently for inpatient care. Specific management issues for the different classifications of malnutrition are given below.

Mild malnutrition:
- Advise the mother to bring the child to the clinic fortnightly for nutrition counselling and growth monitoring.
- Treat any intercurrent problem, e.g., diarrhoea, pneumonia, malaria.
- Check HIV status.

Evaluate carefully if:
- There is no change after 2 months. The child may have an underlying cause.
- Admit if the child develops moderate to severe malnutrition.

Moderate malnutrition:
Patients with this degree of malnutrition can be treated as an outpatient with food supplementation and nutritional counselling.

Severe malnutrition:
Such children should be assessed for the presence of complications: dehydration, shock, severe anaemia, hypoglycaemia, hypothermia, malaria, pneumonia, septicaemia and mouth ulcers. If the children do not have any of these complications or problems, and have good appetite and are alert, they should be treated as outpatients with ready to eat therapeutic food. They should be reviewed weekly until weight for height Z score is > -2, MUAC >11.0cm and no oedema. If the children have the complications mentioned and/or have poor appetite and/or are not alert, look for other intercurrent problems like the presence of oedema that signifies kwashiorkor or marasmic kwashiorkor, and appropriately manage.

Plan of Care (See Flow Chart, Figure 30.1, and Table 30.2)
- Advise the mother to keep child warm.
- Ensure sufficient staff to provide feeds during day and night. Death often occurs at night because of hypoglycaemia.
- Initiate feeding within 2 hours of admission and feed every 2 or 3 hours throughout the 24-hour period until the child is out of danger. The child may need tube feeding in the first days of admission.
- Give all children with severe PEM a broad spectrum antibiotic.
- Update immunizations.
- Keep any skin ulcers clean; you can use antiseptic washes.
- Mouth ulcers: Clean mouth with normal saline (or salt water) and apply gentian violet.

Feeding Regime
- Initial phase: 100kcal/kg/day; protein 1–1.5g/kg/day; liquid 130ml/kg/day ***OR*** 100ml/kg/day if severe oedema.
- After stabilization: Gradually increase intake to 150–200kcal/kg/day; protein 2–4g/kg/day.
- Correct micronutrient deficiencies:
  - Multivitamins
  - Folic acid
  - Zinc
  - Vitamin A
  - Ferrous sulphate 3mg/kg/day after child has started gaining weight

Monitoring Response to Therapy
- Weigh child daily:
  - Child with oedema: Weight loss initially, then weight gain of >10g/kg/day is expected. If weight gain is less than that, check feeding, re-examine for possible missed infection.
  - Child without oedema: Should gain weight as soon as good feeding is established.
  - Calculation of weight gain: Child's weight 3 days ago 6,000g; current weight 6,300g; weight gain = 300g; daily weight gain = 100g. Divide 100g by 6kg to get g/kg/day.
- Check for intercurrent problems daily.

Figure 30.1: Symptomatic severe malnutrition

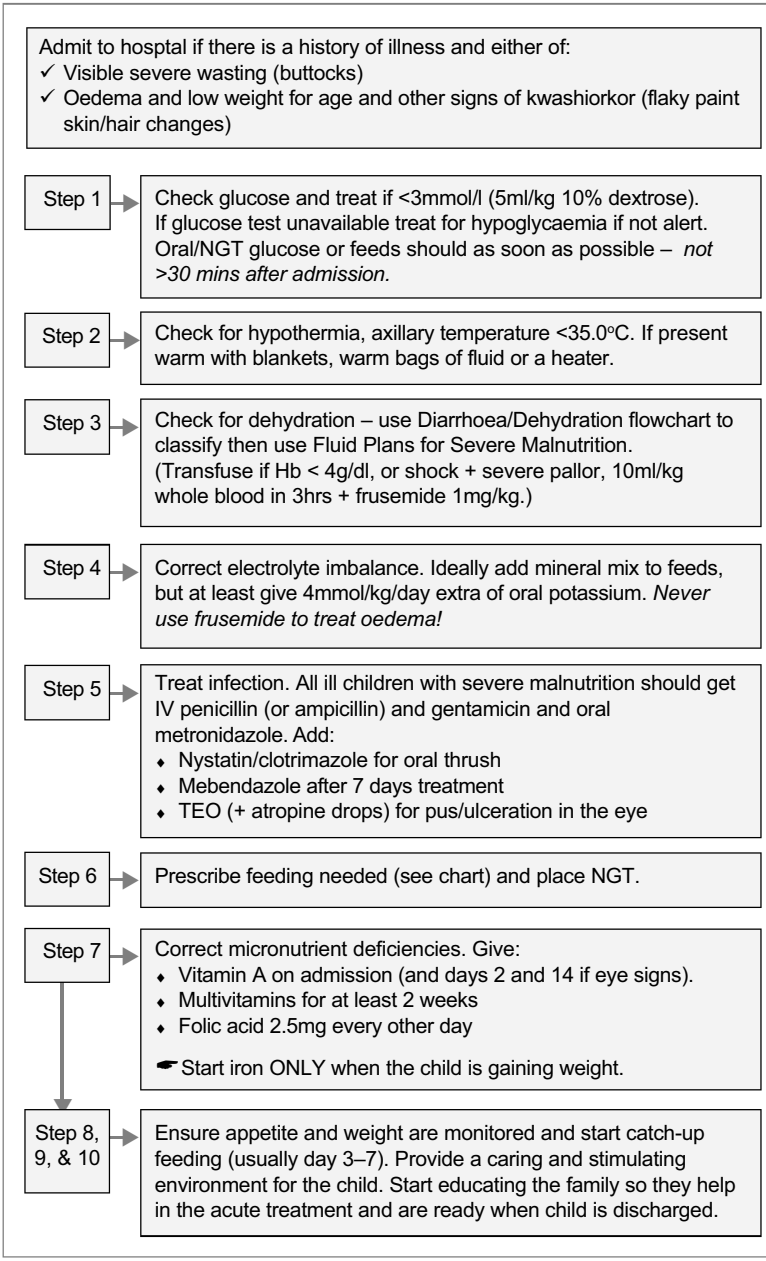


Table 31.2: Time frame for care of seriously malnourished child

Arrival at health facility: Triage for danger signs and initiate treatment then admit	Stabilization		Rehabilitation
	Days 1–2	Days 3–7	Weeks 2–6
1. Hypoglycaemia	→		
2. Hypothermia	→		
3. Dehydration	→		
4. Electrolytes	→		→
5. Infection	→	→	→
6. Micronutrients	no iron	with iron	→
7. Initiate feeding	→	→	
8. Catch up growth			→
9. Sensory stimulation	→	→	→
10. Counsel on feeding	→	→	→

Advice to Mothers

- Explain the problems and involve the mother in the care of the child.
- Show the mother how well the child is doing on the weight chart.
- Nutrition counselling: Advise mother on how to mix nutritious food from the 3 food groups.
- Show her how to provide sensory stimulation once child is over acute phase and takes interest in surroundings.

Prevention

Preventive strategies for macronutrient malnutrition include the following:

- Appropriate nutritional advice in the MCH clinic (breastfeeding and complementary feeding), with emphasis on how to mix nutritious food from the 3 food groups.
- Showing mothers how to provide sensory stimulation to their children.
- Use of growth chart in the MCH clinic for all children aged below 5 years.
- Health education to parents attending all health facilities and in the community on appropriate child rearing and feeding practices.
- Advocating for good hygiene in food preparation.
- Advocating for environmental sanitation.

☛ **Admit to hospital if there is a history of illness and either of: Visible severe wasting (buttocks), or oedema and low weight for age and other signs of kwashiorkor (flaky paint skin/hair changes)**

31. Children with Special Health Needs

31.1 Failure to Thrive

A child whose physical growth is significantly below expected for age is said to have “failure to thrive”. Failure to thrive is placed in two categories, non-organic and organic.

31.1.1 NON-ORGANIC FAILURE TO THRIVE

In this category, the child is usually less than 5 years with no underlying medical condition. The failure to thrive may be due to maternal emotional problems, the child may have been unwanted, or there may be severe poverty. This form of failure to thrive could be a form of child abuse.

Clinical Features

Besides the size, child is often unkempt, has delayed social motor and speech development, and there is poor parent–child interaction.

31.1.2 ORGANIC FAILURE TO THRIVE

The child in this category of failure to thrive has an underlying medical condition that is usually a chronic illnesses, for example a chronic infection like TB, HIV, or kala azar; major congenital malformations; or an endocrine or metabolic disorder.

A complete history including nutritional, social and growth monitoring is essential. In non-organic FTT the mother's history may be inconsistent, or show no concern for the child. A thorough physical examination for all forms of failure to thrive is essential.

Investigations

- Stool for ova and cysts
- Haemogram and blood film
- Urea and electrolytes creatinine
- Urinalysis
- Mantoux test
- CXR – to rule out chronic chest infections
- HIV test
- Additional tests as indicated

Management

- Feed the child depending on the degree of malnutrition.
- Treat the cause if known and treatable and counsel the mother on how to cope and manage at home.
- Counsel the mother in case of non-organic FTT to try to resolve the underlying issues.

31.2 Child Abuse and Neglect

Child abuse is maltreatment of children or adolescents by parents, guardians, or other caregivers. Early recognition is very important for prompt intervention.

Most child abusers (90%) are related caretakers who tend to be lonely, unhappy, angry and under heavy stress. Many of them experienced child abuse of one form of another during their own childhood. Abused children may have certain provocative characteristics, negativity, difficult temperament, offensive behaviour, or disability.

Types of child abuse are in various forms, as itemized below:

- Physical abuse (non-accidental trauma): This is the commonest form of child abuse. It manifests as physical injuries that include bruises, burns, head injuries, and bone fractures. Their severity can range from minor bruises to fatal injuries.
- Emotional abuse: This type of abuse is characterized by intentional verbal acts, criticisms, and lack of nurturing. This type is very difficult to prove.
- Nutritional neglect or deliberate underfeeding: This is associated with failure to thrive.
- Sexual abuse: This usually occurs with family members and is the most overlooked (or under reported) form of abuse. Types of sexual abuse include molestation, sexual intercourse, and rape.
- Others: These include intentional drugging (or poisoning) or neglect of medical care.

31.2.1 CLINICAL PRESENTATION

Physical abuse may manifest as unexplained inconsistent injuries and delay in seeking medical help for the injuries. Sexual abuse may remain concealed for fear of reprisal from the perpetrator; often the victim (in this case the abused child) does not know what to do or where and how and to whom to report. Most victims report to a health facility due to acute stress or vaginal bleeding, STIs, UTI, enuresis, encompresis (faecal incontinence in absence of organic defect) or pregnancy. Children with nutritional neglect present with failure to thrive, poor hygiene, delayed immunizations, delayed development in speech, mental status and social interaction. Most abused children are shy with expressionless faces and tend to avoid eye-to-eye contact.

31.2.2 INVESTIGATIONS

For children who are suspected to be abused, the following are recommended:

- Thorough history and examination for all types of abuse, indicating who accompanies the child to the health facility.
- In physical abuse, total skeletal survey (x-ray – may find fractures at various healing stages) is recommended.
- Sexual abuse: Examine for sperms, acid phosphatase and infections, e.g., gonorrhoea. Rape cases may require examination under GA to determine the type and extent of genital injury.
- Nutritional neglect: Must rule out all other causes of failure to thrive.

31.2.3 MANAGEMENT

Admit the child for the following reasons:

- The diagnosis may be unclear, admission may be important for the child because of consideration for immediate safety, or the state of the child might require medical or surgical intervention.
- The need to remove the child from the source of the abuse in order to protect the child until the evaluation of the family with respect to the safety of the child is completed.
- The needs of the perpetrator for psychiatric evaluation and care.

- The need to involve the police and the social worker for more effective management of the child.

For children who experience rape or sodomy, the following needs to be done:
- Sedate as necessary with phenobarbitone 5–8mg/kg/day or diazepam at 0.1–0.25mg TDS.
- Give prophylaxis for HIV/AIDS (see under HIV/AIDS).
- Carry out surgical repair of injuries (sphincter injury, which may require colostomy with secondary repair).
- Counsel the child.

31.2.4 PREVENTION

Health workers should have a high index of suspicion on the likelihood of abuse. Older children should be encouraged not to keep "secrets" and to refuse any enticement to have what could be sexual abuse. Children who are in a high-risk situation should be removed from that environment and not left there.

Referral for these children is necessary for long-term psychological and psychiatric care.

32. Gastrointestinal Conditions Other than Diarrhoea

32.1 Infestation with Worms

Although worm infections comprise a large group of parasitical cestodes, schistosomes, flukes, nematodes, and filarial worms, the focus here is on nematodes. Among these are hookworm disease, ascariasis, enterobiasis, trichuriasis, trichostrongyliasis, anisakiasis, capillariasis, and gnathostomiasis. Even so, only a few of these are included. Table 32.1 summarizes the most common worm infections with their clinical features and the method of detection, and Table 32.2 presents the preferred drugs and dosages for treatment of worm infestations. (This information is repeated from Chapter 6 for ease of reference; schistosomiasis is discussed in Section 32.3.)

☛ **De-worm children above 2 years at least every 6 months with mebendazole 500mg STAT.**

Prevention

Appropriate prevention depends on the particular worm. In general, the following measures should be instituted:
- Providing safe water
- Washing hands and trimming fingernails
- Changing innerwear and sheets frequent
- Using latrines

Table 32.1: Specific worm infestations, their clinical features, and investigations required for diagnosis

Worms	Clinical features	Investigations
Ascaris lumbricoides (roundworms): Large round, cream coloured worms that live in the small intestines	▫ Infection by swallowed embryonated eggs ▫ Loef?er's syndrome ▫ Mild bouts of recurrent colic ▫ The mother has seen the worm in stool or vomitus ▫ Complications such as obstruction, vomiting may occur	Stool for ova
Hookworms	▫ "Ground itch" ▫ Features of anaemia (iron deficiency)	Stool for ova Haemogram
Trichuris trichiura (whipworms)	▫ Diarrhoea with blood ▫ Rectal prolapse ▫ Anaemia ▫ Wasting	Stool for ova Worms may be seen adhering to rectal mucosa
Strongyloides stercoralis	Most infections are asymptomatic but the following may occur: ▫ Larva currens (buttocks) ▫ Soiling of innerwear with stool ▫ Hyperinfection syndrome ▫ Diarrhoea ▫ Gram-negative septicaemia ▫ Bacterial peritonitis ▫ Encephalitis	Direct stool microscopy (motile larvae, adult worms
Enterobius vermicularis oxyuriasis (pin worm) Synonyms: Threadworm, pinworm, seatworm. The worm is 4mm long and is just visible to the human eye	Mode of spread *Auto-infection:* ▫ Direct anal to mouth transfer via the fingernails ▫ Retro- infection; eggs may hatch into larvae at the anal-rectal area. Then larvae move retrogradely to the caecum. *Cross infection:* ▫ Contamination of fingers by clothing, objects, toilet seats, etc. ▫ By inhaling and swallowing eggs in the dust ▫ Main presentation: perianal and perineal itching. Migrating larvae may cause: ▫ Vaginitis, vulvitis, salpingitis, and peritonitis ▫ Irritation, insomnia may occur	Stool for ova Ova can be obtained from the perianal region by use of adhesive tape
Taenia saginata (beef tapeworm)	▫ Non-specific symptoms, irritability ▫ Segment may be passed with stools ▫ Egg in stools	Stool for ova (motile proglottides)

Table 32.2: Drugs and their dosages in of worm infestations

Worms	Adults	Children
Ascaris lumbricoides (Roundworm)	Levamisole 2.5mg/kg as a single dose *OR* Albendazole 400mg STAT	Levamisole 2.5mg/kg as a single dose *OR* Albendazole 200mg STAT for children under 2 years
Hookworm	Levamisole 2.5mg/kg as a single dose *OR* Albendazole 400mg STAT	Levamisole 2.5mg/kg as a single dose Albendazole 200mg STAT for children under 2 years + ferrous sulphate
Trichuris trichiura (whipworm)	Albendazole 400mg STAT	Albendazole 200mg STAT for children under 2 years
Strongyloides stercoralis	Albendazole 400mg BD x 3 days *OR* Thiabendazole 25mg/kg x 3 days	Albendazole 200mg BD x 3 days *OR* Thiabendazole 25mg/kg x 3 days
Enterobius vermicularis (pinworm)	Albendazole 200mg STAT for children 12 months up to 24 months and 400mg STAT for children above 2 yrs	Albendazole 200mg STAT for children 12 months up to 24 months and 400mg STAT for children above 2 years
Taenia saginata (beef tapeworm)	Niclosamide 2g; 1g before breakfast, 1g 1 hour after breakfast	>6 years 1g before & 1g after breakfast 2–6 years 500mg before and 500mg after breakfast < 2 years 250mg before and 250mg after breakfast

32.2 Amoebiasis

This is an infection usually of the colon by Entamoeba histolytica. Most of the people infected by Entamoeba histolytica are asymptomatic cyst carriers.

Clinical Features

Two diseases that are caused by Entamoeba histolytica are amoebic dysentery and amoebic liver abscess.

- Amoebic dysentery: This presents as bloody diarrhoea, and depending on the severity of infection there may be varying degrees of dehydration.
- Amoebic liver abscess: This presents as intermittent fevers, night sweats, and tenderness in the right hypochondrium. Some patients may have difficulty breathing. The abscess may rupture into the chest, causing empyema or into the abdomen causing peritonitis.

Investigations

- Stool for microscopy – Trophozoite with ingested RBC in amoebic dysentery
- Full haemogram – Liver abscess (leucocytosis, mild anaemia)
- Chest x-ray – Elevation of the right hemidiaphragm liver abscess
- Abdominal ultrasound will show abscess in liver

Management

- Amoebic dysentery: See Section 18, on diarrhoea.
- Admit if liver abscess is suspected and start treatment for amoebic liver abscess:

- Metronidazole 30–50mg/kg/day in 3 divided doses for 7–10 days
- Aspiration or surgical drainage of pointing liver abscesses is indicated to prevent spontaneous rupture in pointing abscesses.

- Asymptomatic cyst carriers:
  - Treat cyst carrier in food handlers only. Use diloxanide furoate-metronidazole (e.g., entamizole).

Prevention

- Provision of safe drinking water and sanitary disposal of faeces are important preventive measures.
- Regular examination of food handlers and appropriate treatment when necessary are needed, including in schools.

32.3 Schistosomiasis

This is infection with blood flukes of the genus Schistosoma, which may cause chronic disease of intestines, liver, and genitourinary tract. Adult flukes are white worm-like creatures that inhabit parts of the venous system of man. All the worms need molluscan intermediate host. Important species of schistosomiasis in Kenya are Shistosoma haematobium and Shistosoma mansoni. Adult worms live and copulate within the veins of the mesentery. The sexually mature worms are mainly found in the intestinal veins for Shistosoma mansoni, while those of Shistosoma haematobium are mainly located in the venous plexus of the genitourinary tract. Eggs that are laid penetrate the intestinal or bladder mucosa, pass into the lumina, and are passed in faeces or urine. Once passed, the eggs hatch in fresh water, liberating cercariae that multiply in snails (the intermediate host) and produce thousands of cercariae. These penetrate human skin within a few minutes after exposure and transform into schistosomes, which develop into sexually active adult worms in the intestinal veins or venous plexus of the genitourinary tract depending on the species.

An adult worm's lifespan ranges from 3 to 37 years. Shistosoma haematobium is common along the coastline, especially along Tana River, Kwale and Lamu. Shistosoma mansoni, on the other hand, is widespread, and occurs particularly in Machakos, the rice schemes, parts of Nyanza, and even Nairobi.

Clinical Features

Acute dermatitis and fever after exposure is a rare presentation. Occasionally transverse myelitis and convulsions may occur. Chronic schistosomiasis is the main presentation in Shistosoma mansoni, manifesting with portal hypertension, splenomegaly, anaemia, and oesophageal varices. On the other hand, Shistosoma haematobium may present with terminal haematuria and dysuria and may progress to obstructive uropathy; bladder cancer has been noted as a late complication in some patients. Metastatic eggs can be found in other organs such as the spinal cord and the brain. It has also been noted that Salmonella infection, presenting as recurrent pyrexia, is difficult to eradicate until schistosomiasis has been treated.

Investigations

- For Shistosoma mansoni:
  - Stool for ova, use concentration or Kato technique rectal snip.
  - Barium swallow and endoscopy to demonstrate oesophageal varices
  - Abdominal U/S
  - Liver biopsy if indicated
- For Shistosoma haematobium:
  - Urine for RBC and for ova of S. Haematobium hatching test
  - X-ray of lower abdomen may show calcified bladder (sandy patches)
  - Intravenous urogram when obstructive uropathy is suspected

Management

Shistosomiasis should be treated with praziquantel 20mg/kg BD for one day (effective against all types). Patients should be examined for living eggs and if positive given another course of treatment.

Refer to specialist if:

- There are features of obstructive uropathy.
- There are features of portal hypertension.

Prevention

Preventive strategies against schistosomiasis include the following:

- Avoid contact with contaminated water.
- Give mass chemoprophylaxis to school age children in endemic areas.
- Improve environmental hygiene, for example by advocating for the use of toilets by communities.
- Eradicate snails, which are the intermediate hosts.

32.4 Gastrointestinal Bleeding

Clinical Features

Gastrointestinal bleeding may present as blood in vomitus or in stool. In either case, there may be frank red blood or altered blood that would appear as coffee grounds or there may be black stool. Bleeding could occur from the upper or lower gastrointestinal tract. The amount of bleeding varies depending on the cause of bleeding. Massive bleeding can present with features of shock.

Among the common causes of features of upper gastrointestinal bleeding are:

- For the newborn
  - Swallowed maternal blood: In this situation the baby looks well.
  - Stress ulcers often following birth asphyxia.
  - Coagulopathy: DIC associates with asphyxia, sepsis, vitamin K deficiency.
  - Necrotizing enterocolitis (NEC) – more common in sick preterm infants.
- Infants and children
  - Swallowed blood following epistaxis (history of epistaxis).
  - Gastritis.
  - Oesophageal varices.
  - Gastric/duodenal ulcers.

For all ages, the common causes of lower gastrointestinal bleeding include the following:
- Anal fissure
- Infectious diarrhoea (including NEC in neonates, shigella, campylobacter, salmonella, amoebiasis, and schistosomiasis).
- Coagulopathy due to bleeding disorders that include liver disease and DIC.
- Intussusception that is more common in infants and young children.

Investigations
- Full blood count and blood film
- Group and cross match if excessive bleeding
- Stool for occult blood
- Stool culture or microscopy as indicated
- Specific tests according to suspected cause of bleeding:
  - Endoscopy
  - Barium swallow or meal or enema
  - Septic screen
  - Abdominal x-ray for neonate with suspected NEC
  - Coagulation screen
  - Liver function tests
  - Abdominal ultrasound

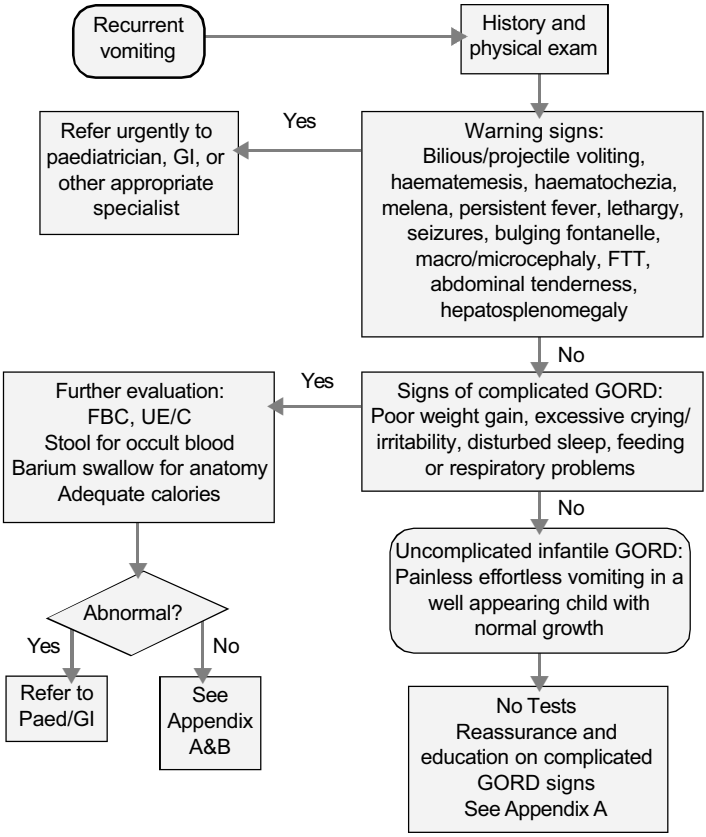
Management
- Initiate treatment for shock (refer to Section 17.6).
- Monitor vital signs half hourly until bleeding stops.
- Transfuse as soon as blood is available.
- Use nasogastric suction to assess blood loss and monitor continued bleeding.
- Be ready to give more blood when needed.
- Investigate and treat the underlying condition.

32.5 Vomiting

Clinical Features
Vomiting in children may be due to a systemic infection or may accompany diarrhoea, as it often happens. It should be noted that some normal babies regurgitate milk regularly and are clinically normal with normal growth. These are not considered to be having a vomiting problem. Vomiting may also be due to upper gastrointestinal tract obstruction, and may be the primary presentation for this condition.

The common causes of vomiting include the following:
- For early infancy
  - Gastro-oesophageal reflux disease (GORD), which initially presents as painless and persistent vomiting (see Figure 32.1).
  - Pyloric stenosis that presents with projectile vomiting and with a mass palpable in the right upper abdominal quadrant in the affected children.
  - Congenital upper gastrointestinal obstruction.

Figure 32.1: Gastro-oesophageal reflux disease (GORD)



Appendix A: Reflux precautions:
- Head up 30 degrees, side position to sleep
- Upright after feeding for 30 minutes
- Minimal handling after feeding
- Small frequent feeds
- Thickened feeds

Appendix B: Medications:
- Acid suppression: Omeprazole 0.5 – 1.0mg/kg/day (maximum 30mg/day)
- Prokinetic: Domperidone 0.1mg/kg/day

- Later infancy/early childhood
  - Intussusception that presents with intermittent acute pains and blood in the stool. A mass may be palpable in the abdomen.

Investigations
- Full haemogram
- Serum electrolytes
- Plain abdominal x-ray supine and erect or dorsal decubitus views
- Abdominal ultrasound
- Upper GI series
- Endoscopy

Management
- Avoid antiemetics.
- Treat non obstructive causes appropriately.
- Initiate rehydration according to degree of dehydration, using normal saline in the acute phase.
- Arrange to transfer to surgical unit urgently all children suspected to have gastrointestinal obstruction and gastro-oesophageal reflux disease syndrome.

Reflux precautions:
- Head up 30 degrees, side position to sleep
- Upright after feeding for 30 minutes
- Minimal handling after feeding
- Small frequent feeds
- Thicken feeds

Medications:
- Acid suppression: Omeprazole 0.5 – 1.0mg/kg/day (maximum 30mg/day)
- Prokinetic: Domperidone 0.1mg/kg/day

☛ **Refer if symptoms persist despite treatment.**

32.6 Peptic Ulcer Disease

This refers to ulceration of gastric or duodenal mucosa that tends to be chronic and/or recurrent.

Clinical Features of Duodenal Ulcer
Duodenal ulcer has the following features:
- Presents with epigastric pain that is typically nocturnal and also when the patient is hungry.
- May present for the first time with complications as described later in this section.
- There is a wide individual variation in presenting symptoms and in the foods that give pain or discomfort when eaten.
- 95% of duodenal ulcers are caused by Helicobacter pylori (H. pylori).

Clinical Features of Gastric Ulcer
Gastric ulcer presents with:
- Epigastric pain that is worse after eating food.
- Other symptoms are similar to those for duodenal ulcers.

Investigations
- Stool for occult blood
- Barium meal
- Upper GIT endoscopy, where available and biopsy gastric mucosa for H. pylori

Complications
Chronic blood loss may lead to iron deficiency anaemia, and acute bleeding results in haematemesis or melaena stool.

Management
- Avoid any foods that to the patient's experience give pain.
- Avoid obviously acidic foods, e.g., Cola drinks.
- Avoid gastric irritating drugs (NSAIDs).
- Give magnesium-based antacids or combined magnesium-aluminium compounds, liquid preferred. Adjust dose to limit pain.
- Eradicate H. pylori by triple therapy:
  - Omeprazole 20mg BD 14 days or cimetidine 20–40mg/kg/day
  - Clarithromycin 500mg BD 14 days or metronidazole 15–20mg/kg/day BD
  - Amoxicillin 25–50mg/kg BS 14 days
- Refer/consult if there is severe haemorrhage.
- Make sure you stabilize the patient before transfer.
- Infuse fluids/blood to maintain normal pulse.
- Continue to assess for any further loss of blood as evidenced by: Persistent tachycardia, postural hypotension, continuing haematemesis.

☛ **Note: Eradication of H. pylori leads to healing and most patients will not need long-term treatment. Complications will also be avoided.**

32.7 Constipation and Encopresis

Clinical Features
- Constipation is failure to open bowels regularly and is often accompanied by painful passage of hard stool. It may be associated with soiling of pants.
- Encopresis is intermittent leakage of soft/watery stool in a child with chronic constipation.
- Constipation may be caused by obstructive lesions (these include congenital or acquired defects), neurological or endocrine abnormalities (hypothyroidism), or they may be functional.
- Note: Exclusively breastfed infants may take several days without passing a stool. But when they do the stool is soft. This should not be confused with constipation.

Investigations
- Abdominal x-rays in suspected obstructive lesions
- Barium enema when indicated
- Thyroid function tests when indicated
- Investigate and treat nonfunctional lesions

Management
Children with perceived constipation are often treated at home with herbs and even enemas. Such treatment may make it difficult to diagnose this condition and may lead to some complications. However, the inclusion of bananas or pawpaw in the diet may be beneficial, especially in increasing fibre intake.
Treatment of functional constipation is in three stages:
- Disimpaction (2–5 days): Mineral oils taken orally is the preferred treatment but daily enemas using magnesium salts can also be used. In general try to avoid enemas.
- Sustained evacuation (about 3 months): this aims to restore normal bowel function. Child is encouraged to use toilet at regular intervals with positive rewards; diet is gradually modified to a low diary, high fibre one once disimpaction is achieved. Occasionally fibre supplement (1g/yr/day) may help. Encourage good water intake. Laxatives and stool softeners are used in conjunction with diet.
- Gradual withdrawal of medication while maintaining bowel habits and diet.

Refer
- All children with suspected nonfunctional lesions
- Any child that fails to respond to above treatment
- Children in need of psychological counselling

33. Disorders of the Liver and Spleen

33.1 Hepatosplenomegaly

Liver enlargement is reported to have occurred when the liver measures more than 3cm below the costal margin or has a liver span greater than normal for age. Enlargement of the spleen, on the other hand, is reported to have occurred if the spleen is “just palpable”. Causes of these conditions are summarized in Table 33.1.

Investigations
- Full blood count and blood film
- Liver biopsy when indicated
- Bone marrow if needed
- Specific tests will depend on the suspected cause listed in the table

Table 33.1: Causes of hepatosplenomegaly

Category of causes	The specific causes associated with hepatomegaly	The specific causes associated with splenomegaly
Infections	Malaria kala azar Schistosomiasis Infectious hepatitis Amoebic hepatitis/abscess Brucellosis	Malaria/tropical splenomegaly HIV Kala azar (leishmaniasis) Schistosomiasis Infectious hepatitis Brucellosis Other infections, like SBE, typhoid fever, infectious mononucleosis
Blood	Haemolytic anaemia Leukaemia	Haemolytic anaemia, e.g., sickle cell anaemia in child <3 years autoimmune haemolytic anaemia Leukaemia
Nutrition	Kwashiorkor	Iron deficiency
Congestion	Cardiac failure	Portal vein thrombosis
Other	Liver tumours Displaced rather than enlarged liver	Liver cirrhosis (portal hypertension) Juvenile rheumatoid arthritis, SLE

Management

- Make sure you identify the cause and treat accordingly
- Admit
  - If patient is severely anaemic – may need transfusion
  - If patient is febrile
  - For invasive diagnostic tests

33.2 Jaundice after the Neonatal Period

- Definition: Yellow discolouration of skin and mucous membranes due to excess bilirubin. It is also referred to as hyperbiliribinaemia, usually with serum bilirubin at that time of >2mg% (34.2 ìmol/L).
- Jaundice is a clinical feature and not a diagnosis. Any patient with jaundice should be carefully evaluated to determine the cause of the jaundice so as to institute appropriate management.
- Hyperbilirubinaemia is categorized according to the location of the abnormality in the metabolism and excretion of bilirubin: pre-hepatic, hepatic, or post-hepatic:
  - Pre-hepatic: This is due to excess intravascular release of bilirubin, often by haemolysis)
  - Hepatic: This is due to hepatocyte dysfunction with faulty uptake, metabolism, or excretion of bilirubin.
  - Post-hepatic: This is due to blockage of bile and its constituents so that they do not exit from the biliary system; this may result from common bile duct obstruction or intrahepatic cholestasis).
- The common causes of hyperbilirubinaemia include viral hepatitis, haemolytic anaemia (e.g., sickle cell, malaria), cirrhosis, biliary obstruction, hepatoma, drug induced reactions

Clinical Features
Meticulous history and physical examination are important before ordering investigations. The history should include exposure to hepatotoxic drugs, known history of haematological disorder, history suggestive of viral hepatitis (anorexia, nausea, and aversion to fatty foods), history suggestive of obstructive jaundice (of dark urine, pale stool and pruritus)

Physical examination should look for features suggestive of cirrhosis (spider naevi, gynaecomastia, loss of axillary hair, parotid gland enlargement and ascites) or features suggestive of parenchymal liver disease or haemolytic jaundice (splenomegaly). In hepatic encephalopathy in children the early signs may be mild and easy to miss. Child becomes slow and may have disturbed sleep-wake pattern. This progresses through drowsiness, arousable sleep to unconsciousness.

Investigations
- Full haemoglobin – Polymorphonuclear leucocytosis is found in infections including leptospirosis. Sickle cells may be seen in the peripheral blood smear
- Reticulocyte count – Increased reticulocyte count indicates a haemolytic anaemia.
- Blood slide for malaria parasites – ***Jaundice in a patient with malaria is a medical emergency.***
- Urine – Bilirubin:
  - Absence of bilirubin in a patient suggests haemolytic anaemia.
  - Presence of bilirubin suggests hepatobiliary jaundice.
- Urine – Urobilinogen:
  - Excessive urobilinogen suggests haemolysis. Urobilinogen is absent in obstructive jaundice.
- Liver function tests:
  - Gamma Globulin Transaminase (GGT) – Elevated levels suggest primary liver disease.
  - Alkaline phosphatase – Elevated levels suggest obstruction.
  - SGOT (AST) – Elevated levels suggest hepatocellular damage.
  - SGPT (ALT) – Elevated levels suggest hepatocellular damage more specific than AST.
  - Serum proteins:
    - Albumin – Low levels in chronic liver disease such as cirrhosis.
    - Globulins – Hyperglobulinaemia is found in chronic active hepatitis, cirrhosis.
- If above investigations are not diagnostic consider:
  - HBs Ag, HAV - Ab. TORCHES in young infants.
- Ultrasound: Useful in obstructive jaundice, gall stones, differentiating between abscess and tumour.
- Alpha-foetoproteins: Substantial elevations of alpha-foetoproteins are found in malignancy.
- Paracentesis of ascitic fluid: Protein content <3g% is found in cirrhosis. Protein content >3g% is found in tuberculosis, peritoneal tumours, peritoneal

infection or hepatic venous obstruction. Blood stained ascites usually indicates a malignant disease – cytology is mandatory.
- Liver biopsy is important in diagnosis of chronic hepatitis, cirrhosis, and hepatocellular malignancy.

Management
- Patients with history and physical findings suggestive of viral hepatitis can be managed as outpatients requiring advice on bed rest and should be given multivitamins.
- Conduct diagnostic evaluation and manage according to cause.
- Admit if patient shows signs of encephalopathy. Refer/consult if not able to manage.
- Consider hepatic encephalopathy in any patient who has jaundice and mental complaint. Early treatment of hepatic encephalopathy may reduce mortality.

33.3 Obstructive Jaundice beyond Neonatal Period

This refers to jaundice caused by obstruction of bile in the biliary tree. It can be due to intrahepatic or extrahepatic causes.

Clinical Features
These include the following features:
- Jaundice and pruritus, which can be severe, with steady increase in jaundice
- Distended gall bladder
- Anorexia
- Troublesome diarrhoea with pale, foul smelling stool.
- Dark urine with a history of flatulence.

The causes of obstructive jaundice include the following:
- Those that are intraluminal include gallstones, which can dislodge from the gallbladder and get impacted in the common bile duct (CBD), and helminthiasis, especially ascaris and liver flukes.
- Those within the wall or mural include primary sclerosing cholangitis.
- Those acting outside the wall or extramural include enlarged lymph nodes of any cause, and neoplasms.
- Other causes include iatrogenic trauma to the ducts during surgery (especially cholecystectomy).

Investigations
- Full haemogram
- Liver function tests
- Prothrombin time index
- Plain abdominal x-rays may show stones
- Abdominal ultrasound and CT scan

Management
Appropriately manage the conditions diagnosed and refer those that require surgical management.

34. Haematologic Conditions

34.1 Anaemia

Patients with anaemia have a reduction in total red blood cell mass, decreased, concentration of red blood cells (RBC) and reduced haemoglobin (Hb) in the peripheral blood, resulting in a corresponding decrease in the oxygen carrying capacity of the blood. The average normal haemoglobin levels for the various ages in childhood are shown in Table 32.1.

Table 34.1: Average normal haemoglobin levels in childhood

Age category in childhood	Average haemoglobin level
Newborns	14g/dl
Children aged under 5 years	10g/dl
Children aged 5–9 years	11g/dl
Children aged 9 years and above	12g/dl

Anaemia except in the newborn may therefore be classified as follows as follows:
- Severe anaemia being haemoglobin below 5g/dl.
- Moderate anaemia being haemoglobin between 5g and 8g per decilitre.
- Mild anaemia being haemoglobin above 8g/dl but below normal for age category.

The common causes of anaemia in Kenya are the following:
- Haemolysis of red blood cells caused by infections like malaria or congenital abnormalities like haemoglobinopathies exemplified by sickle cell disease.
- Iron deficiency as a result of chronic blood loss due to bleeding or loss following parasitic infestation like hookworm or nutritional deficiency of iron.
- Reduced production of red blood cells by the bone marrow due to depression of its function by chronic illness, infection, infiltration or just failure to produce blood cells (aplasia).

Clinical Features
- Meticulous history and examination are essential in order to identify the cause of the anaemia .
- Pallor of the palms is a useful indicator of anaemia and is classified into two categories: as “some pallor” for mild to moderate anaemia and “severe pallor” for severe anaemia.
- Other features of severe anaemia include irritability, listlessness, anorexia, easy fatigability, heart failure, and shock. Other clinical features depend on the underlying cause of the anaemia.

Investigations
- Full haemogram include reticulocyte count if haemolysis is suspected
- Thin blood film examination for cell morphology and blood parasites

- Stool for ova of helminths, occult blood
- Sickling test/Hb electrophoresis if indicated.
- Bone marrow
- Urinalysis.
- Others depending on suspected cause

Management

- Admit all patients with severe anaemia or those who fail to respond to treatment as outpatients for appropriate investigation and management.
- For anaemia due to malaria, manage the malaria according to the guidelines given in Section 20. In addition, do the following:
  - Folic acid: Give to all patients who have malaria and anaemia
    - Below 2 years of age 2.5mg daily for 3 months
    - Above 2 years of age 5mg daily for 3 months
    - Continue with the doses once weekly as for malaria prophylaxis above
- For anaemia due to iron deficiency, do the following:
  - If severely anaemic admit and manage appropriately
  - If the anaemia is mild or moderate and the child is not severely malnourished give iron and folate orally.
  - Review the child every 2 weeks.
  - If severely malnourished, delay giving iron until recovery phase of malnutrition.
- For anaemia due to worm infestation, de-worm using albendazole or mebendazole.
- Continue iron therapy until normal haemoglobin is achieved, usually after 3 months of treatment (1 month's treatment corrects the anaemia while the other 2 months treatment is used to build up iron stores). The dose of iron is usually 6mg/kg/day of elemental iron (or 30mg of ferrous sulphate, which contains 6mg of elemental iron) to a maximum of 200mg 3 times a day.
- If patient is not able to tolerate oral iron or if compliance is poor, consider iron dextran as total dose infusion:
  - Dose of dextran iron in mg = (normal Hb – patient's Hb) × 1,000. Give as total dose infusion. This also replenishes body stores of iron.

☛**Do not give iron in the presence of sickle cell disease, so as to avoid excessive iron load in the body, which that might result in toxicity.**

- Advise mothers to give a balanced and adequate diet to all children. Iron and folate containing foods include meat, fish, eggs, dark green leafy vegetables, and fruits.
- Refer and consult if:
  - Anaemia is not improving after treatment for a month.
  - No cause for anaemia has been identified.

34.2 Sickle Cell Anaemia (Disease)

This is a chronic haemolytic anaemia found mainly in Nyanza, Western and Coast provinces, characterized by sickle-shaped red blood cells as a result of

homozygous inheritance of Haemoglobin S. Because sickled red blood cells are fragile and cannot withstand the trauma of being squeezed through capillaries during circulation, haemolysis occurs in the small blood vessels. These abnormal red blood cells are also destroyed within the spleen.

Clinical Features

Symptoms of sickle cell disease or anaemia usually start around the age of 6 months and include the following:

- Pain and swelling of the hands and feet (hand and foot syndrome).
- Anaemia and mild jaundice.
- Impaired growth and development.
- Susceptibility to infections (including malaria, Haemophilus influenza, Streptococcus pneumoniae).
- Hepatosplenomegaly.
- Acute splenic sequestration of blood with resultant cardiovascular collapse
- As the child grows pain predominate, being experienced as:
  - Bone pain, involving the long bones, the back, and the head.
  - Severe abdominal pain with vomiting.
- Acute chest syndromes (sudden onset of fever, chest pain, leucocytosis and pulmonary infiltrates on x-ray) that may be fatal.

Other features of sickle cell disease include:

- Aplastic crisis
- Priapism (painful erection of the penis)
- Hyperhaemolytic crisis
- Impaired renal function
- Avascular necrosis of the femoral head is common
- Occlusion of major intracranial vessels that may lead to hemiplegia cranial nerve palsies and other neurological deficits
- Bossing of the skull that might be “Tower shaped” skull.

Investigations

- New patients
  - Full haemogram to include peripheral smear.
  - Sickling test
  - Hb electrophoresis
- At other times these will be determined by type of presentation
  - X-ray: To exclude osteomyelitis, pneumonia
  - Full haemogram
  - Blood cultures
  - CT scan
  - Renal function

Management

Management options for sickle cell disease include:

- Maintaining adequate diet to prevent growth failure due to malnutrition.
- Ensuring adequate hydration, therefore avoiding dehydration by encouraging the child to drink as much as possible.

- Avoiding exposure of the child to precipitating conditions, e.g., exposure to cold.
- Allowing activity according to tolerance.
- Seeking medical care early.
- Giving prophylaxis for malaria.
- Giving supplementary folic acid but avoiding administration of iron.
- Ensuring adequate immunization including that of pneumococcal vaccine if possible.

Management of Crises

- For all patients with sickle cell crisis the following should be done:
  - Intravenous or oral fluids should be given and their intake monitored carefully
  - Infections should be treated vigorously and promptly
- For patients with thrombotic (vaso-occlusive, painful, or ischaemic) crisis, the following should be done:
  - Assess severity of pain carefully and give appropriate analgesia at all times
    - For mild pain give paracetamol, diclofenac or ibuprofen
    - For moderate pain use give dihydrocodeine, codeine phosphate
    - For severe pain give analgesia and refer to hospital
- Admit all patients with aplastic, sequestration, and haemolytic crises for appropriate management.

Transfusion in SCD

Children with the following complications may need transfusion:

- Aplastic crisis
- Hyperhaemolytic crisis
- Acute splenic sequestration
- Acute chest syndrome
- Acute stroke especially if recurrent.
- Priapism

In some of these cases exchange transfusion may be helpful. In general, avoid blood transfusion unless patient develops cardio-respiratory distress (nasal flaring, intercostal or subcostal retractions, heart failure, grunting), or has severe anaemia (Hb well below patient's usual level).

Refer to an appropriate specialist if

- Patient is not responding to treatment
- Surgery is indicated

35. Neoplasms in Childhood

Neoplasms can occur in any age group. In general most neoplasms require referral to higher level for treatment. All suspected malignancies or those for which the diagnosis is unclear should be referred early to facilitate appropriate

evaluation and management. Early treatment of malignancies carries the best prognosis. Clinical features, useful investigations, and management of common childhood malignancies are summarized in Table 34.1.

Table 35.1: Common childhood malignancies, their clinical features, useful investigations, and line of management

Tumour	Clinical features	Investigations	Management
Leukaemias	Anaemia bone pains, haemorrhagic tendencies, epistaxis and gum bleeding Repeated infections	Haemogram Bone marrow Cytochemistry Flowcytometry	Refer to hae-matologist/ onco-logist for specialized care for chemotherapy
Burkitt's lymphoma	Usually a jaw tumour May also present as an abdominal mass or central nervous system tumour	Biopsy of the mass; haemogram, bone marrow, x-ray, ultra-sound scan CT scan, PET scan Lumbar puncture	Refer for specialized care
Hodgkin's disease	Lymph node enlargement, usually cervical Splenomegaly abdominal masses	Haemogram Chest x-ray Lymph node biopsy for histology and immunohisto-chemistry Bone marrow	Refer for specialized care for chemotherapy with or without radiotherapy
Nephroblastom a (Wilms' tumour)	Average age 2 years: Embryonal tumour Early childhood Painless loin mass (abdominal mass) Fast growing	Full haemogram U/E in normal IVU (intravenous urography) shows displaced calices FNAC shows malignant embryonal tumour cells CXR for metastasis	Refer to specialized care Chemotherapy Surgery – nephrectomy with post surgical chemotherapy has good prognosis
Neuroblastoma	Embryonal tumour Abdominal mass in loin region Markedly elevated blood pressure Fast growing often crossing midline Child is sick looking	Full haemogram IVU shows caudally displaced normal kidney FNAC – malignant embryonal cells Ultra sound shows supra renal tumour with normal kidney CXR – look for metastasis, 24 hr urine – VMA grossly elevated	Refer to specialist centre Chemotherapy Surgery NB: Challenging anaesthesia, has poor prognosis
Dysgerminoma	Commonest midline tumour in neonatal period Commonest in ovary, testis, thymus, sacrococcygeal (most dramatic – teratoma) Presents with pressure symptoms May ulcerate especially when malignant	Plain x-ray may show calcification U/S – defines extent/site of tumour Foetoprotein tumour marker	Surgical excision; if benign, leave alone; if malignant, chemotherapy Good prognosis

Continued

Table 35.1, *continued*

Tumour	Clinical features	Investigations	Management
Rhabdo-sarcoma/ rhabdomyo-sarcoma	Tumour of muscle; can occur anywhere commonest in pelvis, bladder, vagina may present with a fungating mass (sarcoma botryoid) May ulcerate and bleed	Good physical examination: Full haemogram U/S, CXR CT scan when available Biopsy FNAC	Surgery Chemotherapy Poor prognosis
Retinoblastoma	Age usually below 3 years Inherited through chromosome 13 May be unilateral or bilateral Yellowish whitish reflex	Skull x-ray Urine catecholamines Fundoscopy CT scan – head	Refer to ophthalmologist and oncologist for specialized treatment
CNS tumours	Headache, convulsions, vomiting Papilloedema Disturbance of gait & vision	X-ray skull CT scan MRI scan	Refer to neurosurgeon Surgery, radiotherapy, chemotherapy

36. Blood Transfusion

36.1 General Principles

- Use blood only when required to save life.
- Do not transfuse on the basis of haemoglobin alone, but also on the clinical status of the patient.
- For all transfusions in the neonatal period, cross match blood against the mother of the neonate as well as the baby, especially if the baby is jaundiced.
- Never use blood that has not been screened.
- Do not used blood beyond expiry date.
- Rate of transfusion for small babies must not exceed 15ml/kg/hr.
- Use packed cells whenever possible except in acute blood loss.
- Remove the bag of blood from the blood bank refrigerator just before transfusion. Never transfuse blood that has been out of the refrigerator for more than one hour.
- Re-evaluate the patient immediately prior to transfusion to ensure that blood is still required to save life.
- Use only blood that has been properly grouped and cross matched and is in the correct bag labelled for the patient.
- Give blood immediately at the time that it is needed.
- Give frusemide (1mg/kg STAT) IV at the beginning of the transfusion (but only if the patient is not actively bleeding, or dehydrated). If patient has heart failure, give frusemide immediately; do not wait until blood is available.
- Give antimalaria drugs (full course) to all patients having blood transfusion.

- Determine the volume of blood to be transfused (V) by use of the formula:
  Volume = Wt in kg x Hb deficitx 6 if whole blood is used (OR: x 3 if packed red cells are used) (Hb deficit = desired Hb minus current Hb)

- Note: When this formula is used, the volume of the blood needed may be too much to give in one transfusion. In this case it may be necessary to give the volume in divided aliquots over two or more days. In general avoid giving more than 20ml/kg/session unless the patient is bleeding.

36.2 Indications for Transfusion

- When there is acute blood loss with signs of shock and/or signs of continuing bleeding.
- When there is severe anaemia:
  - Transfuse as soon as possible if:
    - Neonate Hb < 10g/dl in 1st week and < 8g/dl thereafter
    - Child Hb < 4g/dl
    - Child Hb 4–6g/dl with following: dehydration, shock, heart failure, very high malaria parasitaemia
- So as to provide plasma and platelets for clotting factors when specific components are not available.
- In exchange transfusion for neonate with severe jaundice, or in older patient when indicated.

36.3 Transfusion Reactions

If the patient develops fever, skin rash or becomes ill, then:
- Stop blood transfusion immediately.
- Give chlorpheniramine 0.4mg/kg STAT IV or IM (max 5mg).
- Return blood to the bank with a fresh sample of patient's blood.
- Monitor urine output.
- Monitor cardiovascular and renal function.
- If hypotension develops start IV fluids.

36.4 Other Transfusion Management Issues

36.4.1 REFER/CONSULT

Refer the patient or consult for appropriate management if:
- You cannot give blood transfusion for any reason.
- Anaemia is due to persistent or recurrent bleeding that cannot be easily controlled.
- Anaemia has not improved after 1 month of supervised treatment (Hb should increase by 2–4g/dl in one month).
- Anaemia recurs within 6 months of full treatment.

36.4.2 ADMIT PATIENTS

Patients with the following conditions should be admitted:

- Severe anaemia.
- Active and severe bleeding.
- Anaemia and/or jaundice and aged below 2 months.
- Anaemia (any degree of severity) accompanied by pneumonia, heart failure, dizziness, confusion, oedema, severe malnutrition.

36.4.3 ADVICE TO MOTHERS

Give balanced and adequate diet to all children. Iron and folate containing foods include meat, fish, liver, eggs, dark green leafy vegetables, and yellow fruits.

37. Cardiovascular Diseases in Children

Most cardiac diseases in young children are congenital, while those in older children may be acquired or congenital. The heart may also be affected by systemic disorders like pneumonia, anaemia, electrolyte imbalances and malnutrition.

Clinical Features

The clinical features depend on the severity of the lesion or defect in the heart. Minimal lesions or defects may only be discovered on routine examination, but major ones may lead to functional disability. Easy fatigability and difficulty in breathing are prominent features of cardiac dysfunction, while frequent interruptions of breastfeeding accompanied by sweating may be the manifestation in infants. Other features include poor weight gain and poor growth. The affected children have stature and nutrition that is usually below the average for the age as well as frequent respiratory infections.

Physical examination that consists of evaluation of pulses in all limbs and of blood pressure, apex beat, and heart sounds, and inspection of the precordium is likely to detect the specific cardiac lesion. The presence of a murmur indicates presence of a defect but does not indicate its size. Cyanosis and digital clubbing are often noted in children with cyanotic heart diseases.

Parents can usually notice that the affected child has a problem, although they may not be able to localize the problem. A young baby who gets tired quickly or who has to pause many times while breastfeeding, who looks breathless or is not growing well, or who has a darkish bluish tinge on the lips and tongue should be suspected to have a heart problem and should be taken to a health facility for examination. Innocent murmurs occur at any age, but are commonest among neonates.

37.1 Heart Failure (Congestive Cardiac Failure)

Heart failure occurs when the heart is unable to supply output that is sufficient for the metabolic needs of the tissues in the face of adequate venous return. Any severe cardiac condition, severe pneumonia, or anaemia can lead to heart failure.

Signs of Cardiac Failure

- Among infants and young children, cardiac failure manifests as feeding difficulties and excessive sweating, rapid weight gain, tachycardia, gallop rhythm, respiratory distress, and tender hepatomegaly.
- Among older children, cardiac failure manifests in addition with raised jugular venous pressure, dependent oedema, orthopnoea, fatigue, exercise intolerance, and basal crepitations.

Investigations

- Chest x-ray: May show cardiac enlargement as well as evidence of other cardiac or pulmonary lesions
- Haemogram
- Urea and electrolytes
- Electro-cardiogram (ECG)
- Echocardiography

Management – General

- Let the child regulate physical activities when out of hospital.
- Order bed rest in cardiac position.
- Give oxygen by nasal prongs or catheter for child in severe failure.
- Restrict salt intake, control fluid intake and measure urine output.
- Take daily weight if admitted.

Management – Pharmacological

Infants and young children:

- Diuretics: Give frusemide: IV 1mg/kg per dose (max 2mg/kg/dose), PO 2–3mg/kg/day (max 6mg/kg/dose).
- Digoxin: In all cases give ½ total digitalizing dose (TDD) initially, then ¼ TDD after 8 hours, then ¼ TDD after another 8 hours. Daily maintenance dose, ¼ TDD, given in 1 or 2 divided doses. Total digitalizing doses are:
  - Premature babies: 0.03mg/kg PO
  - Full term newborn: 0.03–0.05mg/kg PO
  - Infants less than 2 years: 0.05–0.06mg/kg PO
  - Children 2–10 years: 0.04–0.05mg/kg PO
- After load: Captopril (ACE inhibitors) – Begin initially 0.5mg/kg/24 hours 8 hourly, increase by 0.5mg/kg/24 hours every 24–48 hours until dose reaches 3–8mg/kg/24 hours, neonates 0.03–2mg/kg/24 hours. Or use enalapril 0.1mg/kg/day with gradual increase as needed (max 0.5mg/kg/day up to 40mg/24 hours)

- Note: Electrolytes should be monitored during therapy with diuretics and digoxin.
- Treat anaemia and sepsis or pneumonia concurrently.

Older children (over 10 yrs):
- Diuretics: Frusemide 0.5–2mg/kg/dose (max 6mg/kg/dose) IV or PO OD; use higher doses in patients who were already on it.
- Digoxin: 0.01–0.015/kg/24 hours. Maximum should not exceed adult dose. Divide dose as for the younger child.
- After load: Captopril 0.3–0.5mg/kg/dose increase gradually to maximum of 6mg/kg/day in 2 or 3 doses per day. Or enalapril dose as in young children.
- Potassium supplements: Advise patient to eat fruits, e.g., bananas or oranges.
- Treat underlying causative factor.
- Maintenance therapy: All children will need maintenance diuretic, digoxin and ACE inhibitors which are continued on outpatient basis.
- Refer to specialist:
  - Patients who fail to respond to therapy or deteriorate despite therapy.
  - Children with CHD or heart failure of uncertain origin.
  - For definitive treatment of underlying cause.

37.2 Pulmonary Oedema

Pulmonary oedema is accumulation of fluid in the alveoli due to an increase in pulmonary capillary venous pressure resulting from acute left ventricular failure. ***This is an acute emergency.***

Clinical Features
Breathlessness, sweating, cyanosis, frothy blood-tinged sputum, respiratory distress, rhonchi, and crepitations.

Investigations
Chest x-ray: Loss of distinct vascular margins, Kerley B lines, diffuse haziness of lung fields.

Management
- Initiate treatment urgently and admit.
- Prop up patient in bed.
- Administer needed drugs:
  - IV morphine 0.1–0.2mg/kg STAT may be repeated (watch for respiratory depression).
  - IV frusemide 0.5–2mg/kg/dose, maximum 6mg/kg/dose. Infusion – 0.05mg/kg/hour.
  - Digitalize if not already on digoxin.
  - IV aminophylline 6mg/kg over 15 min then 0.9mg/kg/hour.
- Give oxygen by nasal prongs or catheter.
- Start on oral medication as soon as possible.
- When the patient has stabilized, investigate to identify the cause.

- Manage the underlying cause.
- Refer to specialist:
  - If patient fails to respond to above therapy.
  - For definitive treatment of underlying cause

37.3 Congenital Heart Disease

37.3.1 CONGENITAL HEART DISEASE WITH CYANOSIS

The congenital cardiac abnormalities that are associated with cyanosis involve shunting of blood from the right side of the heart to the left side. These include the following cardiac abnormalities:

- Tetralogy of Fallot
- Pulmonary atresia with ventricular septal defect (VSD)
- Transposition of the great vessels
- Truncus arteriosus (associated VSD is always present)
- Eisenmenger syndrome
- Hypoplastic left heart syndrome

Those abnormalities manifesting in the neonatal period have a poor prognosis.

TETRALOGY OF FALLOT

This is the commonest of the cyanotic group because of a slightly better prognosis in infancy, allowing more of them to survive longer. Classically, Tetralogy of Fallot consists of pulmonary stenosis, ventricular septal defect, dextroposition of the aorta, and right ventricular hypertrophy.

Specific Clinical Features

Cyanosis is a major feature. It may not be present at birth, but develops later during first year. Other features include dyspnoea on exertion, to which the affected child responds by assuming a squatting position for a few minutes after such an exercise. Affected children also tend to have paroxysmal hypercyanotic attacks often referred to as “blue” spells. The pulse may be normal but a systolic thrill is felt along the left sternal border in 50% of cases. Clubbing of fingers and toes occurs after a long time.

The following complications are associated with Tetralogy of Fallot:

- Cerebral thrombosis due to polycythaemia,
- Brain abscess (usually after 2 years of age) presenting with headache, fever, nausea and vomiting with or without seizures,
- Bacterial endocarditis, and
- Congestive heart failure.

Investigations

- Full blood count or haematocrit
- CXR – Boot shaped heart oligaemic lung fields
- Electrocardiogram
- Echocardiogram

- Blood culture if suspect endocarditis
- CT scan if cerebral thrombosis or abscess is/are suspected

Management
- For children with "blue" spells, administer oxygen; child should be in knee-chest position.
- Prevent/correct dehydration in these children at all times.
- Provide supportive therapy:
  - Venesection: Maintain haematocrit at 55–65% but avoid iron deficiency.
  - Intravenous or oral propranolol.
- Refer all children to a specialist unit for definitive treatment by interventional closed repair or open heart surgery.

37.3.2 CONGENITAL HEART DISEASE WITHOUT CYANOSIS

The commonest in this group of conditions are ventricular septal defect, patent ductus arteriosus, and atrial septal defect.

VENTRICULAR SEPTAL DEFECT (VSD)

This is the most common cardiac malformation, accounting for 25% of congenital heart diseases. The magnitude of the left to right shunt is determined by the size of the defect and the degree of the pulmonary vascular resistance.

Clinical Features

Small defects with minimal left to right shunts are the most common. Patients are often asymptomatic. The patients may have a loud, harsh or blowing left parasternal pansystolic murmur, heard best over the lower left sternal border on auscultation. Large defects with excessive pulmonary blood flow and pulmonary hypertension are characterized by dyspnoea, feeding difficulties, profuse perspiration, recurrent pulmonary infections and poor growth. Physical examination reveals prominence of the left precordium, cardiomegaly, a palpable parasternal lift and a systolic thrill, besides a systolic murmur.

Prognosis and Complications

Spontaneous closure of small defects occurs in 30% to 50% of cases. A large number remains asymptomatic and a significant number with large defects get repeated infections and congestive cardiac failure. Infective endocarditis is a complication in VSD while pulmonary hypertension may develop as a result of high pulmonary blood flow.

Investigations
- CXR – Usually normal but some show minimal cardiomegaly and increased pulmonary vasculature
- ECG – May suggest left ventricular hypertrophy
- Electrocardiography
- Echocardiography

Management
- Control congestive cardiac failure if present.
- Refer the affected child to the specialized unit.

PATENT DUCTUS ARTERIOSUS (PDA)

The pulmonary arterial blood is shunted through the ductus arteriosus into the aorta during foetal life. Functional closure occurs soon after birth when pulmonary pressure falls. Gradual anatomical closure takes place over several days. This process is slower in the preterm infant. Patent ductus arteriosus occurs when ductus fails to close and the blood continues to shunt through it to the aorta.

Clinical Features

On auscultation one frequently hears a systolic or machinery murmur over the entire precordium, axilla, and back. The patient also has bounding peripheral pulses. The affected child may also be in congestive cardiac failure with its typical clinical manifestations. There are three types of patent ductus arteriosus:
- Anatomical defect: This type is the typical ductus that occurs in term and preterm babies and treatment is surgical management.
- PDA of prematurity: This is basically a “functional” problem in which the ductus remains open when there is tissue hypoxia, e.g., in respiratory distress or anaemia, and is contributed to by fluid overload. The ductus normally closes spontaneously or by use of drugs and sometimes surgery may be required.
- PDA accompanying other abnormalities: Other congenital cardiac abnormalities may be present and may be the only communication between the right and left side of the heart. In such cases closure of the patent ductus may lead to death unless the accompanying defects are also corrected.

Investigations

As for VSD

Management
- Medical management of CCF if present
- Refer all children to specialized unit for confirmation of diagnosis and management
- Medical closure in preterms – indomethacin or ibuprofen

37.3.3 GENERAL MANAGEMENT OF CONGENITAL HEART DISEASE

The following general principles should guide the management of congenital heart disease:
- Parents should be counselled on what can and what cannot be done depending on the heart lesion.
- Evaluation and close follow up of affected children are vital for appropriate and effective management.
- The majority of patients having mild CHD require no treatment. Such patients are expected to live normal lives and should not have any exercise restriction. The parents of the child should be made aware of this.

- Good nutrition should be maintained with adequate immunization and prevention of anaemia.
- Children with severe disease will tend to limit their own exercise, but if dyspnoea, headache, and fatigability in cyanotic patients occur, their exercise and other activities should be limited.
- Bacterial infections should be treated vigorously.
- Prophylaxis against bacterial endocarditis should be given before dental procedures, urinary tract instrumentation, and lower GIT manipulation.
- Cyanotic patients should be observed for polycythaemia in and dehydration avoided.
- Venesection with volume replacement should be carried out for polycythaemic when haematocrit goes above >65% and maintain it between 55–65%.

37.4 Acquired Heart Disease

37.4.1 ACUTE RHEUMATIC FEVER

This is an acute, systemic connective tissue disease in children related to an immune reaction to untreated group A beta haemolytic streptococcus infection of the upper respiratory tract . The significance of this disease is the rheumatic heart disease complication that may result from it, which may cause severe heart valve damage. Rheumatic heart disease is the commonest form of heart disease in Kenyan children. The initial attack of acute rheumatic fever occurs in most cases between the ages of 3 and 15 years.

Clinical Features

For the sake of diagnosis, clinical features related to rheumatic heart disease are categorized into major and minor criteria.

- The major criteria include migrating polyarthritis, carditis (manifested by signs of cardiac failure, persistent tachycardia, pericardial rub or heart murmurs), Sydenham's Chorea, erythemamarginatum, and subcutaneous nodules.
- The minor criteria include past history of rheumatic fever, raised ESR, fever, and arthralgia.

Diagnosis of rheumatic fever occurs when 2 major criteria and 1 minor criteria are present, or 1 major criteria and 2 minor criteria.

Complications

The main complication of rheumatic fever is rheumatic heart disease.

Investigations

- Anti-streptolysin-0-titre (ASOT) – Titre of 1:300
- Throat swab for culture
- ESR
- Chest x-ray – Features of cardiomegaly
- ECG if available

Management

- Admit for strict bed rest until symptoms resolve.
- Eradicate streptococcal infection from the throat:
  - Give penicillin or amoxicillin for children 25–50mg/kg in divided doses TDS for 10 days
  - If allergic to penicillin ***OR*** amoxicillin, give erythromycin 30–50mg/kg QDS for 10 days
- Give aspirin: 75–100mg/kg/day in 4–6 divided doses. Treatment continued until fever and joint inflammation are controlled and then gradually reduced over a 2-week period.
- Treat heart failure if present.
- Treat chorea, if present, with haloperidol 25 micrograms/kg (0.025mg/kg) TDS.

Prevention

- Reduction of overcrowding among populations as much as possible.
- Early treatment of streptococcal sore throat with appropriate antibiotics (benzathine penicillin 25,000–50,000 units/kg/dose STAT; maximum 1.2 mega units dose ***OR*** phenoxymethylpenicillin 25–25mg/kg/24 hour TDS for 10 days).

Long-Term Prophylaxis

Parents should be made aware of the necessity for long-term prophylaxis. Children with previous acute rheumatic fever without carditis should be given benzathine penicillin 1.2 mega units monthly for 5 years or up to the age of 18 years, whichever is longer. Patients allergic to penicillin should be given erythromycin 125–250mg BD for 5 years On the hand, the children with previous acute rheumatic fever with carditis should be given benzathine penicillin 1.2 mega units ***OR*** erythromycin 125–250mg/dose BD for those sensitive to penicillin for life.

37.4.2 RHEUMATIC HEART DISEASE

Rheumatic heart disease is inflammatory damage of the heart valves, as a complication of acute rheumatic fever. The mitral valve is the most commonly involved valve, although any valve may be affected. The inflammatory damage in rheumatic heart disease results in stenosis or incompetence of the valves, either singly or in combination with other valves. Patients' rheumatic heart disease may be asymptomatic with the lesion only discovered during routine examination. However, some of the patients may present with congestive cardiac failure. Heart murmurs are over the precordium on auscultation, but the murmurs depend on the nature of the damage (whether incompetence or stenosis) and on the specific valves involved.

Complications

The complications for rheumatic heart disease include congestive cardiac failure, pulmonary oedema and bacterial endocarditis.

Investigations
- Chest x-ray
- ECG
- Echocardiography

Management
- Treat underlying complication, e.g., heart failure, pulmonary oedema.
- Continue prophylaxis against recurrent rheumatic fever.
- Advise that infective endocarditis prophylaxis is indicated before or during dental procedures, urinary tract instrumentation, and GIT manipulations.
- Refer to a specialist
  - All patients with significant heart murmur for evaluation.
  - All patients with increasing cardiac symptoms.

Long-Term Prophylaxis
- Rheumatic fever: All patients with a history of rheumatic fever should be given prophylaxis for life.
- Endocarditis prophylaxis In addition to rheumatic fever prophylaxis the following should be done:
  - For dental procedures, give amoxicillin 50mg/kg PO 2 hours before procedure and 25mg/kg PO 6 hours after the initial dose. If the patient has penicillin allergy give erythromycin 1g PO 2 hours before procedure then half the dose 6 hours after the initial dose.
  - For lower gastrointestinal and genitourinary procedures give amoxicillin 50mg/kg IM 30 minutes before procedure and 6 hours after the initial dose as well as gentamicin 1.5mg/kg IM 30 minutes before procedure and 8 hours after the initial dose.

Patient Education
The need for follow up should be strongly emphasized.

37.4.3 INFECTIVE ENDOCARDITIS

The most common pathogens are bacterial, although they may also be fungal. Any child with a heart condition can get endocarditis but it can occasionally affect normal valves.

Clinical features
The clinical features include fever, splenomegaly, petechiae, and new murmurs.

Investigations
- Full blood count
- Urinalysis
- Blood culture
- Electrocardiogram
- Echocardiography

Management
- Give penicillin 100,000–400,000U/kg/24 hour IV 4–6 hourly, and gentamicin 6–7.5mg/kg/24 hours.
- Monitor carefully for response.
- If patient is not improving, consider changing antibiotic after results of culture.
- Refer to specialist if:
  - No or poor response to therapy.
  - Patient deteriorates.

37.5 Pericardial Disease

Diseases of the pericardium are difficult to detect unless one has a high index of suspicion. Clinical features may be vague or very dramatic, as when one has cardiac tamponade. A review of some of the diseases affecting the pericardium is given below.

37.5.1 ACUTE PERICARDITIS

This is caused by bacterial infections, but it may also be due to viral pathogens.

Clinical Features
Patients may present with fever, chest pain and dyspnoea and may have pericardial friction rub on auscultation.

Investigations
- Full blood count
- Chest x-ray
- ECG
- Echocardiogram
- If pericardiocentesis is done, send fluid for microscopy, protein estimation, and culture.

Management
Bed rest
Penicillin and gentamicin if bacterial infection is suspected.

37.5.2 PERICARDIAL EFFUSION

This may be due to bacterial infection resulting in collection of pus in the pericardium (exudates) or to some non-infective inflammation with collection of serous fluid in the pericardium (transudate), for example in rheumatoid arthritis.

Clinical Features
This condition may be asymptomatic if it is due to non infective cause and is a small effusion. Otherwise, there may be chest pain that is acute or a dull ache depending to the cause of effusion. On examination, the apex beat may be difficult to palpate and the heart sounds may be distant if the amount of fluid in the pericardium is large.

Investigations
- Full blood count
- Chest x-ray
- ECG
- Echocardiogram
- If pericardiocentesis is done, send fluid for microscopy, protein estimation, and culture.

Management
- Pericardiocentesis may be diagnostic as well as therapeutic.
- Treat according to type of fluid.

37.5.3 CARDIAC TAMPONADE

Cardiac tamponade occurs when cardiac filling is severely limited by the presence of a large amount of pericardial fluid.

Clinical Features
The affected patient presents with severe dyspnoea, cold extremities with decreased capillary refill, raised jugular venous pressure (JVP), tachycardia, pulsus paradoxus, and inaudible heart sounds.

Investigations
- Full blood count
- Urinalysis
- Blood culture
- Electrocardiogram
- Echocardiography

Management
- Admit urgently and do pericardiocentesis.
- May need to have a temporary drainage catheter.
- Treat any underlying condition.
- Needs ICU care.

37.5.4 CONSTRICTIVE PERICARDITIS

This tends to be chronic and is often due to tuberculosis. The pericardium becomes thick and inelastic leading to poor filling of the heart.

Clinical Features
The patient presents with cough and dyspnoea, small volume pulse, ascites, hepatomegaly, and raised JVP.

Investigations
- Chest x-ray – Heart size normal or small. There may be calcification in the pericardium.
- Electrocardiogram
- Echocardiogram

Management
- Surgical removal of pericardium.
- Treatment of TB if it is the cause.

37.6 Hypertension in Children

This is defined as elevation of systemic blood pressure beyond the 95th blood pressure centile for age (or above the upper limit of normal). The blood pressure varies with age and gender and stature and these are found in normograms for blood pressure for children. A simplified version of normogram that considers only age is shown in Table 37.1. In order to record blood pressure accurately, a correct size cuff for the child is needed; such a cuff is expected to cover about two-thirds of the arm.

Table 37.1: Upper limits of normal blood pressure values for both sexes at different ages (in mmHg)

Average age	12 hours	8 years	9 years	10 years	12 years	14 years
Systolic blood pressure	80	120	125	130	135	140
Diastolic blood pressure	50	82	84	86	88	90

The following are the common causes of hypertension at different ages:
- For neonates and infants: Renal artery thrombosis or stenosis and coarctation of the aorta.
- From 1 year to 10 years: Renal parenchyma disease and coarctation of the aorta.
- From 11 years to 18 years: Renal parenchyma disease, essential hypertension.

Clinical Features
Essential hypertension may initially be asymptomatic. Coarctation of the aorta in a neonate may present with sudden collapse or features suggesting sepsis. Others will present with clinical features of the underlying disease or target organ system – hypertensive encephalopathy, pulmonary oedema.

Investigation
- Urinalysis
- Urea and creatinine
- Chest x-ray
- Special investigations as indicated for the suspected cause

Management – General
- Maintain blood pressure at or slightly below the 95th centile for age (blood pressure should not be reduced by more than 25% in the acute phase).
- Determine and treat any underlying cause of hypertension.
- Advise aerobic exercise, salt restriction, weight reduction.

Management – Pharmacological
This is summarized in Table 37.2.

Table 37.2: Summary of plan for care in hypertension

Severity of hypertension	Drugs to be used
Mild:	HCTZ* ***OR*** propranolol/atenolol ***OR*** HCTZ* + propranolol/atenolol
Moderate:	HCTZ* + propranolol/atenolol + hydralazine ***OR*** HCTZ* + methyldopa ***OR*** HCTZ* + nifedipine/captopril
Severe:	HCTZ* + propranolol/atenolol + hydralazine/captopril ***OR*** HCTZ* + propranolol/atenolol + nifedipine/captopril ***OR*** HCTZ* + propranolol/atenolol + methyldopa

Note:
*HCTZ = Hydrochlorothiazide; bendroflumethiazide, frusemide, or other appropriate diuretics may be substituted
Beta-blockers: Propranolol oral 1–8mg/kg/24 hours on 3 divided doses ***OR*** Atenolol oral 0.1–0.5mg/kg/24 hours in 2 divided doses, maximum 20mg per day
Calcium channel blockers: Nifedipine oral 0.2–1mg/kg/24 hrs in 3–4 divided doses (6–8 hourly)

Hypertensive Crisis
- Defined as systolic or diastolic pressure above the 95th percentile by 50% or when signs of hypertensive encephalopathy or pulmonary oedema occur.
- Congestive heart failure

Management
- Admit urgently.
- Monitor closely: This is mandatory – may require ICU care.
- Aim to lower BP by 20% over 1 hour, by one-third over 6 hrs, and return to baseline levels within 24–48 hrs.
- Administer nifedipine sublingual 0.2–0.5mg/kg dose 4 every 4–6 hours (max 10mg/dose). Watch: precipitous fall in BP may occur. ***OR***
- Hydralazine IM/IV 0.1–0.8mg/kg/dose every 4–6 hours (max. 20mg/dose). Be careful not to cause uncontrollable hypotension. ***OR***
- Sodium nitroprusside IV continuous infusion 0.5–8ìg/kg/minute. Requires ICU setting.
- Monitor blood pressure during infusion, titrate dose according to response.

38. Urinary Tract and Renal Conditions

38.1 Features of Renal Disease

Clinical Features
The clinical features of renal disease include the following:
- Changes in urine output that include reduced urinary output (oliguria, anuria), increased urinary output (polyuria), increased frequency without increased volume.

- Oedema of the body, usually facial initially but later involving legs and generalized.
- Haematuria that ranges from microscopic to gross. Haematuria is a serious sign of disease and should be aggressively investigated. Causes include infections (urinary tract infection, tuberculosis, schistosomiasis), acute glomerulonephritis, trauma, meatal ulcers, blood disorders (bleeding disorders, leukaemia, purpura, sickle cell disease), tumours, scurvy, congenital abnormalities.
- The blood pressure may be raised in some conditions or it may be a terminal manifestation in some conditions.
- Renal masses may be palpable, for example if the patient has nephroblastoma, polycystic kidneys, horse-shoe kidneys, neuroblastoma, and hydronephrosis.

Laboratory Findings

The following laboratory findings may be found in renal disease:

- Pyuria of >10 cells/mm^3 in uncentrifuged urine specimen.
- Casts of renal tubules formed by red blood cells (RBC), white blood cells (WBC), epithelial cells. The casts may be granular or hyaline.
- Proteinuria that may vary from minimal to gross.
- High blood urea or blood urea nitrogen (azotaemia, BUN) that accompany renal failure.
- Raised blood creatinine levels that accompany renal failure.
- Hyperkalaemia: Usually, there are no clinical consequences until the levels rise to 6mmol/L and above. Clinical features of hyperkalaemia include muscle weakness, abdominal distension, tingling of the face and of the muscles on the hands and feet, and irregular pulse, heart block, and increased amplitude of the T-wave on the ECG.

38.2 Urinary Tract Infections (UTI)

Urinary tract infection is commonly caused by the following bacterial organisms: Eschericchia coli (75%), Klebsiella, Proteus vulgaris; less commonly by Streptococcus faecalis and some Pseudomonas species; and rarely by a Staphylococcus species.

Clinical Features

- In children it is not easy to differentiate upper from lower urinary tract infections, but loin (lumbar) pain and tenderness suggest upper urinary tract infection.
- In neonates and early infancy, boys are affected more often than girls because of the occurrence of the higher incidence of congenital urinary tract malformation in boys than girls that is noted at that age. Affected children present with fever, failure to thrive, irritability, poor feeding, and vomiting.
- In older infants and children, girls are affected more often than boys because of their anatomically shorter urethra than that found in boys. Affected children present with anorexia, vomiting, fever, abdominal pain, frequency, enuresis in

a previously dry child, and dysuria. For the younger child, the mother may report that the child cries when passing urine.
- For all male children, ask about the nature of the stream of urine when they are passing it. In those with urinary tract obstruction, the urinary stream is poor.
- Recurrences of urinary tract infection are common.

Investigations
The following investigations are recommended for a child with urinary tract infection:
- Full blood count
- Urinalysis: >10 WBC/cubic^3 in uncentrifuged urine midstream or catheter specimen
- Urine C&S (midstream, suprapubic puncture or catheter specimen). Bacterial colony count: Most reliable providing urine has been plated within 1 hour of voiding. Interpret results as follows:
  - <10,000: Nonspecific contaminants; significant if suprapubic specimen.
  - 10,000–100,000: Doubtful significance. Repeat cultures and evaluate clinical symptoms.
  - 100,000: Diagnostic of UTI.
- The urine specimen should reach the laboratory within 2 hours of voiding or be refrigerated at 4°C for a period not exceeding 24 hours.
- Further evaluation include:

Micturating cystourethrogram – urethral valves and reflux.
  - Abdominal ultrasound best done when child is febrile to demonstrate acute pyelonephritis.
  - Intravenous urography.
- When associated with haematuria or proteinuria, pyuria is suggestive of parenchymal renal disease such as glomerulonephritis or interstitial nephritis.
- Sterile pyuria is often due to TB – do cultures for TB.

Management
- Encourage a lot of oral fluid.
- Give amoxicillin ***OR*** cotrimoxazole for 7–14 days; nitrofurantoin can also be used.
- Important: Clear infection in order to prevent chronic pyelonephritis.
- Repeat urine culture 1 week after treatment.
- Put children with recurrences of reflux on prophylaxis.
- Refer to specialist if:
  - Patient is an infant.
  - Recurrent attacks occur more than 3 in one year.

38.3 Glomerular Disorders

38.3.1 ACUTE GLOMERULONEPHRITIS (AGN)
This is an inflammatory renal disease commonly following streptococcal infection of skin and tonsils.

Clinical Features
The patient presents with smoky or tea coloured urine as a result of haematuria, with oedema that manifests as puffiness of the eyes, more noticeable in the morning. The oedema is seldom severe or generalized. The affected children also experience back pain, hypertension – commonly presenting as headaches – visual disturbance, and vomiting. Occasionally the patients may present with pulmonary oedema with dyspnoea or convulsions and coma due to hypertensive encephalopathy. There may be evidence of primary streptococcus infection, most often as an acute follicular tonsillitis with cervical adenitis and less often as skin sepsis. In the initial stages of the illness there is oliguria that is followed by diuresis (oliguric – diuretic phases).

Investigations
- Urinalysis: RBC, RBC casts and WBC. Granular and hyaline casts, mild to moderate proteinuria.
- Blood urea: Moderately high in oliguric phase; otherwise normal.
- Antistreptolysin O titre: Increased except in those with a skin primary cause where it remains normal.
- Throat and skin swab where indicated, but culture may be negative. Streptococcus may be cultured.

Management
- Admit the child.
- Give penicillin or amoxicillin for 10 days.
- Monitor fluid intake, urine output, weight, and BP daily.
- Restrict fluid input in oliguric phase: child <5 years 300ml/day and child >5 years 500ml/day in addition to urine output.
- Order a high calorie, low salt and protein diet in oliguric phase.
- Treat hypertension if present [see hypertension].
- Monitor electrolytes, urea, and creatinine daily especially in the oliguric phase.
- Refer to specialist if in acute renal failure.

38.4 Nephrotic Syndrome

Causes of nephritic syndrome include the following:
- Idiopathic or unknown for the majority of children with nephritic syndrome.
- Congenital nephritic syndrome, which may be to congenital syphilis.
- Secondary nephritic syndrome, which is due to post acute glomerulonephritis, plasmodium malaria, other infection and infestations, allergy following bee stings, heavy metal poisoning (e.g., mercury and lead), urinary tract infection.

Clinical Features
The clinical features of nephritic syndrome include the following:
- Oedema that is marked to massive and may be accompanied by ascites and/or pleural effusion
- Marked proteinuria
- Hypoproteinaemia, mainly low serum albumin in blood

- Hyperlipidaemia
- Children with nephritic syndrome who have haematuria with hypertension are categorized as nephritic nephrosis.

Investigations
- Urinalysis
- 24-hour urine for protein
- Serum protein
- Urea and electrolytes
- Serum cholesterol

Management
- High protein if urea is normal, low salt diet (no salt added to food)
- Frusemide administered carefully to induce diuresis
- Prednisone 2mg/kg/day (maximum 60mg). The responses to prednisone are generally divided into steroid responders and non steroid responders:
  - Response usually occurs within 2 weeks demonstrated by no protein in urine. When urine is protein free start tapering of the dose over 6–‒12 weeks.
  - Relapses are treated the same way
  - If there is continuing proteinuria after 1 month the child is steroid resistant.
  - If proteinuria returns after the steroids are stopped the child is steroid dependent and may require continuation
  - Repeated relapses or steroid dependants who develop steroid toxicity can be treated with cyclophosphamide. Cyclosporin or levimazole may be better alternatives in future.
  - Steroid unresponsive cases may benefit from ACE inhibitors even in the absences of hypertension. Cyclosporin can also be tried; diuretics are used to control oedema.
- Antibiotics are used if there are clinical signs of/or suspected infections. Possibility of urinary tract infection should always be considered.
- Refer to specialist patients:
  - With persistent haematuria
  - With hypertension
  - Who develop chronic renal failure
  - Who relapse or do not respond.

38.5 Tubular Disorders

Tubular disorders can be congenital or be the result of shock or toxins. Congenital variety tends to be associated with acidosis (renal tubular acidosis – RTA) and renal rickets.

Acute tubular necrosis has three phases: oliguric, diuretic, and recovery phases. The whole cycle may take a few days to weeks and some patients may never recover.

Investigations
- Urine pH: Suggestive if it is low (<5.8).
- Serum electrolytes: Low bicarbonate, low potassium and high chloride suggestive.
- Specific tests of tubular function may be needed to identify the abnormality.

Management
- For acute tubular necrosis:
  - Maintain intravascular volume.
  - Monitor urine output.
  - Correct any electrolyte or acid base disturbances.
  - Order dialysis if due to dialysable toxin.
- For renal tubular acidosis:
  - Correct acidosis using oral sodium bicarbonate or sodium citrate.
  - Use potassium citrate if patient is hypokalaemic.
  - Give high dose vitamin D and calcium if child has rickets.
- Refer/consult specialist as required.

38.6 Acute Renal Failure

Acute renal failure is an acute or sub-acute decline in the glomerular filtration rate and/or tubular function characterized by rapid accumulation of nitrogenous waste products, for example urea and creatinine, in the blood.

Aetiologies of Acute Renal Failure
The causes of acute renal failure divided into pre-renal, renal and post-renal groupings:
- Pre-renal acute renal failure: This group of diseases includes the following:
  - Diarrhoea and vomiting with severe dehydration,
  - Burns,
  - Inappropriate diuretic treatment,
  - Peritonitis,
  - Pancreatitis,
  - Heart failure, and
  - Liver disease with ascites.
- The renal grouping includes the following:
  - Diseases of the renal arteries and veins that include:
    - Direct trauma to renal vessels
    - Dissecting aortic aneurism
  - Intrinsic renal problems that include:
    - Glomerulonephritis
    - Acute interstitial nephritis
    - Acute tubular necrosis
    - Intratubular obstruction
  - Post-infectious glomerulonephritis:
    - Renal damage related to drugs for example methicillin, ibuprofen, and gentamicin

  - Following volume depletion and also as a result of toxins
  - Rhabdomyolysis
  - Uric acid nephropathy
- The post-renal grouping includes the following:
  - Obstruction of the collecting system:
    - Bladder outlet obstruction,
    - Bilateral ureteral obstruction,
    - Ureteral obstruction, and
    - A single kidney.

Clinical Features
- Low or no urinary output (sometimes it may be normal)
- Oedema
- Heart failure
- Hypertension
- Hyperkalaemia
- Acidosis
- Rising blood urea and creatinine
- Diagnostic work up including history and physical examination, as well as:
  - Careful review of medical records and medications (e.g., gentamicin).
  - Presence of swelling and oedema of muscles, which may indicate rhabdomyolysis
  - Abdomen or flank pain, which may indicate obstruction to urine flow or inflammation of the kidneys

Investigations
- Full blood counts
- Urinalysis and urine culture and sensitivity
- Urea and electrolytes
- Serum creatinine.
- ECG if hyperkalaemic

Management
- Hypovolaemic patients: Give 20ml/kg normal saline over 30 minutes – patient should pass urine in the next 2 hours. Replace fluid as completely as possible in patients who have vomiting, diarrhoea or burns.
- Non hypovolaemic patient: Restrict fluid.
- Do not give drugs that may further damage the kidneys, e.g., gentamicin, tetracycline, sulfonamides, NSAIDs, nitrofurantoin
- If the blood pressure is normal or high and the patient is not dehydrated, give intravenous frusemide in a dose of 1–5mg/kg.
- Treat the hypertension if indicated.
- Treat hyperkalaemia, as indicated below:
  - For mild to moderate hyperkalaemia (K = 6–7mmol/L):
    - Do not give potassium containing fluids or food.
    - Give oral potassium retaining resins.
  - Severe hyperkalaemia (K >7mmol/L):

  - Give 1ml/kg 50% glucose with insulin 1 unit/5g of glucose over 30 minutes.
  - Repeat after 30–60 minutes if hyperkalaemia persists.
- If there are ECG changes, give IV 10% calcium gluconate 1ml/kg/dose to be injected over 5–10 minutes.
- Refer to centre with facilities for dialysis if:
  - If hyperkalaemia is persistent.
  - Anuria is present for more than 24 hours ***OR*** oliguria for more than 48 hours.

38.7 Chronic Renal Failure

Chronic renal failure describes the situation in which there is advanced, irreversible, and usually progressive renal failure. Chronic renal failure is commonly caused by chronic glomerulopathies, hypertension, chronic interstitial nephritis, and diabetes mellitus. The following are important manifestations of chronic renal failure:

- There is poor growth.
- At biochemical level in the blood, there is acidosis, hyperkalaemia, elevated blood urea and elevated serum creatinine.
- At cardiovascular level there is pulmonary oedema, hypertension, pericarditis and cardiac tamponade and heart failure.
- At skeletal level, there is bone pain and bone fractures (rare).
- At nervous system level, there is encephalopathy (confusion, convulsions) and peripheral neuropathy.
- At haematological system level there is anaemia, excessive bleeding, e.g., from gums, skin, nose.
- At the skin level, there is scratching (pruritus) and darkening of skin.

Chronic renal failure should be suspected in the presence of the following:

- A previous history of renal disease e.g. acute nephritis, nephrotic syndrome.
- A known history of hypertension.
- A known history of diabetes mellitus.
- High blood urea and serum creatinine.
- Some of the systemic manifestation listed under “manifestations of chronic renal failure”.

Management

- Monitor clinical state regularly: This includes BP measurement and nutritional status (growth monitoring).
- Monitor laboratory parameters: BUN, creatinine, alkaline phosphatase.
- Adjust diet: High energy intake above recommended for age; protein 1.5g/kg/day, preferably high quality types; watch out for micronutrient deficiency and correct when needed; sodium restriction (1–4mg/kg/24 hours) if oedema or CCF.

- Watch potassium intake, especially when child needs dialysis.
- Treat hypertension if present.
- Do not transfuse blood unless HB is <6g/dl. Use packed cells.
- For renal osteodystrophy, give high doses of vitamin D preferably the active form.
- Avoid drugs that may worsen the problem, and adjust dosing according to degree of renal failure (creatinine levels).
- Refer to specialist if
  - Chronic renal failure is diagnosed.
  - End stage renal failure.

38.8 Hypokalaemia

Hypokalaemia is said to have occurred when serum potassium levels are persistently below 3.5mmol/L. Causes of hypokalaemia include inadequate dietary intake (rare), gastrointestinal fluid loss (vomiting, diarrhoea, fistulae), renal loss (diuretics, uncontrolled diabetes mellitus), systemic metabolic alkalosi, and dialysis.

Clinical Features
Clinical features for hypokalaemia include the following:
- Muscular weakness
- Tetany
- Fatigability
- Thirst
- Polyuria
- Paralytic ileus
- Cardiac arrhythmias
- Low serum potassium
- Elevated serum bicarbonate
- Low serum chloride
- ST segment depression and appearance of V waves on ECG

Investigations
- Urea and electrolytes
- ECG

Management
- Treat cause where possible.
- If necessary give oral potassium (Slow K), 80–100mmol daily or intravenous (at a rate of infusion not to exceed 25mmol/hr).
- Care must be taken in patients with renal failure to avoid hyperkalaemia.

☛ ***Never give potassium IV as a bolus. The patient will have cardiac arrest.***

38.9 Genito-Urinary Anomalies

The genitor-urinary anomalies include undescended testes, hypospadias, ectopia vesicae, patent urachus, and urachal cyst, as well as recto urethral fistula in males with imperforate anus. The important ones to note are obstructive type – urethral valves and obstructed ureters. Early identification and relief of the obstruction will prevent renal damage. Management of these conditions is complex and the patients need to be referred appropriately for management.

39. Central Nervous System

39.1 Seizure Disorders

A seizure is defined as a paroxysmal involuntary disturbance of brain function that may result in loss of consciousness and abnormalities in movement, behaviour, or sensation. Seizures can result from organic lesions such as acute or chronic infections, tumours and developmental defect, but more commonly the cause is unknown. Epilepsy is defined as recurrent seizures.

Clinical Features
The clinical features depend on the type of seizure. The various forms of seizures are:

- Partial seizures, which include:
  - Simple partial seizures – Can be motor, sensory and sensory-motor (consciousness not impaired).
  - Complex partial seizures – Starting with an aura (later impairment of consciousness) and often accompanied by automatic behaviour.
  - Partial seizures becoming progressive (jacksonian seizures) or generalized.
- Generalized seizures, which include:
  - Absences, which are brief lapses of awareness that last for about 30 seconds and are uncommon below 5 years of age.
  - Tonic seizures, which manifest with sustained muscle contractions.
  - Myoclonic seizures, which are repetitive symmetrical muscle contractions whose distinctive forms are:
    - Benign myoclonus of infancy disappear by age 2 years.
    - Early childhood type, whose onset starts at about 2 years and has a relatively good prognosis.
    - Complex type, whose onset in starts in the first year of life commonly following birth asphyxia, with a poor prognosis.
    - The juvenile form that begins at age 12–16 years, among children that are neurologically and has a good response to treatment.
  - Clonic seizures, characterized by rhythmic jerking.
  - Tonic-clonic seizures characterized commonly by an aura with loss of sphincter control and post ictal deep sleep.
  - Atonic seizures characterized by sudden loss of muscle tone.

- Infantile spasm, characterized by their initiation at age 4–8 months, sudden symmetrical contraction of all parts of body, and whose prognosis is poor if there is identifiable underlying pathology but good if there is not identifiable underlying pathology.

Meticulous history from parents and reliable witnesses is critical in diagnosing a seizure disorder. It is important to find the details of the prodromal phase, aura, and the type, duration, frequency, and age of onset of seizures. Details about the post ictal phase are important. It is also important to determine the underlying pathology, for example birth asphyxia, neonatal jaundice, or infection of the central nervous system.

A careful and thorough physical examination is necessary to detect associated neurological dysfunction or abnormality. Evaluation of blood pressure, head circumference in those aged less than 2 years, and fundoscopy are important in the examination of such children.

Investigations

- If child has fever
  - Full haemogram
  - Malaria parasites
  - Lumbar puncture if meningitis
- When metabolic conditions are suspected, do
  - Blood sugar
  - Urea and electrolytes and creatinine
- Electroencephalography (EEG)
- CT scan of the head
- Magnetic resonance imaging (MRI), is of additional help

Management

During an epileptic attack, the following should be observed:

- Place the patient on the left lateral position with the head turned to the same side;
- Loosen or remove tight fitting clothing around the neck.
- Do NOT attempt to insert any instrument into the mouth to avoid tongue biting, as this may have already happened.
- Shield the patient from being surrounded by too many eager observers.
- Allow seizure to complete its course without physically attempting to hold down the patient. However, the patient should be removed from danger like fire.

General Management of Seizures

For a child with seizure, the following should be observed:

- Treat any underlying diagnosed condition.
- For most patients with epilepsy, start on therapy as outpatients.
- Counsel parents and patient that treatment is usually life long. Therapy may be discontinued after a seizure-free period of at least two years if the patient has

no risk factors. Reduce dose gradually over many months. Sudden discontinuation of drugs may precipitate status epilepticus. Complex partial seizures will require lifelong drugs.

Pharmacological Management

- Refer to Tables 39.1 and 39.2 for a summary of the drugs of choice for common seizures and the appropriate paediatric dosages, respectively.
- Start long-term therapy if patient has had 2 or more seizures within 1 year.
- Start therapy with 1 drug, usually phenobarbital. Increase at regular intervals until seizures are controlled or side effects appear.
- If side effects appear and seizures are still not controlled, introduce other drugs and taper off the first drug.
- Admit for evaluation if underlying metabolic cause is suspected or raised intracranial pressure is present.
- Refer to specialist if:
  - Seizures are not controlled with maximum drug dose.
  - Raised intracranial pressure is suspected.
  - Space occupying lesion is suspected.

Table 39.1: Drugs of choice for common seizures

Main classification of convulsive disorder	Subclassification of the main convulsive grouping	Preferred drug of choice for treatment	Other drugs that can be used for treatment
Partial seizures	Simple	Phenytoin	Carbarmazepine, Valproic acid
	Complex	Carbamazepine	Phenotoin
	Secondarily generalized	Phenobarbitone	Phenotoin
Generalized seizures	Absence	Ethosuximide	Valproic acid, Clonazepam
	Tonic-clonic, clonic, tonic, atonic	Phenobarbitone	Carbamazepine, Phenytoin
	Myoclonic	Clonazepam	Nitrazepam, Valproic acid, Phenobarbitone

Parent and Patient Education

The following is important for the education of the patient and the parent:

- Medication should be taken regularly and it should not be assumed that the child is healed when the seizures are controlled. Treatment in most cases is life long.
- Ensure normal activity for the age of the child including school.
- Child should avoid dangerous activities like climbing trees.
- Protect child from falling into fires.
- The patient should never swim alone and all precautions should be taken when swimming
- The parent should not to be over protective for the child.

Table 39.2: Paediatric dosages of common drugs for convulsive disorders

Drug	Dosage	Frequency	Remarks
Phenobarbitone	3–6mg/kg	Once daily	May cause hyperactivity in some children
Phenytoin	4–7mg/kg	Once daily	Causes gum hypertrophy
Carbamazepine	20–30mg/kg/day	3 divided doses	
Sodium valproate	30–60mg/kg/day	3 divided doses	May precipitate, absence status if given with clonazepam. Also causes transient alopecia.
Ethosuximide	20–40mg/kg/day	2–3 divided doses	
Clonazepam	0.1–0.2mg/kg/day	Once daily	May precipitate absence status if given with sodium valproate

NB: Sodium valproate is the most broad spectrum anticonvulsant, but it is very costly and is better used as a second line drug. If seizures are not controlled, drugs used at maximum recommended dose should be withdrawn gradually as another one is introduced.

39.2 Status Epilepticus

Clinical Features

A succession of seizures without regaining consciousness between attacks or one prolonged convulsion lasting 30 minutes or more. Status epilepticus can occur with partial, complex partial, absence, tonic-clonic, or clonic seizures and may result in respiratory embarrassment with cyanosis and hypoglycaemia.

Management

The following is recommended in stabilizing the child with status epilepticus:

- For the airway and breathing:
  - Establish the airway.
  - Give oxygen.
  - Provide ventilation.
- With regard to circulation and disability
  - Establish intravenous access.
  - Give 10% dextrose 5ml/kg.
  - Give diazepam intravenously or rectally.

Management – Pharmacological

- In the first 5–15 minutes:
  - Give diazepam: 0.2–0.5mg/kg IV over 1– 3 minutes or 0.5mg/kg rectally (max 10mg in 1–3 years and 15mg in 3–15 years). Repeat after 5–10 minutes if not controlled.
- In the next 15–45 minutes:
  - If seizure persist: Use phenobarbitone or phenytoin
    - Phenobarbitone: Loading dose 15–20mg/kg IV in 5 minutes.
    - Rate of infusion not exceed 1mg/kg/min.
    - Additional 5mg/kg/dose can be repeated every 15–30 minutes to maximum of 30mg/kg.

  - IV Phenytoin (with glucose-free solution). Loading dose 15–20mg/kg. Infusion not to exceed 1mg/kg/minute.
- In the next 45–60 minutes:
  - If all these do not control the convulsion, or severe respiratory depression results from the drugs, child needs ICU care where ventilation can be done.
  - When patient is stable look for the cause and treat as needed.

39.3 Febrile Convulsions

Ordinarily seen in childhood, these are generalized tonic-clonic seizures with the following characteristics:
- They occur in children aged between 6 months and 5 years,
- There is fever at the time of the attack (usually greater than 38°C),
- They are of brief duration (always less than 15 minutes),
- They occur in the absence of central nervous system infection, and
- There is absence of neurological abnormalities in the inter-ictal period.

Investigations
Evaluate to find the cause of the fever if not determined by physical examination:
- Blood slide for MPs
- Full blood count
- Lumbar puncture and CSF examination – Strongly recommended in all infants or children who have received antibiotics
- Blood for culture

Management
- Emergency care:
  - Give paracetamol to reduce the temperature.
  - Reduce child's clothing to a minimum to facilitate lowering of temperature.
  - Give rectal diazepam if child is convulsing at the time of presentation.
  - Treat identified cause.
- Subsequent care:
  - Educate parents that recurrences are common but that they can be reduced by administration of antipyretics as soon as child becomes febrile. Diazepam may be used occasionally.
  - Anticonvulsants should be used regularly after the second or third attack of the febrile convulsions or if the convulsion is atypical.

☛ **Seizures in the neonate are covered under neonatal care.**

39.4 Cerebral Palsy

Cerebral palsy (CP) is defined as a non-progressive disorder that consists of motor and other neurological problems resulting from a defect or lesion of the developing brain. The aetiological factors associated with cerebral palsy are:
- Prenatal causes include rubella, syphilis, toxoplasmosis, and asphyxia.

- Perinatal causes include birth asphyxia as the main factor, being responsible for about 50% of the cases.
- Postnatal causes include bilirubin encephalopathy, meningitis, encephalitis, intracranial haemorrhage, hydrocephalus.

Clinical Features
Spastic paralysis is the commonest variety. It involves one or more limbs and also the trunk. Posture is that of hyperextension with tendency to contractures. Deep tendon reflexes are increased. The choreoathetoid type of cerebral palsy is less common and is characterized by involuntary movements and abnormal posture. Cerebral palsy may also present as ataxia with low muscle tone and lack of balance. Abnormalities associated with cerebral palsy include deafness, visual defects, speech difficulties, mental retardation, convulsions, and growth retardation. If the problem dates from birth, neonatal reflexes may persist. Malnutrition can result from neglect of the child or from difficulties associated with feeding the child.

Management
All children should, if possible, be seen once by a doctor with some experience of cerebral palsy children for correct diagnosis. The nature of the motor dysfunction, its distribution and all related abnormalities should be noted and a decision made on what could be offered to the child.

Symptomatic Therapy
Physical therapy is the mainstay of management of these children. Such therapy should be started as early as possible. The main aim is to prevent contractures and abnormal patterns of movement, to train other movements, and build coordination. Depending on the degree of disability, the child can be trained by an experienced therapist to attain some degree of independence. Home training programme for the parents is the most important part. Anal sphincter control may be assisted by administration of stool softeners and enemas where necessary. Anticonvulsive drugs should be given if there are convulsions, and any accompanying problem should be dealt with appropriately. A multidisciplinary approach is recommended for the management of children with cerebral palsy.

Support of Family
Parents are encouraged to bring their children early for care and not hide them from the public. The diagnosis should be discussed with the parents in an open and honest manner, explaining that there is no cure for the condition but that physical therapy contributes significantly to the wellbeing of the affected child.

39.5 Mental Retardation

Children whose neuromotor and cognitive development is delayed are considered to have mental retardation. The degree of impairment in the mental retardation varies from mild to very severe. Intellectual performance is below average, as expected, and the severely retarded child is not able to adapt to daily demands

and thus may not be able to lead an independent life. Mental retardation may also be part of a condition like Down's Syndrome. It is necessary to exclude deafness and cerebral palsy because hearing impairment retards the child's ability to learn at normal pace, while children with cerebral palsy may have normal intelligence but are physically impaired to perform.

Management
- Proper assessment is needed so that the child can be placed in appropriate and school.
- Counselling of the parents and their involvement is essential for success of care school.
- Special school may be necessary.

39.6 Hydrocephalus

Hydrocephalus is excessive enlargement of the head because of accumulation of cerebral spinal fluid in the cerebral ventricles as a result of the blockage of its flow. Hydrocephalus can be congenital or acquired, as indicated below:
- Congenital isolated hydrocephaly occurs due to blockage of flow of CSF. Commonest area is the Aqueduct of Sylvius. It may also be part of neuro-tube defect.
- Acquired hydrocephalus is usually due to complications of meningitis or to a tumour. In both situations, the flow of the cerebral spinal fluid is blocked.

Clinical Features
For those aged 0 to 2 years there is enlargement of the head, bulging fontanel, sunset eyes, and large veins on the head. Depending on the cause and the severity, there may be neurological signs as well. For those over 2 years there is headache, vomiting, and papilloedema. There may also be focal neurological signs.

Investigations
- Cranial ultrasound in the young child with open fontanelle
- CAT
- Lumbar puncture if indicated
- Special investigations according to suspected cause

Management
- Treat underlying cause if treatable.
- Place ventriculo-peritoneal shunt to relieve the pressure.
- Refer as indicated.

40. Skin Diseases

40.1 Eczema

40.1.1 ATOPIC ECZEMA

Atopic eczema has a genetic predisposition with a strong personal or family history of asthma and allergic rhinitis. The onset of this condition is usually in the first 2 to 3 months of life.

Clinical Features

- Pruritus is the cardinal feature of eczema. There is tendency to chronicity or relapses.
- Acute changes include erythema, papules or vesicles, crusting and secondary infection.
- Subsequently, there is scaling, hypopigmentation, or hyperpigmentation.
- Distribution of the lesions varies with age. In infants it tends to be on the scalp, face, and extensor surfaces, while in older children it tends to be in flexures, and skin creases.

Management

The management of atopic eczema consists of the following:

- Educate parents on the disease and its natural history and advise them to avoid any precipitating factors, e.g.,
  - Synthetic clothing
  - Any food substance that seriously aggravates the eczema
  - Allowing the skin to dry excessively, e.g., by using harsh soaps like bar soaps, Sunlight, Ushindi, etc. One should use the normal toilet soaps. No need to use medicated soaps.
  - Any of the petroleum jelly products for those who react against them (Vaseline, Ballet, Valon, Ideal, etc.)
  - Keep the skin kept moist by using emulsifying ointment.
  - Use antihistamines like chlorpheniramine maleate to alleviate the itch.
  - For severe cases and generally for not more than 7 days, give topical steroids. Note that infants can absorb steroids through the skin easily.
  - Treat any intercurrent infection (bacterial, or fungal).
  - Refer to the skin specialist if the body surface area involved is extensive (e.g., 50% and over) or the disease is very severe.

40.1.2 CONTACT DERMATITIS

- Acute or chronic inflammation produced by substances contacting the skin and causing toxic (irritant) or allergic reactions.
- Primary irritants include acids, alkalis, soaps, detergents, and acetone. Allergic contact dermatitis may be caused by topical drugs, plants, shoes, clothing, metal compounds, dyes and cosmetics.

- The lesions in contact dermatitis may be acute vesicles or may consist of weeping subacute erythema, dry scaly papules. Chronic lesions may be lichenified (thickened), excoriated, and hyper pigmented.
- The distribution of the lesions may take the shape of offending item or area of its contact, for example shoes, watch, and gloves, or may be asymmetric or have other forms.

Management

The following management is recommended for children with contact dermatitis:

- Identify and remove the causative agent.
- Drain large blisters, but do not remove their tops (roofs).
- Apply gauze or thin cloths dipped in water or normal saline.
- Apply topical 1% hydrocortisone ointment to dry lesions and cream to wet ones.

40.1.3 SEBORRHOEIC DERMATITIS

This is an inflammatory scaling disease of the scalp, face, and occasionally other areas with high density of oil glands (axilla, upper chest, anogenital areas).

Clinical Features

Symptoms develop gradually as:

- Dry or greasy diffuse scaling of scalp (dandruff) with pruritus.
- Yellow- red scaling papules in severe cases found along the hairline, external auditory canal, the eye brows, conjunctivae, and naso-labial folds. The lesions are not accompanied by hair loss.
- Cradle cap (thick, yellow crusts on scalp) in newborns.
- Severe seborrhoeic dermatitis, found in neurologic disorders (Parkinson's disease) and HIV infection.

Management

The following management is recommended for children with seborrhoeic dermatitis:

- Apply 2% salicylic acid in olive oil to control scaling.
- Remove dandruff by applying shampoos containing selenium sulphide, sulphur and salicylic acid, or tar daily (more recently ketaconazole shampoo is excellent).
- Apply topical steroids, using mild lotions (e.g., 0.001% fluocinalone acetate).
- Treat superimposed bacterial, fungal, or viral infections, which are especially prevalent in patients with HIV.
- Refer to specialist if patient does not respond to treatment.

40.2 Bacterial Infections

40.2.1 IMPETIGO CONTAGIOSUM

This is a contagious intradermal infection caused by streptococcal or staphylococcal organisms. This condition is commonly associated with poor hygiene, crowded living conditions, and neglected minor trauma. The condition

frequently complicates scabies, purpura urticaria, and insect bites. Impetigo contagiosum may presents as bullous lesions that rupture and crust on the face, arms, legs, and buttocks.

Management

The recommended management of this condition comprises the following:

- Local treatment for minor lesions consisting of cleaning the lesion with normal saline.
- Systemic treatment for extensive lesions consisting of administration of systemic antibiotics (amoxicillin/cloxacillin or erythromycin).

40.2.2 BULLOUS IMPETIGO

- This condition is common in neonates (pemphigus neonatorum), although any age can be affected. It is caused by an infection by staphylococcal bacteria, involving mainly the axilla and the groin.
- The skin lesions are usually large bullae containing pus and clear serum, and may rupture easily leaving raw areas. Crusting is not a feature in this condition.
- The patient should be admitted if toxic with suspected of septicaemia, or if there are extensive lesions especially in the neonate.

Patient Education

The patients and their guardians need to know the following about bullous impetigo:

- It can spread easily, especially in schools.
- Affected children should be isolated and treated.
- Towels and bath facilities for those affected should be kept separate.

40.3 Fungal Infections

The fungal infections of the skin include dermatophyte (genus microsporum, trichophyton, and epidermophyton) infections, which thrive on non-viable keratinized tissue of the skin (stratum, comeum, hair, nails). Sources of infection include other persons, animals such as puppies or kittens, and more rarely the soil.

The nomenclature for the infection is “tinea” followed by the Latin name of the appropriate part, for example, Tinea pedis for athlete’s foot, which is manifested by scaling or maceration between the toes particularly the fourth interspace. This is caused by Tinea rubrum and/or Tinea interdigitalae. Predisposing factors include hot humid weather and occlusive footwear.

Tinea cruris is an erythematous and scaly rash with distinct margin extending from groin to upper thighs or scrotum. It is common in males and itching may be severe. Tinea corporis (body ringworm) forms characteristically annular plaques with raised edges and central clearing and scaling with variable degrees of itching. Tinea capitis (scalp ringworm) is mainly a disease of children and shows

spontaneous recovery at puberty. It manifests commonly with scaling, itching, and loss of hair, often referred to as “Mashillingi” in Kiswahili. Scarring, alopecia may result from the infection. Tinea anguum involves the nails and presents with nail discolouration and subungual hyperkeratosis (friable debris).

Investigations
These are not usually necessary but in doubtful cases do direct microscopy of skin scale in 20% potassium hydroxide mounted on a slide to demonstrate hyphae.

Management
The management for fungal skin infections comprise of the following;
- Apply gentian violet paint, 0.5% concentration, daily to wet lesions (that are in skin folds).
- Administer ketoconazole 3–6mg/kg/day or fluconazole 6mg/kg/day.
- Apply clotrimazole cream.
- Administer ketoconazole shampoo twice weekly until lesions clear.

40.4 Parasitic Infestations

40.4.1 SCABIES

Scabies is caused by the human itch mite Sarcoptes scabiei and spreads through intimate personal contact, facilitated by overcrowding and poor hygiene. Transmission via bedding or clothing is infrequent, partly because the mites do not survive for a day without host contact.

Clinical Features
The clinical features of scabies include the following:
- Intense itching worse at night or after hot shower.
- Skin papular rashes associated with burrows, which occur predominantly on the finger webs, the wrists flexor surfaces, elbow and axillary folds, and around the areola of the breasts in females and the genitals especially male, along the belt line, and on the buttocks. In young children rash may be generalized and may affect the face.
- Secondary infection causes that manifest themselves as urticarial papules, crusts and pustules.

NB: The burrow is a fine, wavy scaly line (0.5–1cm long) with a small papule/ vesicle at the end.

Diagnosis
- Diagnosis is made by demonstration of typical burrows on the skin; these may be difficult demonstrate.
- Microscopy of skin scrapings (avoid KOH) and demonstrate the mite, ova, or faecal pellets.

Management

The following is recommended for management of scabies:

- Apply to the entire skin (from the neck down) a 25% benzyl benzoate emulsion (use 12.5% in children) on days 1 and 2 without bathing. On day 3 bathe and apply again.
- Apply 5–10% sulphur ointment.
- Use nonspecific measures, which include the following:
  - Maintaining good personal hygiene
  - Using antihistamines for pruritus
  - Putting the clothing used by the affected individually, including bedding and mattresses, in the sun.
- Treat secondary bacterial infections using cloxacillin in severe cases.
- Treat the whole family for scabies at the same time.

40.4.2 JIGGERS/TUNGA PENETRANS

Diagnosis of jiggers is not a problem, but educating the community on treatment is mandatory. The following is recommended:

- The jigger should be extracted with clean pin.
- The jiggers should be suffocated by soaking the affected feet in Lysol, liquid paraffin, or kerosene.
- Tetanus toxoid vaccination.

Prevention

The following preventive measures are recommended:

- Smoothening the walls and floors with mud or cow dung.
- Dusting of the earthen floors with insecticide powders. (Ensure that any such insecticide is safe for human contact.)
- Promoting personal hygiene for affected populations.

40.5 Pellagra (Niacin Deficiency)

Pellagra is a dietary deficiency that may occur in starvation, isoniazid therapy, diarrhoea, and liver cirrhosis.

Clinical Features

This condition presents with characteristic dermatitis, diarrhoea, and dementia, and may result in death if appropriate treatment is not given. Weight loss, anorexia, fatigue, malaise, pruritus with burning sensation, dysphagia, nausea, diarrhoea, vomiting, impaired memory, confusion, and paranoid psychosis may occur. Skin lesions are limited to areas exposed to the sun, e.g., the face, neck, hands, and feet. Mucous membranes may be involved, manifesting as scarlet stomatitis and scarlet red tongue.

Management

Management of pellagra involves the following:

- Administer high protein diet.
- Administer multivitamin tablets or syrup.
- Administer niacin 50–100mg/dose, 3 times a day.

40.6 Dermatological Emergencies

40.6.1 STAPHYLOCOCCAL SCALDED SKIN SYNDROME (SSSS) OR RITTER'S DISEASE

This is a toxin-mediated epidermolytic condition leading to detachment of the superficial epidermal layers to resemble scalding. Affected children may look like they have been immersed in a basin of hot water and sustained burns.

The condition mainly occurs in children under 2 years of age, and varies in severity and distribution from a localized form (bullous impetigo) to a generalized form of epidermolysis. This condition is also found in immuno-compromised patients and in those with renal failure.

Clinical Features

The clinical features in this condition comprise the following:

- Flaccid vesicles that shear off, leaving raw areas, when gentle lateral pressure is applied to them.
- Focus of infection may be in the nose, umbilical stump, purulent conjunctivitis, otitis media. or nasopharyngeal infection.

Investigations

Pus swab for C&S is essential

Management

- Admit.
- Practise barrier nursing – isolate.
- Maintain meticulous fluid and electrolyte balance as in burns.
- Ensure adequate nutrition.
- Give parenteral antibiotics, cloxacillin or flucloxacillin preferred. Change antibiotics according to culture and sensitivity results.
- Maintain skin care:
  - Topical care baths with normal saline.
  - If widespread and weeping lesions are present treat like LIKE WHAT?
- Refer/consult severe cases unresponsive to available treatment.
- Do not give corticosteroids.

40.6.2 ERYTHEMA MULTI FORME SYNDROME

This condition is now a common problem because of the increased prevalence of HIV/AIDS. It is characterized by an infiltration by mono-nuclear cells into the dermoepidemial junction, leading to the formation of vesicles, which are generally found in the extremities, palms, and soles in the mild form of disease. In severe forms of the disease, widespread mucosal involvement occurs, with typical features of Stevens-Johnson syndrome, and may last 1–2 months, being accompanied by a high mortality.

The following is known about its aetiology:

- About 50% of occurrences are idiopathic, with no known cause.
- Administration of drugs like sulphonamides, phenytoin, barbiturates, penicillins, and thiacetazone have been known to lead to its occurrence.
- Viral infections like Herpes simplex and bacterial infections like streptococcal and infections with mycoplasma have been associated with the development of the condition.
- Underlying malignancies have been known to be associated with this condition.

Clinical Features

The clinical features of this condition include the following;

- In severe form the mucous membranes are always involved, with extensive bullae formation and systemic symptoms of fever and prostration.
- There may be cheilitis and stomatitis, which interfere with feeding, with vulvitis in females and balanitis in males, leading to difficulties in micturition.
- There may be conjunctivitis that leads to keratitis.
- There may be epidermal necrolysis, that may be life threatening.

Management

- Admit all cases.
- Stop offending factor – Minimize drug therapy.
- Give intravenous corticosteroids, which are the current therapy for Stevens-Johnson syndrome.
- For skin care, clean with normal saline.
- For eye care, administer 1 % tetracycline eye ointment. Refer to ophthalmologist.
- For mouth care, use antiseptic wash.
- Keep patient warm.
- Practise cradle nursing, single room/bed.
- Give IV fluids until able to feed orally.
- Refer urgently to specialized centres.

40.6.3 EXFOLIATIVE DERMATITIS (EXFOLIATIVE ERYTHROMA SYNDROME, ERYTHRODERMA)

This is a serious, life threatening skin disease characterized by generalized and confluent redness with scaling of the skin, associated with systemic toxicity, generalized lymphadenopathy, and fever. The disease manifests as an acute illness and may also manifest as a chronic illness. More than 50% of patients with this condition have a history of pre-existing dermatosis, commonly eczematous dermatitis (atopic, contact). It is also associated with psoriasis, drug reaction, leukaemia, and lymphoma. In up to 10–20% no possible cause can be identified.

Constitutional symptoms of the condition include fatigue, weakness, anorexia, weight loss, malaise, feeling cold (shivering), red appearing skin that is thickened and scaly, and commonly without any recognizable borders for the lesions. Oedema of lower legs and ankles may occur. The palms and soles may be

involved with resultant thickening and fissuring. There may be alopecia (although this is not a constant finding), with shedding of the nails. Erythroderma may be purely secondary to HIV infection.

Prognosis
This is a very serious disease with many complications in a number of body systems. The highest level of skill and facility are necessary for its management, and the prognosis is guarded.

Investigation
- Confirm primary skin disorder by skin biopsy.

Management
- Bath soaking
- Bland emollients: liquid paraffin, emulsifying ointment
- Nursing care in a single room and keep warm
- Systemic management
  - Supportive – fluid, electrolyte, protein replacement
  - Systemic steroid used under specialist care are prednisone or prednisolone
  - 0.5mg/kg/day in 2 divided doses
- Note: Erythroderma may be purely secondary to HIV infection.

41. Endocrine System Conditions

41.1 Diabetes Mellitus

Diabetes mellitus is recognized by persistent elevation of the concentration of glucose in the blood (hyperglycaemia).

Clinical Features
The clinical features of diabetes mellitus include polyuria, polydipsia, and polyphagia. The affected child also has weight loss and experiences recurrent infections. In severe uncontrolled diabetes with ketoacidosis, there may be altered consciousness and coma.

Classification
Diabetes mellitus is classified into type 1 and type 2 diabetes mellitus.
- Type 1 (which is insulin dependent diabetes mellitus) usually occurs in children and young adults and in the absence of appropriate therapy is associated with ketoacidosis. These patients require insulin to sustain life.
- Type 2 (which is non-insulin dependent diabetes mellitus) usually afflicts adults, although it is increasingly being seen in obese children.

Investigations
The following investigations are recommended:
- Evaluation of plasma glucose: Fasting venous plasma glucose of more than 7.8mmol/L on more than one occasion or random plasma glucose of more than 11.1mmol/L in symptomatic patients is indicative of diabetes mellitus.

- Urinalysis for protein, sugar, and ketones is useful for making a diagnosis.
- Serum urea and electrolytes.

Management

Management of this condition aims at the following:

- Abolition of symptoms of diabetes
- Correction of hyperglycaemia, and glycosuria
- Prevention and management of complications.

For children with diabetes mellitus, the following is also important:

- Maintaining normal weight, growth, and development.
- Improving quality of life.
- Keeping the urine free of ketones.

General Management

Dietary modification is important in both types of diabetes mellitus. The hospital nutritionist should be consulted so as to carry out appropriate dietary modification that is preferably individualized.

The following food composition is recommended:

- Carbohydrate: 50–60% in complex form; should be based on the staple for the family and refined products should be avoided.
- Protein: 10–20% that should incorporate vegetable protein sources including soya beans, lentils (dengu), and beans. Animal products should be included if possible.
- Fat: 25–30% of energy intake that should be preferably polyunsaturated types
- There should be adequate fibre in diet, because fibre can prolong absorption of sugar. Fibre containing foods include most unrefined staple foods, beans, legumes, bran, fruits. and vegetables
- Strict adherence to meals schedule should be maintained.

41.1.1 TYPE 1 DIABETES MELLITUS

This form of diabetes usually presents with diabetic ketoacidosis (DKA). Patients with type 2 DM can also present with DKA, especially in situations of stress such as infection or neglect of therapy.

Clinical features

The clinical features include intense polydipsia, polyuria, and polyphagia. In young children the condition may present with enuresis in a previously dry child. The child may also present with abdominal pain, vomiting, dehydration, acidotic breathing, and altered consciousness or coma. The child has weight loss in spite of having a good appetite.

Investigations

- Urinalysis: Ketonuria and glycosuria
- Blood sugar: Hyperglycaemia
- Urea and electrolytes

Management

- ***Management of diabetic ketoacidosis is a medical emergency.*** Some patients with DKA present without coma.
- Admit the patient.
- Rehydrate the child if dehydrated using normal saline in line with management guidelines is recommended (Table 41.1). After the initial resuscitative rehydration, transfer the child to higher level for appropriate management.

Table 41.1: Fluid replacement in a child with diabetic ketoacidosis

Age	Amount
<24 months	100ml/kg
2–4 years	85ml/kg
5–10 years	70ml/kg
>10 years	20–30ml/kg

Note: Use the same basic principles for rehydration in children, with fluid volume The working assumption is that child has lost 10% of weight due to dehydration. Intravenous infusion of normal saline is initiated. Total fluid to be given should be 100ml/kg/24 hours, with additional fluid for maintenance. The child should receive 20ml/kg of fluid in the first hour and then receive the rest of the rehydration over 24 hours. Cerebral oedema may occur during the rehydration phase.

- Initiate fluid replacement with normal saline then change to 5% dextrose alternating with N/S when blood sugar is between 12.0–14.5mmol/L. If severely dehydrated continue N/S and 5% dextrose together. Continue intravenous fluids until fluid losses have been corrected and ketonuria has disappeared.
- Insulin therapy:
  - After bolus fluid, give short acting (soluble) insulin at 0.1 IU/kg/hr as a continuous IV infusion.
  - Continue IV insulin until blood glucose is 10mmol/L and base deficit is <5.
  - Change to maintenance SC insulin regime when patient is conscious, cooperative, and able to eat.
- Potassium replacement:
  - Hypokalaemia is a common feature. Confirmation should be through ECG and electrolytes. If present supplement as indicated in Table 41.2.
  - Potassium replacement should commence immediately after the first dose of insulin and 20ml/kg of fluids. Potassium can safely be given at the rate of 10–20mmol/hr (10ml of 15% KCL=20mmol K) in an infusion. ***Never give potassium as a bolus.***
- Acidosis:
  - Correction of acidosis is not always necessary unless pH is <7.0 and serum potassium is >4mmol/L or <7.1 and not improving after initial rehydration. Give NaHCO3 8.4% (diluted to 4.2%). Use the following formula:

Base excess x 0.3 x weight in kg. Give 25% over 1 hour and reassess
(1ml NaHCO3 8.4% = 1mmol HCO3)

☛ **Use NaHCO3 with caution: May cause paradoxical CNS acidosis.**

Table 41.2: Potassium replacement

Serum potassium (mmol/L)	Potassium supplements (mmol/L of fluid)
<3	40
3–4	30
4–5	20
5–6	10
6	None

- Monitoring:
  - Two-hourly plasma potassium (while potassium infusion is being given).
  - Hourly blood sugar estimations are mandatory in the first few hours (use glucose oxidase reagent strips).
  - Urine output; if no urine after 3 hours catheterize patient.
- Nasogastric suction should be done in comatose patients to prevent aspiration.
- Oral intake is initiated after ketoacidosis has been corrected.
- Some patients do not have DKA at presentation. For these:
  - Admit patient for insulin therapy.
  - Start patient on soluble insulin 0.1unit/kg subcutaneously half an hour before meals TDS. The severity of hyperglycaemia will aid in selection of the dose.
  - Plasma glucose should be monitored before meals and at bed time.
  - Maintain plasma glucose in the range of 8.3–13.4mmol/L in the hospital to avoid hyperglycaemia at home.
  - Gradual adjustment of insulin dosage is essential when blood glucose is near the desired range.
  - When blood glucose level is between 8.3 and 11.0mmol/L, change to an intermediate-acting insulin.
  - The dose of intermediate-acting insulin is 2/3 of the total daily soluble insulin requirement. Alternative strategy is to base control on 2 doses of intermediate acting insulin, 2/3 in the morning and 1/3 before supper.
- Maintenance of insulin therapy:
  - Maintenance insulin for pre-pubertal children is in the region of 0.6–0.8 unit/kg/day and at pubertal 1.5–2 unit/kg/day. Total daily dose 2/3 in the morning and 1/3 in the evening. Adjust to prevent excess weight gain. Optimum control at home is blood sugar 4–9mmol/L: 4–7mmol/L before meal and <9mmol/L after food.
  - Maintain blood glucose: HbA1c <6.5–7.5%.
  - Short-acting (soluble) insulin is injected 15–30 minutes before a meal
  - Insulin dose should not increase or decrease by more than 2 units at a time
  - Sites of subcutaneous injection:
    - Upper outer areas of the arms
    - The front and sides of the thigh
    - The upper outer surface of the buttocks and the abdomen (except the areas close to the navel)
- Avoid hypoglycaemia – Teach caregivr or child to recognize features of hypoglycaemia.

- Adjust doses: Increase during infection, surgery, and reduce during exercise, renal and hepatic impairment.

☛ **Hypoglycaemia should be considered in all diabetic patients who present with altered consciousness or coma. Take blood for glucose and give 5ml/kg of 10% dextrose immediately.**

Parent/Patient Education

The parent of, or a child with, diabetes mellitus should receive the following information to enhance management of the condition:

- The parent or child (if old enough) should be taught how to give insulin at home and how to look after the insulin: how to measure insulin, technique of injection, care of syringe,
- The parent or child (if old enough) should be taught how to recognize and manage hypoglycaemia.
- Child with any infection should always be taken to a health facility for immediate treatment.
- Such a child should seek medical advice for any injury, however minor.
- Patients with diabetes should take their meals regularly, even at school.
- Teachers should be made aware of child's diabetic status.
- Patients should carry sweets or glucose and chew them if they experience any symptoms of hypoglycaemia.
- Patients should always carry a "Diabetic Alert" card with them and inform all health workers when they present to clinic with any problem.
- Patients should be encouraged join support groups for diabetes mellitus.

41.1.2 TYPE 2 DIABETES MELLITUS

This form of diabetes occurs in obese children usually over age of ten years and can also present ketoacidosis. Children whose BMI is >85% for age should be screened for this condition, especially if there is family history of diabetes.

Management

The primary management of Type 2 diabetes mellitus is based on manipulation of the diet and use of exercises. The following is recommended:

- Manage as outpatient, preferably in the hospital's diabetic or specialist paediatric clinic if there is such a clinic.
- Consult hospital nutritionist for dietary modification.

Pharmacological Management

Oral hypoglycaemic drugs should be used only if the diet and exercise regimen fails and should be strictly under guidance of specialist.

- Use Metformin for a child over 10 years 500mg once a day. Adjust at intervals not less than 1 week to maximum of 2g per day.
- Use Tolbutamide child >12 years 0.5–1.5g (max 2g) daily after food.
- ***Avoid use of glibenclamide and chlorpropamide in children.***
- Insulin is indicated in Type 2 DM if:

- Oral hypoglycaemic drugs are not effective, e.g., persistent polyuria, hyperglycaemia.
- Ketonuria occurs.
- Infection occurs.
- Other complications, e.g., renal failure, occur.
- Patients undergoing surgery.

41.1.3 COMPLICATIONS

The following complications occur among children with diabetes mellitus:

- Hypoglycaemia
  - This occurs when blood glucose falls lower than 4mmol/L.
  - Clinical features include:
    - Sudden onset of sweating,
    - Tremours,
    - Hunger,
    - Mental confusion and drowsiness, and
    - If hypoglycaemia is prolonged, coma.
  - Management includes the following:
    - Non-pharmacological management: Give sugar-containing soft drinks, snacks, or sweets. These can be given at home if patient or caregiver notices signs of hypoglycaemia.
    - Monitor blood sugar every 15 minutes until blood glucose is 6–8mmol/L.
  - Pharmacological management:
    - Give IV 10% dextrose bolus 5ml/kg (do not use 50% dextrose in children).
    - Give 5 or 10% dextrose fluid as a continuous infusion until normal blood glucose is achieved, then change to oral feeding.

In recurrent episodes,

- Reduce insulin doses and instruct child to take snacks before exercises.
- In refractory hypoglycaemia, give IM/IV glucagons: for neonates give 20μg/kg; for child < 30kg, give 0.5μg stat dose; for child > 30kg give 1mg STAT dose; give continuous infusion 1–10μg/kg/hour.
- Infections: Treat with broad spectrum bactericidal antibiotic while awaiting results of cultures where applicable.
- Nephropathy: This is very rare in children. However, all children over 12 years should be screened for microalbuminuria.
- Refer all children with complications to specialists.

41.2 Thyroid Diseases

41.2.1 GOITRE

This is the enlargement of thyroid gland usually caused by lack of iodine or defects in synthesis of thyroxine hormone. Children may demonstrate features of hyperthyroidism or hypothyrodism.

HYPERTHYROIDISM

This condition is due to excessive levels of the thyroid hormone.

Causes

In the neonatal period it is a manifestation of Graves' disease in the mother. In older children it may be a manifestation of Graves' disease in the child or subacute thyroiditis.

Clinical Features

The clinical features for this condition include tachycardia, cardiac failure, arrhythmias, tremors/jitteriness, lid lag, exophthalmos, sweating, and failure to thrive. If the child has a goitre, there may be pressure symptoms on trachea like stridor and difficulty in swallowing.

Investigations

- Thyroid function: TSH, T3, T4
- Thyroid ultrasound
- ECG

Management

Treatment must be done by a specialist:

- Antithyroid drugs – dosage adjusted according to response; given till child becomes euthyroid
  - Carbimazole
    - Neonate 250–500µg/kg every 6–8 hours up to 1mg/kg/day
    - Child 1–12 years 250µg/kg (max 10mg)
  - Propylthiouracil
    - Neonate and infants 2.5–5mg/kg (max 10mg)
    - 1–5 years initial dose 25mg/day in 3 doses
    - 5–12 years start at 50mg/day

  Beta blockers propranolol or atenolol given for control of cardiac symptoms. Digoxin may be necessary if there is cardiac failure.
- Duration of therapy
  - Neonatal: 8–12 weeks
  - Older children surgery or radioactive iodine may by used depending on response to above medication or when compliance is difficult

HYPOTHYROIDISM

This condition is due to deficiency of the thyroid hormone.

Classification

Hypothyroidism can be classified into the following 5 categories:

- Congenital failure of thyroid development (complete or partial)
- Endemic cretinism due to iodine deficiency
- Iatrogenic (after thyroidectomy, radio-iodine therapy, pituitary ablation, drug induced)
- Auto-immune thyroiditis
- Pituitary gland damage, e.g., cranial pharyngeoma

Clinical Features
The deficiency ranges from mild with minimal or unrecognized clinical manifestation to severe mental retardation (cretinism).

In congenital hypothyroidism, most neonates appear normal at birth. Prolonged neonatal jaundice, feeding difficulty, lethargy and somnolence, apnoeic attacks, constipation, large abdomen, umbilical hernia, macroglossia, failure to thrive, delayed physical and mental development, slow pulse rate, dry skin, sparse and dry hair, and hoarse voice are some of the clinical features of such children.

Ideally, diagnosis should be based on neonatal screening tests and not abnormal physical signs. Since such tests are not routinely carried out in the health services, the clinical features listed and a high index of suspicion continue to play an important role in picking up such children, who can then undergo appropriate laboratory investigations to confirm the diagnosis.

Investigations
Hormone levels assay:
- T4 TSH suggests deficit in thyroid gland (most cases)
- T4 TSH suggests deficit above level of thyroid gland
- T4 suggests thyroid hormone unresponsive (goitre is also present in most patients)

Management
Treatment should be done by a specialist
- Give thyroxine
  - Neonates: 10μg/kg OD PO; adjust dosage in steps of 5μg/kg every 2 weeks until usual dose of 25–37.5μg/day for life.
  - Child 1 month to 12 years: Start 5–10μ/kg/day with increments of 25mcg daily every 2–4 weeks till normal metabolism.
  - Child 12–18 years: 50–100μg/day then increments of 50μg/day every 3–4 weeks. Usual dose 100–200μg daily
- Adjust dosage to T4, TSH levels, growth, and neuro-development assessments.

Prevention of Endemic Hypothyroidism
Iodization of salt has helped to reduce the incidence of endemic goitre in our country.

41.3 Adrenal Disorders

41.3.1 ADRENAL INSUFFICIENCY

Causes
The following situations have been associated with adrenal insufficiency:
- Congenital adrenal hyperplasia
- Long term use of steroids
- Addison's disease
- Pituitary hypofunction

Clinical Features
Congenital deficiency may be associated with ambiguous genitalia and precocious puberty. Other manifestations of deficiency include hypoglycaemia, hyponatraemia, hyperkalaemia and hypotension, Addison's Disease with increased skin pigmentation, hypoglycaemia, muscular weakness, craving for salt and hypotension. Adrenal crisis is associated with cardiovascular collapse.

Investigations
- Serum electrolytes for salt losing type
- Blood sugar
- Urinary 17-keto steroids
- Serum cortisol and ACTH
- Abdominal ultrasound to detect the gonads
- Buccal smear for Barr body to determine sex of the baby

Management
- This should be under a specialist
- Acute stage:
  - Give IV hydrocortisone neonate 10mg/kg STAT, then 100mg/m^2 every 6–8 hours until stable. Older child 2–4mg/m^2 every 8 hours. After 4–5 days, change to oral maintenance therapy.
  - Maintenance therapy:
  - Oral hydrocortisone 4–5mg/m^2
  - For salt losing type use fludrocortisone 50–100μg once daily.
  - Prednisolone 5mg/m^2 per day in 1–2 doses can also be used.
  - High sodium intake may be needed to maintain balance in the salt losing variety
- For all children, adjust doses to maintain normal growth but avoid hypertension. Therefore monitor blood pressure and electrolytes regularly.
- For children on long-term steroid use, if withdrawing always do it very gradually to allow adrenal gland to recover. Reduce prednisolone by 5mg/m^2 daily.

42. Musculoskeletal Conditions

42.1 Arthralgia (Non-Specific)

This is joint pain without features of inflammation.

Clinical Features
The clinical features include general malaise, joint pains without affecting joint mobility and without features of inflammation (redness, warm, tenderness), although the joint might be slightly tender. The arthralgia is usually a feature of another illness and careful systemic examination is likely to reveal the responsible disease.

Investigations
There is no specific investigation besides that to identify the responsible disease.

Management
Paracetamol should be administered at 40mg/kg/day given 4 times a day.

42.2 Rheumatoid Arthritis

42.2.1 JUVENILE RHEUMATOID ARTHRITIS (JRA)

This condition is an arthritis beginning at or before the age of 16 years and tends to affect large and small joints and may interfere with growth and development. Stiffness is usually worse in the morning and the child may be reluctant to use the affected limb(s).

Classification
Juvenile rheumatoid arthritis is classified into three grouping: systemic (Still's disease), pauciarticular types I and II, and polyarticular varieties. (Presentation is shown in Table 42.1.)

Table 42.1: Presentation of juvenile rheumatoid arthritis, by type

Type	Systemic disease	Pauciarticular (JRA)	Polyarticular (JRA)
Frequency of occurrence as a percentage	20%	40%	40%
Rheumatoid factor test	-ve	-ve	+/-+ve/-ve
Antinuclear factor test	-ve	75% +ve	
HLA B27 antigen test		+/-+ve/-ve	-ve
Presentation	High fever, rash, splenomegaly, generalized lymphadenopathy, serositis, striking leucocytosis and thrombocytosis	Type I: mainly male Type II: mainly female	As for adult rheumatoid arthritis

Management
- Treat as outpatient:
  - Physiotherapy
  - Acetylsalicylic acid children 75–100mg/kg QDS
  - Regular eye check up to detect eye complications and care
- Admit for:
  - Acute exacerbation
  - Bed rest (may need to splint the affected joint)
  - Intensive physiotherapy
  - Systemic complications
- Refer if:
  - Deformities are present (seek surgical opinion)
  - Disease does not respond to NSAIDs
  - There is systemic organ involvement

Prognosis
Overall prognosis for juvenile rheumatoid arthritis is better than that for adult rheumatoid arthritis. Complete remission occurs in 50–75% of patients. Those with polyarticular form of the disease and are RhF positive have a less favourable prognosis.

42.3 Rheumatoid Arthritis (Adult Type)

Systemic disease, of unknown aetiology, that is symmetrical, peripheral, and polyarthritic, most commonly involving the small joints of hands, wrists, metatarsophalangeal joints, ankles, knees, and cervical spine. This type is rare in children.

Clinical Features
- Symmetrical peripheral polyarthritis mostly of small joints (warm, painful, stiff, swollen). Muscle wasting. Deformity, ulnar deviation, boutonniere deformity.
- Extra-articular: Fever, weight loss, lassitude, anaemia, subcutaneous nodules, splenomegaly, lymphadenopathy, keratoconjuctivitis, pericarditis, pleuritis.
- Complications: All the systems are involved in this disease.

Investigations
- Haemogram – Moderate hypochromic, microcytic anaemia; or leucopaenia in Felty's syndrome
- ESR – Elevated
- X-ray, especially hands and/or any other involved joint
- Rheumatoid factor
- Antinuclear antibodies

Management
- Treat as outpatient:
  - Physiotherapy
  - Acetylsalicylic acid 75–100mg/kg/24 hour, maximum 600–900mg, 6 or 4 hourly preferably after food ***OR*** with antacid. Ibuprofen 30–50mg/kg/24 hour 6-8 hourly maximum 2,400mg/24 hour
- Admit for:
  - Acute exacerbation
  - Bed rest (may need to splint the affected joint)
  - Intensive physiotherapy
  - Systemic complications
- Refer if:
  - Deformities are present (seek surgical opinion).
  - Disease does not respond to NSAIDs.
  - There is systemic organ involvement requiring specialist intervention.

43. Mental Disorders

Childhood mental dysfunction is not uncommon but is often overlooked especially in busy clinics with a lot of very sick children with somatic illnesses. These illnesses depend on recognition by the parents and, to some degree, the teachers if the children are in school. Assessment of such children requires a friendly and a non-threatening environment. Depending on the age of the child, it is important to observe as the child plays and relates to the parent and the environment as well as to the clinician.

The older child with mental illness is able to relate and talk to the clinician. Early recognition of children with mental illness and their referral to a mental specialist is important.

43.1 Vegetative Disorders

These include eating (pica, bulimia and anorexia nervosa) and elimination (enuresis and encompresis) disorders. Encompresis has already been dealt with.

43.1.1 ENURESIS (BED WETTING)

Most children will be dry at night by age of 5 years. Enuresis is more common in boys. It may be a feature of diseases like renal diseases, cardiac diseases, diabetes mellitus, and seizure disorders. Enuresis is categorized as primary when a child has never been dry, and secondary when a child has been dry for at least 1 year before starting to bed-wetting again. Secondary enuresis is usually due to some stressful event(s) in a child's life. However, it is important to rule other diseases that have been mentioned earlier.

Management

The general management of enuresis involves the following:

- Getting the cooperation of the child and parent.
- Avoiding punishment and humiliation to the child.
- Limiting evening and night fluid intake.
- Giving low dose imipramine, which may help in difficult cases.
- For secondary enuresis, dealing with the causative factors.

43.2 Anxiety Disorders

These are the commonest psychiatric disorders in children and adolescents. It may be difficult to distinguish between an anxiety disorder and normal anxiety, but it is very important to make such a distinction. The three types of anxiety disorders are:

- Separation anxiety, in which the affected child shows excessive distress when separated from home and may refuse to go to school or sleep away from home.

- Phobia, whereby there is persistent fear of social situations, school, animals, and other phenomena.
- Post traumatic stress disorder, which is related to a traumatic or a life threatening event.

Management
- Counselling the child and family
- Behaviour treatment – teaching the child coping mechanisms
- Play therapy

43.3 Mood Disorders: Depression

Clinical Features
The clinical features depend on the age of the child, as illustrated below:
- In infants, there is panic behaviour and irritability initially looking for a parent/ care giver. This is followed by the child losing interest in every body. Child becomes inactive, apathetic with sad facies.
- Affected children have a sad face, are withdrawn, have poor feeding and poor sleeping, with poor school performance.
- In adolescence, there is fatigue for no apparent reason, lack of interest in normal activities, poor school performance, and suicidal tendencies.

Management
- General:
  - Address problem area: social skills, school performance, family issues, and any event that may have precipitated the depression.
- Pharmacological:
  - Mood stabilizers: Lithium, carbamazepine, valproate.
  - Tricyclic antidepressants are less efficacious in children.

43.4 Conversion Syndromes (Hysteria)

These are mental disorders in which there is a psychogenic disturbance of either motor or sensory function in some parts of the body.

Clinical Features
Patients with this condition may present with paralysis of a part of the body, tremors, blindness, deafness, seizures, or aphonia. The severity of disability fluctuates, and the patient fails to exhibit the seriousness the disability accords.

Management
- Good psychiatric history to reveal the source of conflict.
- Thorough physical examination to exclude an organic problem.
- Counselling and behaviour modification.

43.5 Disruptive Behaviour Disorders

43.5.1 ATTENTION DEFICIT/HYPERACTIVITY DISORDER

Clinical Features

The onset of this condition is usually before the age of 7 years. The child is permanently on the move during the waking period, leading to poor sustained attention, and as a result finds it difficult to complete tasks and is inattentive. Very often the child is labelled as being stubborn by the parents and has poor school performance

Management

- General
  - Use behaviour modification approaches at home and school.
  - Provide a structured learning environment at school and home.
- Pharmacological – Drugs are given in the morning. Another dose in the afternoon can be given if needed:
  - Methyphenidate: start with 0.3mg/kg/dose or 2.5–5mg/dose increase by 0.1mg/kg/dose to a maximum dose of 2mg/kg/day.
  - Atomoxetine: 0.5/kg/day to a maximum of 1.2mg/kg/day.

43.5.2 CONDUCT DISORDERS

- These are defined as repetitive and persistent behaviours that violate societal norms.
- Children present with truancy, drug abuse, defiance of authority, stealing, excessive lying, running away from home, aggressiveness, and involvement in criminal activities. Such children often have a background of family disharmony.

Management

- Behaviour modification
- Mentorship recreation programmes
- Involvement family and other relevant authorities.
- Sometimes it may be necessary to resort to legal sanctions

43.5.3 PERVASIVE DEVELOPMENT DISORDER

The conditions appear early in life and affects the child's social, cognitive, and language development. These disorders include autistic disorder, Asperger's disorder, and Rett's disorder.

AUTISTIC DISORDER (AUTISM)

Children with this condition show marked impairment of social and emotional interaction with the people around them. The onset is in the first year of life. There is lack of language development, the child is inflexible and may have ritualistic behaviour. It is important to exclude medical conditions like cerebral palsy and hearing impairment.

Management
- Clear diagnosis by an experienced specialist
- Family behavioural therapy
- Special school

43.5.4 CHILDHOOD PSYCHOSIS

Childhood schizophrenia, bipolar mood illness, and depression may present with psychotic features similar to those in adults. The age of onset is usually after 12 years, rarely before that age. Those with very early onset may be difficult to diagnose; they are often mistaken for having some conduct disorder and have poor school performance.

Management
Refer to a psychiatrist.

43.5.5 SUBSTANCE ABUSE RELATED DISORDERS

These are syndromes arising out of repeated maladaptive use of substances. A substance is defined as any chemical with brain altering properties. Substance abuse disorders are characterized by significant impairment in psychological, social, and occupational functioning as observed over a 12-month period. Commonly abused substances in Kenya include tobacco, Cannabis sativa (bhangi), khat (miraa), opioids (heroin), cocaine including crack cocaine, and solvents (glue, petrol, wood varnish). Substance-related syndromes include intoxication, dependence, withdrawal, psychosis, mood disorders, anxiety, sleep disorders, and sexual disorders. Those at high risk include children aged 12–20 years and patients with primary mental disorders.

Management
- Substance specific detoxification
- Patient/family education/counselling
- Alternative leisure activities
- Work/school rehabilitation
- Involvement of community agencies, e.g., religious organizations, Alcoholics Anonymous, Narcotic Anonymous where available.
- Refer for long-term management by psychiatrist.

43.5.6 SUBSTANCE ABUSE BY THE ADOLESCENT

Such patients usually present with self-neglect, slovenliness, deteriorating school performance, excessive sleeping, rough appearance, increasing and unexplained demand for money from care givers, involvement in petty crime (pilfering), and running away from home – in addition to aforementioned substance-related disorders.

Management – General Principles
- Substance specific detoxification
- Patient/family education/counselling

- Alternative leisure activities
- Work/school rehabilitation
- Involvement of community agencies, e.g., religious organizations, Alcoholics Anonymous, Narcotic Anonymous where available.
- Refer for long-term management by psychiatrist.

Management – Pharmacological
- For agitation, use: Diazepam 0.2–0.8mg/kg/dose. max 0.6mg/kg/dose PO daily to be tapered off in 10 days.
- For the parasympathetic upsurge, use: Clonidine 5–7μg/kg/24 hour, max dose 0.9mg/24 hour PO daily for 10 days.
- For any assaultive behaviour, use: Haloperidol 0.05–0.15mg/kg/24 hour; children over 12 years 2–5mg/dose TDS PO; ***OR*** chlorpromazine 2.5–6mg/kg/24 hour 4–6-hourly TDS as necessary.
- For pain, use: Paracetamol 20–40mg/kg/24 hour 4–6-hourly PO as necessary

Management of Selected Substances of Abuse
- ***Opioid detoxification:*** Opioids abused include heroin, morphine, dihydrocodeine, and pethidine. Tolerance develops rapidly and withdrawal features include agitation, lethargy, sweating, goose flesh, running nose, shivering, musculo-skeletal pains, diarrhoea, and abdominal cramps. These effects peak at 48 hours and subside over a period of 10 days. Owing to the highly addictive nature of opioids, admission to hospitals is necessary.
- ***Cannabis dependence:*** Chronic users may develop psychosis, anxiety, mood disorders, and a withdrawal state. Admission is usually necessary for initiating abstinence. Treatment of the psychiatric complication is the same as for the primary syndromes.
- ***Khat (miraa) dependence:*** Chronic users ("2 kilos" or more per day) may develop anxiety, mood disorders, and schizophrenia-like psychosis. Abstinence is to be encouraged. Treatment of the related psychiatric disorders is the same as for the primary syndromes.
- ***Solvent abuse:*** Solvents have powerful euphoriant properties. They are mainly abused by street children and the homeless. Chronic users may develop organ damage (liver, heart, kidney), apart from neurological damage. Patient education is vital. Involve family and relevant authorities in rehabilitation if possible.

43.5.7 SUICIDE ATTEMPTS

Suicide is an unsuccessful attempt to end one's own life. It is more common in adolescents following severe social problems or stress. A suicide attempt is used as a desperate attempt at conflict resolution, But it may also be due to depression, schizophrenia, or influence of alcohol/drugs.

Management

Refer to higher level for appropriate management, which would include admission. The following are general principles to observe for such patients:
- Admit.

- Urgently restore physical fitness, which is important for the person's wellbeing.
- Once patient's life is out of danger, take a full history without accusing the patient.
- Treat the patient with understanding and respect. An emphatic approach is very important if you are to win the confidence of the patient so that they will be able to tell you the true story.
- ***Regard every suicide attempt as serious.*** The next attempt may be successful. Do not regard an attempt as just attention seeking.
- Explore the underlying cause and counsel.
- Involve the parents.

44. Child Health

It is the responsibility of all health care providers to ensure that the children in their catchment area are kept as healthy as possible. Many child health programmes are covered in the care of children in the community. Individual sections in these guidelines also include advice on prevention of various conditions. Other conditions are discussed in detail in this section.

Programmes that help to keep children healthy include:
- Adequate nutrition for all children and their parents
- Growth monitoring
- Ensuring proper child care and stimulation to enhance adequate development
- Immunization of all children
- Screening for disabilities and adequate referral in all cases
- Continued support for all children with chronic illnesses
- School health programmes
- Environmental sanitation and food hygiene

44.1 Immunization

The basic principle of immunization is to administer into a healthy person a vaccine that will prevent that person from getting a certain disease. Ideally, all children should complete their primary immunization by the age of 1 year. This may involve community activities to ensure each child has a card and that immunization is up to date. If by any chance the child's immunization is incomplete, the parent is requested to take the child to an immunization centre at the earliest opportunity.

Immunization may be done with live attenuated vaccines (e.g., rubella, oral polio [OPV], measles, and BCG), inactivated or killed vaccines (e.g., Hib, IPV), or micro-organisms and detoxified toxins (e.g., tetanus).Generally, several vaccines can be given at the same time. This is important since it reduces the number of injections as well as visits to a health facility. BCG, OPV, DPT-HepB-Hib and measles vaccines can be given simultaneously if the child is of the appropriate

age and has not received the immunizations. A critically ill child needing hospital admission must be given the appropriate vaccines upon recovery.

44.1.1 IMMUNIZATION GUIDELINES

All parents are encouraged to take their children for immunization starting soon after birth. Presentation of the child health card at every visit to a health facility helps to detect those children who missed previous vaccinations. In the community, health workers can also check on these cards.

☛ **It is necessary that informed consent be obtained before any vaccination, from either the parent or the patient.**

Vaccine Administration

The following is important for vaccine administration:

- The vaccine dose should always checked against the instructions on the vaccine, but nearly all paediatric doses are 0.5ml.
- Site for intramuscular vaccine administration for children under 2 years of age is on the antero-lateral aspect of the thigh, while those aged more than 2 years should be given in the deltoid if big enough. If they are not big enough, use the site as for a child under 2 years of age. All intramuscular vaccine administration must be deep into muscle.
- Simultaneous administration of uncombined live vaccines must be given at different sites.
- Minimum interval between vaccine doses should be 4 weeks.

Age at Vaccination

Vaccines are given at specific ages, in accordance with the national immunization schedule, shown below. The list includes vaccines not currently on the national vaccination schedule, but indicates when such vaccines could be given.

- Vaccines given at birth are BCG, OPV, Hepatitis B vaccines.
- Vaccines given at 6 weeks, 10 weeks, and 14 weeks include OPV, diphtheria, pertussis, tetanus, Hepatitis B, Haemophilus influenza b.
- Vaccines given at 9 months include measles and yellow fever.
- Other vaccines not on the national vaccination schedule but which can be given between 6 weeks and 12 months include conjugate pneumococcal vaccine and meningococcal vaccine.
- Vaccination of the preterm baby follows the chronological age rather than weight, although HepB should be given when the baby weighs at least 2kg.
- Vaccines given between the ages of 12–24 months include measles, mumps and rubella, varicella, and any of the above if missed, or booster doses for DPT and Hib.
- Vaccines given between 2 and 5 years include DPT-HepB-Hib if never given, varicella, HepA, pneumococcal vaccine, meningococcal, and influenza vaccines.
- Vaccines given above 6 years (including adults) and comprise tetanus vaccine (with boosters every 10 years), pneumococcal, HepB, HepA, influenza (very useful for elderly), and meningococcal vaccines.

Specific Instructions

The following are general instructions with respect to immunization:

- A slight fever and/or other minor illness should not prevent you from immunizing a child.
- Children should be vaccinated during recovery from a serious illness if they had missed the vaccine.
- Mothers/child-caregivers should be informed about possible side effects of each of the given vaccines.
- All vaccinations should be recorded on tally sheets and on the Child Health Immunization cards and mothers should be instructed to always bring the cards along with them when taking children to a health facility.
- Mothers should be instructed to return the child for the next immunization on the date indicated on the card.
- The disposal of used sharp syringes should be handled appropriately to prevent injury and spread of diseases like HIV.
- To ensure appropriate cold storage of the vaccines, follow the recommended cold-chain instructions for each of the vaccines carefully. All the vaccines and diluents must be kept cold. DPT, HB, and TT vaccines are damaged if kept below 0°C and therefore should never be frozen. Always check the Vaccine Vial Monitor (VVM). The cold chain should be maintained because vaccines are easily destroyed by heat and rendered ineffective.
- Hands should be washed before and after handling vaccines.

Contraindications

☛ **A definite severe reaction to a preceding vaccine dose is a contra-indication to further doses of the same vaccine.**

44.1.2 IMMUNIZATION IN SPECIAL SITUATIONS

Immunization in Immunocompromised Host

- HIV/AIDS infection:
  - HIV exposed and asymptomatic children infected with HIV should receive all standard Kenya Expanded Programme on Immunization (KEPI) vaccines.
  - BCG vaccination should not be repeated if there is no reaction and live vaccines are avoided for children in stages in clinical stage 3 or 4 of the disease and immunological stage 3.
- Oncology patients:
  - Live vaccines are best given during remission
  - Corticosteroid therapy (high dose):
  - Live vaccines can be given after cessation of therapy. If they cannot discontinue, do not give.
- Pregnancy:
  - Generally live vaccines are contraindicated during pregnancy unless the risk of disease outweighs the risk of vaccine, e.g., yellow fever epidemic.

Side Effects and Adverse Reactions to Vaccinations

The side effects range from mild to severe for various vaccines.

- BCG vaccine: These include injection abscess, regional or widespread

lymphadenitis, osteomyelitis, and disseminated BCG infection. These should be treated with anti-tuberculosis drugs.
- Oral polio vaccine: Adverse reactions rarely occur.
- Measles vaccine: Adverse reactions include fever, mild rash, and rarely convulsions and encephalitis.
- DPT (diphtheria, pertussis, tetanus): Most adverse reactions are attributed to the pertussis component. Minor reactions include pain at the injection site and fever. Major reactions are persistent crying, high pitched cry, excessive somnolence, convulsions, encephalopathy, and coma.
- Recombinant DNA Hepatitis B vaccine: Side effects include pain, fever, and swelling at the site of injection.

44.2 Immunization Types and Schedules

Kenya's national immunization schedule specifies both the schedule of vaccines (Table 44.1), and the dosage and mode of administration (Table 44.2).

Table 44.1: Childhood immunization schedule in Kenya (KEPI)

Vaccine	Age	Remarks
BCG Polio (OPV 0)	At birth Birth dose	Or at first contact with child.
DPT_1-$HepB_1$ -Hib_1, oral polio (OPV 1)	6 weeks (1½ months)	Or at first contact with child after that age.
DPT_2-$HepB_2$ -Hib_2, Oral polio (OPV 2)	10 weeks (2½ months)	4 weeks after DPT 1 and OPV 1 can also be given anytime after this period, when in contact with the child.
DPT_3-$HepB_3$-Hib_3, oral polio (OPV 3)	14 weeks (3½ months)	4 weeks after DPT 2 and OPV 2; can also be given any time after this period, when in contact with the child.
Measles	9 months	May be given between 6 and 9 months if child is admitted to hospital for any other illness. Repeat at 9 months as per KEPI schedule.

44.2.1 VACCINES AVAILABLE BUT NOT YET IN KEPI PROGRAMME

The following are beneficial, though not yet mandated.
- Pneumococcal vaccine: There are 2 types of pneumococcal vaccine:
  - Conjugate vaccine (PCV), which can be given at 6, 10, and 14 weeks together with DPT-HepB-Hib. When this is available it should be given to all children.
  - Polysaccharide vaccine, which can be given to any person aged 2 years and above. This vaccine is recommended to be used for high risk people with following conditions:
    – Sickle cell disease and any person who has had splenectomy
    – Immune deficiency states such as HIV, malignancy, congenital immune

deficiency, transplant patients, or any person on high dose corticosteroid therapy
  - Chronic cardiac or pulmonary diseases
  - Diabetes mellitus
- MMR (measles, mumps, rubella): Given at 12–15 months.
- Influenza vaccine: Check type available, as some are suitable for persons over 12 years and others can be used from 6 months.
- Meningococcal vaccine: Polysaccharide type for age >2 years is often used to control epidemics. A conjugate type is currently available in developed countries.
- Hepatitis A: Not yet routinely given, but can be given to special high risk groups including patients with clotting factor disorders, at risk of occupational exposure, or during an outbreak.
- Hepatitis B (not combined): Can be used at birth or outside the age when the combined vaccine is not recommended.
- Rabies vaccine (see below).
- Varicella vaccine (live attenuated): Can be given simultaneously with MMR. Can be given either routinely to all children, or post exposure to high risk groups – immunocompromised patients without history of having had varicella infection. For cancer patients it is best given during remission.
- Rotavirus vaccine: Recommended for children from 6 months.
- Acellular pertussis vaccine: In combination with tetanus, diphtheria, etc.

Table 44.2: Vaccine dosage and route of administration

Vaccine dose	Route of administration
BCG* Child under 1 year, 0.05ml Child over 1 year, full dose, 0.1ml	Intra-dermally into upper outer part of left forearm, at the junction of the upper and middle thirds. If given correctly a small weal appears at the site of the injection. Inform the mother that a small sore will appear in 2–6 weeks. Let this heal by itself. It will leave a small scar. If no reaction develops, the vaccination should be repeated after 3 months except in HIV infected children.
Polio (OPV)* 2 drops by mouth. Follow manufacturers' instructions on dosage	Read the instructions on the bottle. Give vaccine by mouth. Use dropper provided. If child spits or vomits repeat the dose.
Pentavalent vaccine consisting of DPT- HepB-Hib 0.5ml	Intramuscularly in the upper outer part of the thigh.
HepB 0.5ml – child 1.0ml – adult	Intramuscularly in the upper outer part of the thigh for child and deltoid (left) for adult
Measles* 0.5ml	Subcutaneously or intramuscularly in upper outer part of the arm (deltoid muscle)
Tetanus toxoid (TT) 0.5ml	Intramuscularly in the outer part of the upper-arm (deltoid muscle)

* = Live vaccine

44.2.2 IMMUNIZATION SCHEDULE FOR PREGNANT MOTHERS WITH TETANUS TOXOID (TT2+)

1st dose with first pregnancy or subsequent pregnancy
2nd dose – 4 wks after first dose
3rd dose – 6 months after 2nd dose
4th dose – at least 1 year after the third dose
5th dose – at least 1 year after the fourth dose

A total of 5 doses is recommended during a woman's reproductive age. The 3rd, 4th, and 5th doses can be given in subsequent pregnancies if not given as suggested above. Immunizing a pregnant mother ensures protection of her newborn baby against tetanus.

44.2.3 VITAMIN A SUPPLEMENTS

Strictly speaking, vitamin A is not a vaccine, but it is an important immune booster. It is currently recommended to be given to all under-5 children (see Table 41.3 for dosage schedule).

Table 44.3: Vitamin A supplementation schedule

Dosage (in IU)	When to give
<6 months – 50,000 6–12 months – 100,000 >12 months – 200,000	A dose can be given to a non-breastfeeding baby in the first 6 months. Otherwise first dose is at 6 months then every 6 months (twice per year) up to the age of 60 months. All mothers are given 200,000IU immediately after birth or within first month of delivery.

44.2.4 IMMUNE GLOBULINS (PASSIVE IMMUNIZATIONS)

These may be non specific or specific and are given either IM or IV.

- Non specific immunoglobulins: Can be used as replacement in individuals with antibody deficiency disorders.
- Specific immunoglobulins: Prepared from donors known to have high antibody to specific antigens or specific sources. Very useful in post exposure prophylaxis. Examples include rabies, varicella, and RhO (D) immune globulin (anti D).

44.2.5 RABIES

Any mammalian animal may carry rabies. Saliva from a rabid animal contains large numbers of the rabies virus, which is inoculated through a bite or any laceration or break in the skin. For more details refer to Chapter ## in Part I of these guidelines.

Management

Emergency care for a suspected rabid bite includes the following:

- Thorough irrigation of bite with copious amounts of saline solution
- Cleansing the bite with a soap solution

- Debridement of the bite area
- Administration of antibiotic
- Administration of tetanus toxoid
- Delayed suture or skin grafting
- Infiltrate the wound with rabies immunoglobulin

Indications for rabies vaccine are the following:
- Bites from wild animals
- Bites from UNPROVOKED domestic animal
- Bites from a sick looking domestic animal, whether immunized or not
- Laboratory findings of Negri bodies in the brain of the involved animal
- Persons at high risk of exposure

☛ ***Always refer as soon as possible to a centre that can vaccinate.***

PART III
Surgery and Related Disciplines

IN THIS SECTION:

45. Anaesthesia and Critical Care

45.1 Preoperative Patient Evaluation

A patient for elective surgery needs thorough evaluation not only for suitability for general anaesthesia but also for possible complications related to or arising from the operation (e.g., a toxic goitre, chronic cough in a hernia patient). Surgical services should ideally be carried out only at level 4 facilities and above. The staff needs to appreciate the abilities of the facility so that high risk procedures are referred to facilities with an ICU available unless they are urgent.

45.1.1 HISTORY

A thorough history must be taken. This should include a history of chronic illnesses, a drug history, and a history of previous surgical encounters.

45.1.2 EXAMINATION

- Conduct a thorough physical examination and in particular check for:
  - Anaemia
  - Jaundice
  - Level of hydration
  - Fever
  - Lymph node enlargement
  - Respiratory and cardiac function
- Assess psychological preparedness for surgery.
- Take and record vital signs must be. For any major operation an observation chart needs to be kept for at least 24 hours before surgery. Specific charts are available for certain disease conditions, e.g., diabetes, hypertension, asthma, etc.

45.1.3 BASIC INVESTIGATIONS

These should include the following:

- Urinalysis.
- Full haemogram.
- Urea and electrolytes.
- Blood sugar.
- A chest radiograph is useful.
- Additional relevant investigations relevant to the diseased system:
  - Urine for culture and sensitivity.
  - An intravenous urography in most urological operations.
  - Liver function tests and prothrombin time index (PTI) in hepatobilliary disease.
  - Creatinine clearance in renal patients.
  - Electrocardiogram (ECG) in hypertensive and known heart patients.
  - A thyroid profile may be necessary before thyroid surgery.

45.1.4 TREATMENT – SUPPORTIVE BEFORE SURGERY

These include the following:

- Correction of conditions that are identified in the preoperative evaluation as necessary.
- Correction of volume and electrolyte imbalance.
- Control of blood pressure.
- Control of thyrotoxicosis.
- Control of diabetes mellitus (and any other metabolic disease).
- Correction of anaemia and malnutrition.
- Prophylactic antibiotics where indicated (see appropriate section for details).
- Preoperative physiotherapy.
- Counselling the patient and family.

45.1.5 PREMEDICATION

These are prescribed to surgical patients in order to achieve the following objectives:

- Relieve anxiety (oral/parenteral benzodiazepines)
- Antiemetics like metoclopropamide (plasil 5–10mg).
- Reduction of secretions (anticholinergics like atropine 0.6mg hyoscine 10–20mg).
- Preoperative analgesia (pethidine 1mg/kg).
- Amnesia (benzodiazepines).
- Reduce gastric fluid pH and volume – Ranitidine 50mg IV

45.2 Use of Blood Transfusion in Surgery

The golden rule of blood transfusion should be that no transfusion is given unless the benefit of the transfusion outweighs the risks. Before all blood transfusion, therefore, there must be a balance among the risks associated with transfusion, the indications for transfusion, and the availability and benefit of using alternatives to conventional transfusion. The following is a listing of risks, indications and alternatives to traditional transfusion.

- Risks associated with transfusion
  - Viral infections
  - Bacterial infections
  - Compatibility complications
  - Heamodynamic complications.
- Indications for transfusion
  - Transfuse blood intra-operatively for preoperative haemoglobin less than 6.0g/dl
  - Transfuse blood for haemoglobin of 6–10gm% with obvious continuing blood loss or obvious morbidity like heart disease.
  - Transfuse blood for blood loss of 10% of blood volume or more.
  - Avoid “topping-up” anaemic patients prior to surgery.
- Alternatives to conventional transfusion
  - Autologous donation is frequently used in patients for elective surgery. A pint of blood is removed every 7 days prior to surgery and is re-transfused at the

time of surgery. This blood can safely be stored for 21 days. It is important to liaise with the blood donor bank to ensure that the patient gets own blood.
- Intraoperative haemodilution where a unit is withdrawn and replaced with saline. This can be set aside for re-transfusion as needed.
- Another alternative, for level 5 and 6 facilities, is the use of cell savers during surgery as for example during abdominal aortic aneurysm surgery.
- Strictly observe all precautions that appertain to blood transfusions.
- Do not correct postoperative anaemia with transfusion if there is no active bleeding or shock. Transfusion is discussed in paediatric and medicine chapters.

45.3 Antimicrobial Prophylaxis in Surgery

Antimicrobial prophylaxis can decrease the incidence of infection, particularly wound infection after certain operations, but this benefit must be weighed against cost, risks of toxic or allergic reactions, and emergence of resistant bacteria. The administration of antibiotic agents to prevent infection cannot be substituted for either sound surgical judgment or strict aseptic technique.
Surgical wounds may be designated as clean, contaminated, or dirty, as described below:
- Clean wounds: Chemoprophylaxis has no place in clean operative procedures.
- Contaminated wounds: This category includes operations involving, for example, the interior of respiratory, urinary, or gastrointestinal tracts. Chemoprophylaxis may be useful in such situations.
- Dirty wounds: These include most traumatic wounds, which are highly contaminated. In such situations, a thorough surgical toileting is necessary, apart from chemoprophylaxis. Other highly contaminated wounds involve operations on the large intestines and severe burns.

Other risk factors in the development of infection include the development of infection secondary to malnutrition, impoverished blood supply, obesity, old age, and immunodeficiency states.

45.3.1 OTHER INDICATIONS FOR PROPHYLAXIS

These include the following:
- Operative procedures of long duration, such as cardiac and vascular procedures, orthopaedic, and neurosurgical procedures.
- In clean surgeries for insertion of a prosthesis or graft material.

45.3.2 PROPHYLACTIC TREATMENT

- A single dose of parenteral antimicrobial given with induction of anaesthesia before an operation usually provides adequate tissue concentrations for several hours.
- Or 3 doses cover of the same antibiotic for 24 hours.

45.4 Postoperative Care

The aims of postoperative care are to:
- Monitor the patient's postoperative period to detect and correct any anomalies.
- Keep the patient comfortable and give adequate analgesia. Rectal diclofenac 100mg (adults), paracetamol for children or pethidine 1mg/kg TDS.
- Offer supportive feeding.
- Restore normal health and independence.

To achieve the above, the surgeon must give legible, concise, and clear postoperative instructions and involve other team members like physiotherapists in the management of the patient.

45.4.1 IMMEDIATE POSTOPERATIVE RECOVERY PHASE

This period normally lasts about 1–2 hours from theatre to that period in the recovery ward, where facilities allow. During that period, the following are carried out:
- Keep the patient in semi prone position with extended neck and flexed limbs.
- Maintain clear airway using oropharyngeal airway and provide supplemental oxygen till fully awake.
- Monitor vital signs 1/2 hourly.
- Keep in recovery ward till fully awake (arousal).

45.4.2 TRANSIT FROM THEATRE TO WARD

- During this process, keep airway clear to avoid upper airway obstruction and aspiration pneumonitis. Use recommended trolley with side rails.

45.4.3 POSTOPERATIVE CARE IN FIRST 24 HOURS

This involves the following procedures:
- Continue observing vital signs 4 hourly or as often as individual case demands.
- Relieve pain with analgesia, e.g., pethidine 50–100mg every 6 hours in adults and in children 1mg/kg in divided doses or use infiltration method at the operative table as for example intercostals infiltration in thoracotomies.
- Transfuse if necessary.
- If not feeding, give intravenous fluids, Hartmann's, normal saline, or 5% or 10% dextrose about 4 litres in 24 hours for a 70kg adult. Titrate against state of hydration.
- Maintain an input and output chart (urine output 1–2ml/kg/hour).
- Watch for airway obstruction, reactionary bleeding, etc.
- Attend to drains if in situ and make sure they are draining.
- Offer general nursing care, e.g., keep patient warm, turn in bed, and change wet linen to avoid bed sores.
- Carry out appropriate wound care.

45.4.4 POSTOPERATIVE PERIOD 72 HOURS – 7 DAYS

During this period, the following procedures are carried out:

- Mobilize out of bed after about 18–72 hours to avoid static pneumonia and thrombosis.
- Encourage independence, e.g., self feeding, attention to calls of nature.
- Give oral medication as appropriate.
- Take observations every 6 to 12 hours.
- Carry out wound care as appropriate.

45.5 Theatre Etiquette

In order to attain optimal results, a doctor operating in theatre is expected to maintain the following "rules":

- Be involved in the preoperative selection and preparation of patients including obtaining of informed consent.
- As the team leader, maintain strict time discipline and other aspects of good leadership.
- Be familiar with any problems with the theatre set up for the day well in advance.
- Accord respect to all team members.
- Observe the required sterility requirements in theatre.
- Observe the required health and safety rules while operating.

☛ **In our environment it is mandatory to wear eye goggles and aprons to avoid the dangers associated with blood splashes.**

- Operate in the safest environment and not allow attention to wander during surgery.
- Observe silence and as much as possible avoid discussions not directly related to the surgery.
- Make sure to write own operating notes, or if delegated, make it a point to confirm what has been documented.
- Ensure anaesthetic notes are complete and accurate.
- Do not leave the theatre before the patient unless care has been delegated to another competent doctor.
- Follow up the patient till the time of discharge.
- Conduct regular audits of the surgical team's work.

45.6 HIV/AIDS and the Surgeon

The HIV/AIDS disease in Kenya is currently affecting all age groups, including teens. It is important for a surgeon to appreciate the varying surgical presentations this disease has.

Strict surgical barriers must be implemented at all times to avoid spreading of the disease between the patient and the surgeon. This can be achieved through

community dissemination of knowledge, individual or group counselling, knowledge skills, and the use of physical barriers like double gloving, gowns, and surgical goggles.

The surgeon should always be on the lookout for signs of possible HIV infection in the patient; these include:
- Wasting
- Enlarged nodes
- Skin lesions like Kaposi's sarcoma or herpetic rash
- Oral and oesophageal lesions
- Pulmonary lesions
- Other gastrointestinal lesions

Counselling of both the patient and the relatives is important and an assessment of the suitability of the patient for surgery. The CD4 cell count is a useful indicator of perioperative risk.

This topic is dealt with in detail the chapters for Internal Medicine, Paediatrics and Obstetrics and Gynaecology.

46. Abdominal Injuries

Injuries to the spleen, liver, bladder, gut, etc., are not an uncommon cause of preventable death and their proper clinical assessment is vital. The spleen, liver, retroperitoneum, small bowel, kidneys, bladder, colorectum, diaphragm, and pancreas tend to be the most commonly injured organs.

Signs and Symptoms of Blunt Injuries
Abdominal injuries can be masked by injuries elsewhere, e.g., fractured limbs, fractured ribs or spinal cord, and head injuries, and may also develop slowly. If a patient has multiple injuries, assume the abdomen is involved until this is ruled out. Organomegaly makes the involved organs more vulnerable to abdominal trauma, so be cautious with children with pretrauma splenomegaly.

☛ **Unexplained shock in a trauma patient should point towards an intra-abdominal bleed.**

Clinical Features
Of important value are the vital signs (pulse rate, blood pressure, respiratory rate, temperature). There may be obvious bruises or abdominal wall wounds. Pain, localized tenderness, or rigidity of the abdominal wall indicates the most likely site of injury. Abdominal distension could be due either to gas leaking from a ruptured viscous or from blood from injured solid organ(s) or to torn blood vessels. This is a serious sign. Haematurea occurs in bladder injuries and haematochezia in rectal injuries.

The absence of bowel sounds or sustained shock despite resuscitation mandates urgent surgical intervention.

Investigations

- Plain abdominal and chest x-rays may show existing fractures, foreign bodies, gas under the diaphragm, or bowel loops in the chest. Order abdominal ultrasound or CT scans as applicable.
- Total blood counts are useful for serial assessments.
- Group and cross-match blood if intra abdominal bleed is suspected.
- Bloody nasogastric aspirate may indicate upper gastrointestinal tract injuries.
- Peritoneal lavage is indicated in the following patients:
  - Patients with spinal cord injury.
  - Those with multiple injuries and unexplained shock.
  - Obtunded patients with a possible abdominal injury.
  - Intoxicated patients in whom abdominal injury is suggested.
  - Patients with potential intra-abdominal injury who will undergo prolonged anaesthesia for another procedure.
- Where available abdominal ultrasound is a useful diagnostic tool

Management

- Maintain airway and breathing.
- Is your patient in shock? (Has low BP, high pulse rate, cold clammy extremities, etc.) Take blood sample for later grouping and cross matching and transfer sample with patient.
- Clean, stitch, and dress small superficial wounds, but do not let this adversely delay referral. Management at level 2 and 3 is limited mainly to patient resuscitation in order to stabilize patient.
- Give tetanus toxoid 0.5ml STAT.
- Start antibiotics crystapen 1g QID + metronidaxole 400mg TDS IV as appropriate.
- Keep patient warm.
- Closely monitor BP, pulse rate, respiratory rate, temperature, and urine output.
- Measure abdominal girth, as this may prove useful in follow up of patients' progress.
- If not sure of wound depth, explore the wound directly under local anaesthesia.
- Explore penetrating wounds early.
- In blunt trauma, manage according to clinical findings and how they evolve over time. Mild symptoms are managed conservatively, while deterioration is managed by exploration.
  - Indications for laparotomy in blunt trauma include:
    - Persistent abdominal tenderness and guarding.
    - Persistent unexplained shock
    - Paralytic ileus
    - Positive radiological or ultrasound findings of pneumo-peritoneum or multiple air-fluid levels
    - Positive peritoneal lavage or ultrasound findings
  - Manage specific organ injuries at laparotomy.

- Inform receiving facility when the referral has left the referring facility as trauma needs urgent attention on arrival.
- At discharge, provide adequate documentation to be sent back to referring facility.

47. Animal and Snake Bites

These include bites by humans, dogs, and other domestic animals, as well as wild animal bites.

Management
This will depend on the extent of tissue loss and the site of injury. Most bites consist of cuts and simple lacerations. Other animals (hippopotamus and crocodiles) inflict major tissue destruction (lacerations, avulsions, and amputations).

Immediate Care
If not already acted upon at lower health facilities, stop all bleeders by pressure and ligature while preparing for thorough toileting. Administer a pain reliever, e.g., pethidine 100mg IM for an adult.

Local Care
- Clean cuts and lacerations thoroughly with chlorhexidine 5% or hydrogen peroxide 6%. Hydrogen peroxide is indicated for septic wounds only. One may use detergent only and dress.
- Update tetanus toxoid 0.5ml IM STAT immunization.
- Give analgesia as appropriate, e.g., ibuprofen 400mg TDS.
- Give amoxicycllin 500mg TDS (25–50mg/kg) + metronidazole 400mg TDS for 5 days.
- Give rabies vaccine where indicated (Section 1.4.2, on rabies management.)
- Give antivenin for snake bites in appropriate cases.
- Consider urgent referral if rabies vaccine or anti snake venom is not available in facility. Ensure adequate documentation and availability of resuscitation equipment during the actual referral phase.
- For large bites, carry out surgical toileting under anaesthesia. DAILY dressing is advised and later skin grafting or flap repair is performed. Open chest injuries will require closure and underwater seal drainage. Open abdominal wounds will necessitate an exploratory laparotomy.
- In the case of amputated extremities, carry out toileting and stump refashioning where necessary followed by appropriate rehabilitation.
- Should the patient be in shock, treat aggressively with saline infusions, blood transfusions, and vasopressor agents
- In major tissue destruction, administer antibiotic, e.g., crystalline penicillin 1g 6 hourly, gentamicin 80mg TDS, and metronidazole 400mg TDS for 7 days; piperacillin 2g TDS is an alternative. This will cover for clostridium, Gram-negative, and anaerobic bacteria, which colonize the mouths of most animals.

48. Burns

The majority of burns are caused by heat, which may be open flame, contact heat, and hot liquids (scalds). Others are chemical, electric, friction, sunburns, and irradiation. Extreme cold can cause tissue injuries (i.e., frost bite).

48.1 Initial Management of Burn Cases

48.1.1 FIRST AID MEASURES

If not acted on at lower level, initiate the following management plan:

- Airway: Ensure patient has a clear air way for example by suction of oral airway, endotracheal intubation and tracheostomy.
- Breathing: Ensure patient is breathing and receiving oxygen by mask if need be.
- Circulation: Ensure adequate intravenous access and availability of intravenous crystalloids; group and cross match blood.
- Give tetanus toxoid and analgesics.

48.1.2 QUICK ASSESSMENT OF THE EXTENT OF BURNS

- Degree of burn:
  - First degree: Epidermis only involved.
  - Second degree: Epidermis and portions of dermis involved.
  - Third degree: All skin layers, including the subcutaneous tissue are involved.
- Special sites of injury (note facial, perineal, hands, and feet).
- Look out for circumferential burns on extremities.
- Other injuries (e.g., fractures, head injuries, chest injuries, abdomen, etc.).
- The Wallace Rule of Nines (see Figure 48.1) is used to estimate the extent of burns
- Admit if meets admission criteria.

☛ **Initiate fluid management schedule.**

48.1.3 CRITERIA FOR ADMISSION

- Extent of burns: Are >10% body surface area. If the extent is > 25% of body surface area, transfer to special burns unit.
- Burns to the following burn areas:
  - Hands and feet
  - Face and neck
  - Perineum
  - Joints and other associated injuries
- Inhalational burns.
- Chemical and electric burns.
- In the presence of other known pre-existing diseases, e.g., diabetes mellitus.

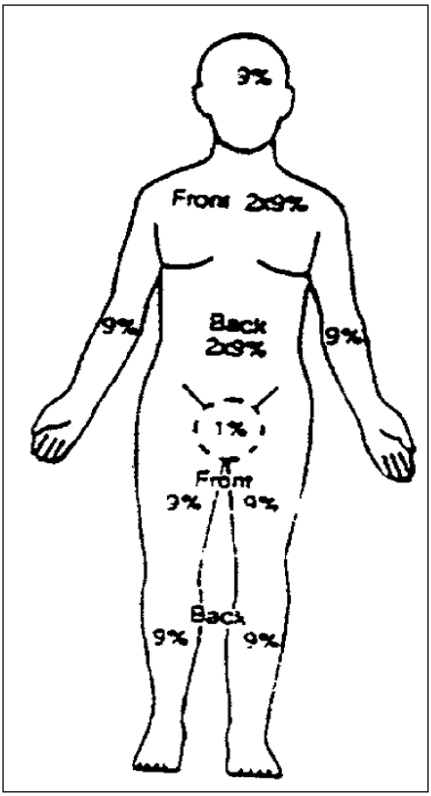
48.1.4 REFERRAL PROCEDURES

- Ensure adequate documentation at the first contact with the patient. During referral it is important for resuscitation to continue and to provide an appropriate escort during transportation. The following needs to be observed during referral of the patient:
  - The patient is covered with dry sheet.
  - The patient is kept warm.
  - The patient received appropriate analgesics.

At the receiving facility:

- Reconfirm the examination findings at the earlier facility if referred.
- Re-evaluate the extent of the burns using the Wallace rules of nine for adults (Figure 48.1).

Figure 48.1: Evaluating the extent of burns using the Wallace Rules of Nine



48.2 Fluid Therapy

Fluid administration is the mainstay of burn treatment and is life saving. Quick vascular access is mandatory. Do not waste time on collapsed peripheral veins; urgently perform a cut down to facilitate fluid therapy. See details below for fluid management schedule.

Re-evaluate the extent of the burns using the Wallace rules of nine for adults (Figure 48.1) to guide the administration of fluid.

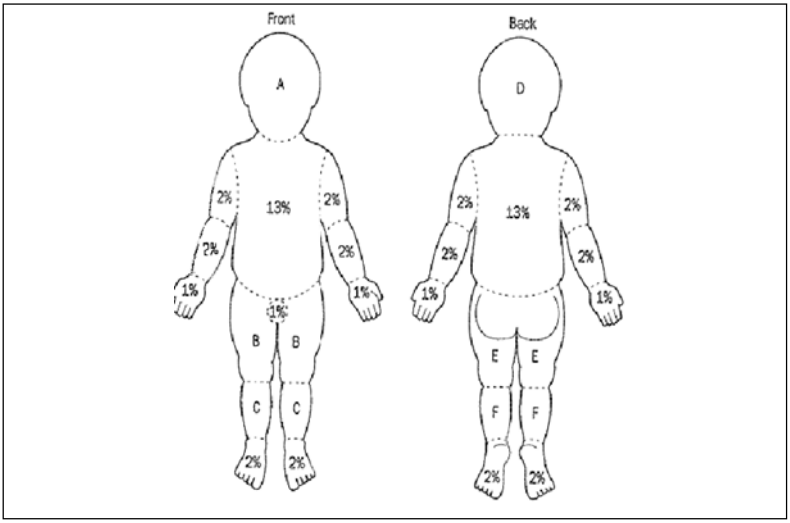
48.2.1 BODY SURFACE AREA ESTIMATION IN ADULTS

"Rule of nines" is used for estimating the extent of a burn surface area in adults. By adding the affected areas together the percentage of the total body surface burnt can be calculated quickly.

48.2.2 BODY SURFACE AREA ESTIMATION IN CHILDREN

Note that the body surface area distribution in children is different to the adult and is continuously changing with growth. Figure 48.2 should be seen in conjunction with Table 48.1, which will assist in body surface area estimation for the different age groups in children.

Figure 48.2: Body surface area estimation in children



It is safer to overestimate body surface area than to underestimate it. A useful rough guide is to estimate the palm of the hand excluding the fingers as being approximately 1%. The total body area is critical to the fluid management of the burn patient.

Table 48.1: Change in body surface area with growth

Body area	< 1 yr (%)	1 yr (%)	5 yr (%)	10 yr (%)	15 yr (%)
Head (A/D)	10	7	7	6	5
Thigh (B/E)	3	3	4	5	5
Leg (C/F)	2	3	3	3	3

48.2.3 AMOUNT OF FLUIDS TO BE ADMINISTERED

Calculation Using the Parklands Formula

- 4 x Total body surface area burnt x weight in Kg = ml of fluids to be administered within the first 24 hours from the time of the burns.
- The total fluids calculated should be administered as indicated below:
  - First 8 hours from the time of burns = 1/2 total calculated fluid
  - Next 8 hours = 1/4 total calculated fluid
  - Next 8 hours = 1/4 total calculated fluid
- As an example, for a 80kg man with 20% burns, total fluid (80kg x 20% x 4) ml = 6400ml. Administer as follows:
  - 3,200ml within the first 8 hours
  - 1,600ml next 8 hours
  - 1,600ml over the next 8 hours

Other Fluid Management Considerations

For management of a person with burns, the following is necessary:

- Types of fluids to use these should either be normal saline or Hartman's solution
- Monitoring should be carried out for vital signs, urine output (maintain at least 1–2ml/kg/hr) and packed cell volume.
- Care of the burn surface includes the following:
  - Cleaning with clean water, antiseptics or normal saline
  - Applying antiseptic cream like silver sulphadiazine and nursing wounds exposed and using a cradle.
  - Using a moist plastic bag for burns of the hands and feet after antiseptic cream application.
  - Early surgical debriding of dead, burned tissue and skin grafting for extensive burns.
- Pregnant females are more prone to the effects of burns than non pregnant females. For pregnant women with burns observe the following:
  - Prompt and aggressive fluid management is essential.
  - Pregnancy is associated with a 50% increase in intravascular volume as well as a 43% increase in cardiac output.

☛ These factors in addition to others make ***pregnant women more prone to fluid loss associated with burns***. As a result, a pregnant woman will not likely conform to the Parklands fluid replacement formula and may need up to twice this volume. In fluid resuscitation for these patients variables like urine output, heart rate, central venous pressure, and mean arterial pressure are more reliable indicators of successful resuscitation.

- Types of fluids used for treating burns include the following:
  - Crystalloids
  - Normal saline
  - Ringer's lactate solution (use with caution in patients who have associated metabolic acidosis following burns)
- The type of monitoring required for patients with burns includes the following:
  - Vital signs
  - Urine output (maintain at least 1–2ml/kg/hr)
  - Urea and electrolytes
  - Packed cell volume

48.3 Special Burns

48.3.1 TYPES OF BURNS

- Circumferential burns: If this leads to compartment syndrome, an escharotomy should be performed.
- Inhalational burns: Should be suspected if there are burned lips and/or burned nostrils, especially in cases of open fires and smoke. Give humidified air and oxygen, bronchodilators. and appropriate antibiotics. Intubation may be necessary.

- ***For pregnant females with burns,*** early intubation and mechanical ventilatory support is strongly recommended if inhalation burn injury is suspected due to risk of tracheal oedema. Both the functional residual capacity and the residual volume are decreased by 20% in pregnancy, making ventilatory support particularly important.

- Electrical burns: These are deep burns, and require specialized care.
- Chemical burns: To manage these types of burns, irrigate with plenty of water and soap.

48.3.2 MANAGEMENT OF ELECTRICAL BURNS

Low voltage electrical injury tends to be associated with electrocution (cardiac arrest), while high voltage burns are associated with extensive tissue destruction rather than electrocution. The body tissues most vulnerable to electrical injury are peripheral nerves and skeletal muscles.

- Injury from electrical burns occurs through two main avenues:
  - Electric shock resulting in cardiac arrhythmias and muscle spasm.
  - Thermal injury resulting in muscle destruction.
- Diagnosis of electrical burn can be made on the basis of:
  - History of contact.
  - Presence of 2 contact injury points on skin.
  - Presence of cardiac arrhythmias and respiratory disturbances.
  - Presence of skeletal fractures secondary to muscles spasms.
- Management at levels 4 to 5:
  - Resuscitate as appropriate.
  - Maintain a fluid balance and urine output.
  - Initiate or continue analgesia. For severe burns, give morphine 10mg IV 6 hourly.
  - If more specialized treatment is needed refer to burns unit.
- At level 6 (burns unit):
  - Cardiovert if needed. Cardioversion may be electrical or chemical.
  - Maintain adequate urine output, more than 50ml/hr, but raise to more than 100ml/hr to avoid renal failure secondary to myoglobinaemia.
  - Give anti arrhythmic drugs if needed.
  - Administer tetanus toxoid as in all burns.
  - Look out for compartment syndrome.
- The rest of the treatment plan will follow in a similar fashion to other burns.
- Skin grafting shortens the duration of hospital stay and should be performed early when necessary.
- Start physiotherapy and occupational therapy early.

48.4 Mortality Risk From Burns

Improvements in wound care and the use of antibiotics have had an influence on the survival following burns. However, the risk of mortality is directly related the body surface area that is burned. Other relevant independent factors influencing mortality are the HIV status of the patient and the presence of respiratory burns.

49. The Multiply Injured Patient

A patient injured in more than two body systems is defined as multiply injured. This situation commonly occurs in road traffic accidents, falls from a height, blast injuries, etc. The approach to a patient with multiple injuries has to be systematic in order to identify all the injuries and prioritize their sequence of attention.

49.1 Resuscitation Required and Its Order

- Airway: Position the head and with finger or suction, clear blood, mucus, and foreign bodies. Take care to avoid causing cervical injury and apply cervical collar or use the jaw lift manoeuvre. Use log rolling procedure if it is necessary to reposition the patient in any way.
- Breathing: Check respiratory rate and air entry into the chest. If need be perform mouth to mouth respiration using a gauze or plastic sheet with hole inserted.
- Circulation: Stop active bleeding and monitor pulse rate and blood pressure; fix a large intravenous cannula preferably in the antecubital area. Perform a cut down if need be.
- Dysfunction of CNS: Assess neurological status, consciousness level, spinal cord, etc.
- Drugs, including fluids: Use these to correct acid base and volume imbalance.
- Exposure for examination: Disrobe the patient entirely and carry out a complete physical examination. Look for:
  - Chest injuries: For example, haemopneumothorax from whatever cause takes priority.
  - Head injuries: Require setting of baseline observations.
  - A patient in shock from non-obvious causes: This points towards the abdomen, suggesting visceral injury. It may be very unapparent and can be fatal.
  - Peripheral bone fracture: This may need stabilization initially and proper attention later.
- After resuscitation and stabilization: Carry out frequent and more thorough examinations.
- Give attention to:
  - Continued bleeding – Stopping it and transfusion; haemopneumothorax may need underwater seal drainage.
  - Persistent shock from unexplained source – May necessitate an exploratory laparotomy.
  - Fractures – Limb may need plaster of paris fixation; spine fractures need bed rest with fracture boards. X-rays of a patient with multiple injuries should be taken after adequate resuscitation. Exceptions are in the chest and cervical spine, which should be taken after initial resuscitation.
  - Acute gastric distension – Managed by nasogastric tube and suction of the same; the patient will require feeding to counter the catabolism associated with multiple injuries.

- Some of the injuries may require referral for more specialized care. This referral is executed ***after*** adequate resuscitation.

49.2 Chest Injury

49.2.1 PENETRATING INJURY

Common objects causing injury are knives, arrows, spears, and bullets. The objective of management is to restore normal anatomy or physiology resulting from the stab injury.

Investigations

- For the majority of cases, the chest radiograph alone is adequate.
- Specialized investigations are ordered where more detail required.

Management

- Clean wounds and apply clean dressing to wounds. Tetanus toxoid 0.5ml STAT.
- Make sure resuscitation measures continue during transportation.
- If the implement used during stabbing is still in situ, DO NOT remove. Advisable this be removed only in a controlled setting like in theatre. For referral, stabilize this by surrounding with heavy dressing or other cloth like material.
- If available, insert chest tube.
- Drain pleural collections using chest tube, which will suffice for most injuries.
- Conduct surgical intervention to stop bleeding that continues, or correct significant anatomical or physiological anomalies. (This is applicable for only about 5% of cases.)

49.2.2 SIMPLE RIB FRACTURES

This is a break in the continuity of a rib(s). Could be traumatic or pathological. Types of fractures can be crack fracture(s), single or multiple fractures with fragment displacement, and segmental fracture(s).

Clinical Features

- There is history of trauma. Pain on breathing or movement. Evidence of chest trauma. Crepitus at the fracture site or tenderness. May have signs of associated haemo-pneumothorax, subcutaneous emphysema.
- Caution: The chest injury may be associated with splenic or liver injury, especially with higher and lower rib fractures.

Investigations

- Physical examination
- Chest radiograph; oblique views may be necessary

Management

- Oxygen: Supplement if signs of respiratory distress are present.
- Analgesia: Administer pethidine and 2% lidocaine 2–5ml directly into fracture site; repeat once daily or after 3 days.

- Chest drainage: Insert tube as indicated. Admit patient for observation if fractures of the first rib and those of the 8th rib and below are present.
- Antibiotics: Give flucloxacillin 500mg QDS. For children less than 2 years give quarter adult dose; for older children, half adult dose. Antibiotics given because of the associated atelectasis. Mucolytic drugs, e.g., carbocisteine 750mg TDS for adults; children 2–5 years 62.5–125mg QID, while 6–12 years 250mg TDS.
- Manage associated conditions.
- Initiate chest physiotherapy.

49.2.3 FLAIL CHEST

This occurs when multiple fractures are sustained with more than one site per rib. The main danger is that the patient may lapse into respiratory failure.

Clinical Features

The features include the following:

- Chest pain
- Paradoxical chest movement
- Dyspnoea may be present
- Evidence of fractured ribs
- Haemothorax or pneumothorax or both

Investigations

- Chest radiograph

Management

- Splint the flail segment.
- Administer analgesia. Make sure no neurological deficit is present.
- Restrict fluids to avoid development of adult respiratory distress syndrome.
- Observe for respiratory failure: If it develops, transfer patient to ICU. If no respiratory failure results, continue with conservative management in general wards.
- At referral centre if referred to ICU: Carry out intubation with positive end expiratory pressure (PEEP) applied.
- Best facility to refer: Best managed at level 5 and above where possible use of ICU will be available.

49.2.4 PNEUMOTHORAX

This occurs when air enters the plural space, causing lung collapse on the affected side. Causes include spontaneous development following staphylococcal pneumonia due to chronic obstructive pulmonary disease. Pneumothorax may also be caused by blunt trauma with rib fractures and or lung contusion, penetrating injuries, stab wounds, and missiles.

Clinical Features

There is shortness of breath, tightness of the affected chest, tachypnoea, and tachycardia. Sweating and cyanosis may be present. Reduced chest excursion

also occurs, with reduced air entry on auscultation. Hyper-resonant chest is noted on percussion.

Investigations
Chest radiograph: Shows various degrees of lung collapse.

Management
- If more than 5% pneumothorax, institute tube thoracostomy drainage (underwater seal drainage); ***maintain absolute sterility while performing the procedure.***
- Chest tube may be removed when the lung is fully expanded and remains fully expanded after test clamping the chest tube for a number of hours.
- Tension pneumothorax needs more rapid treatment with immediate insertion of a wide bore cannula drainage or underwater seal drainage under local anaesthesia.

☛ **Tension pneumothorax is a clinical diagnosis and not a radiological diagnosis. Ordering a chest radiograph may result in patient death before active treatment can be implemented.**

- An associated frail chest leads to paradoxical breathing and may require assisted ventilation (i.e., intermittent positive pressure ventilation), if features of respiratory failure develop.

49.2.5 HAEMOTHORAX

This occurs when blood collects in the pleural space. Haemothorax may vary in amount from small to massive collections. Causes include trauma, post surgical bleeding, and tumours of the chest cavity and chest wall.

Clinical Features
Depending on the magnitude of the blood collection, there could be hypovolaemic for massive bleeding, or symptoms similar to those associated with pneumothorax, except for the percussion note, which is dull for haemothorax. However, haemopneumothorax is the more common presentation following chest trauma.

Investigation
Chest radiograph.
Erect posteroanterior view and lateral
Look for fractured ribs, collapsed lung(s), fluid collection in the pleural space (air-fluid level), position of mediasternum, and diaphragm.
Specialized tests as needed.
Other tests relevant to primary underlying cause of the haemothorax.

Management
- Resuscitation if needed
- Small haemothorax (blunting of the costophrenic angle), will resolve spontaneously. Conservative management with daily reviews.

- Large haemothorax will require underwater seal drainage.
- Physiotherapy as needed.
- For large clotted haemothorax, perform thoracotomy to drain clot or refer to a more specialized unit.
- Look at the primary problem
  - For a fracture of rib, inject 2% lidocaine about 2–5ml intercostal block.
  - Advanced malignant disease, coagulopathy, etc., will need to be appropriately managed.

49.3 Maxillofacial Injury

This injury can present with an apparently frightening clinical picture. Do not panic! Traumatic injuries to the facial structures may be classified as:
- Soft tissue injuries ± tissue loss
- Hard tissue injuries ± bone loss
- Combined soft and hard tissue injuries

Management
The management principles of maxillofacial injuries are:
- Advanced trauma life support (ATLS) principles (ABCDE)
- Restore occlusion
- Restore function
- Restore aesthetics
- A thorough history and examination is paramount to the management of maxillofacial injuries.

☛ ***Patients with maxillofacial injury require immediate referral to higher levels for appropriate management.***

ATLS
Primary Survey
- Airway + cervical spine control: Note that maxillofacial injuries both soft tissue and hard tissue may compromise the airway.
  - If palate is collapsed on roof of mouth, scoop with finger and try to elevate.
  - If tongue is pushed back in direction of pharynx, pull forward with forceps.
  - Apply suture to hold in place if need be. Lay patient on the side.
  - With severe nose injury, suck to clear the blood and insert nasopharyngeal tube if need be. Take precautions as above for possible neck injuries.
  - If needed in very severe injury, perform tracheostomy with cuffed tube.
  - Apply local pressure or nasal packs soaked in liquid paraffin.
  - Perform direct suture of spurting bleeders.
- Breathing
  - Rule out other injuries such as head injury or chest injury that may impair breathing; relevant radiographs such as chest radiograph and CT scan of the head should be taken.
  - If the patient is not breathing or oxygen saturations are low, intubate and ventilate.

- For chest injury management, refer to Section 49.2, on chest injuries.

◆ Circulation
- Monitor vitals such as BP and pulse, which are pointers to impending or established shock; also monitor urine (insert a urinary catheter if the patient is unconscious).
- Give benzyl penicillin 2.4g IM 8 hourly + metronidazol 500mg IV 8 hourly until the situation is managed.
- Administer fluids to maintain haemodynamic stability.
- Monitor fluid management as above.
- Give tetanus toxoid 0.5ml IM stat.

◆ Disability
- Check for consciousness and other neurological deficits (Glasgow Coma Scale – GCS – and examination of all cranial nerves). Refer to Table 49.1.

Table 49.1: Glasgow Coma Scale

Serial No.	Category	Specific function	Score
I	**Eye opening (E)**	Spontaneous	4
	To voice	3	
	To pain	2	
	Nil	1	
2	**Best verbal response (V)**	Oriented, converses	5
	Converses but confused	4	
	Inappropriate words	3	
	Incomprehensible words	2	
	Nil	1	
3	**Best motor response (M)**	Obeys	5
	Localizes pain	4	
	Flexion withdrawal	3	
	Flexion abnormal	3	
	Extension	2	
	Nil	1	

Glasgow Coma Score
Score = E + M + V (the higher the score the better the prognosis).
Note: Trend is more important than present level of consciousness.

Resuscitation

◆ Arrange transport with adequate resuscitation equipment if at level 4. Ensure communication with receiving facility has been made.

Secondary Survey

At levels 5 and 6, management should be as above plus secondary survey to detail all injuries and to do specific investigations. This helps in prioritizing treatment.

Definitive Management

SOFT TISSUE INJURIES

As above plus:

- Tetanus toxoid 0.5ml IM STAT.
- Rabies vaccine in case of animal bites (refer to Section 1.4.2, on rabies management).
- Antibiotic therapy (refer to Section 51.2, on management of orofacial fractures in dental and orofacial conditions).
- Thorough debridement of necrotic tissues and surgical toilet; all vital structures that are injured such as the parotid duct, facial nerve, and naso-lacrimal duct should be repaired.
- Primary closure if there is adequate tissue for approximation; plan for wound cover with skin graft or flaps if there is tissue loss.

☛ **Always rule out underlying bone injury by taking appropriate radiographs.**

HARD TISSUE INJURIES

- These may be classified as:
  - Dentoalveolar
  - Mandibular fractures
  - Midface fractures (Le Forte I, II and III)
  - Panfacial fractures
  - The bones of the mid face tend to stick out and are thus prone to being injured. The nose, zygoma, and mandible are the most prone to injury, with maxillary bone injuries being relatively less common and more complicated.

DENTOALVEOLAR FRACTURES

This is more common in children but can occur in adults.

- Check for missing teeth/fragments/fillings to rule out inhalation (take chest x-ray, abdominal x-ray).
- For mobile teeth, rule out fractures of the root using radiographs such as intra-oral periapical (IOPA), upper or lower standard occlusal or an orthopantomograms (OPG). Then reposition and splint. Teeth that have very poor support or are infected should be extracted.
- For alveolar fractures, reduce and splint with composite resin, dental wires (figure of 8), arch bar, or acrylic resin splints. Fixation should be maintained for 4–6 weeks in adults and 2–3 weeks in children. (Stainless steel wire 0.5mm)
- Put the patient on a soft diet.
- Clean and repair associated soft tissue injuries of the gingivae and lips.
- Give antibiotic cover (refer to Section 51.2, on management of orofacial fractures in dental and orofacial conditions), analgesics, and oral mouth wash.

MANDIBULAR FRACTURES

- These may involve any part of the mandible – the symphysis, parasymphysis, body, angle, ramus, condyle, and coronoid.
- They may also be displaced or undisplaced, depending on the pull of the muscles attached to the mandible.
- Plain radiographs demonstrate these fractures well – OPG, PA mandible (to assess linguo-buccal displacement), lower standard occlusal, lateral views.

Management

- Closed reduction – Indications (these are not absolute indications)
  - Undisplaced fractures involving the dentate mandible, children in developing dentition and
  - severely atrophic edentulous mandible.
- Maxillo-mandibular fixation (MMF) for 6 weeks; 10–14 days for children. This is done using arch bars, eyelets, or Ivy loops (stainless steel wire 0.5mm)
- Lingual-labial occlusal splints
- Circum-mandibular wiring
  - Gunning splints
  - Antibiotic cover syrup amoxicillin 500mg 8 hourly orally and metronidazole 400mg 8 hourly orally.
  - Normal saline rinse or chlorhexidine 0.2% mouthwash.
- Open reduction and internal fixation (ORIF)

Indications:

- Displaced unstable fracture segments;
- Associated midface fractures;
- When MMF is contraindicated such as in epileptics, mentally handicapped.

Treatment

- Semi-rigid fixation with trans-osseous wires (osteosynthesis)
- Lag screws
- Plates and screws; load sharing plates or load bearing plates (for edentulous atrophic mandible, comminuted and defect fractures).

MIDFACE FRACTURES

- Investigations include plain radiographs: Occipito-mental view (OMV), PA skull, OPG), CT scan

Treatment

- MMF + suspension wires
- ORIF – -semi-rigid fixation with trans-osseous wires – rigid plating with mini plates (1.5 and 2.0mm plates)

ZYGOMATIC COMPLEX FRACTURES

- Investigations include OMV, submental vertex (for zygomatic arch fractures), CT scan (axial, coronal cuts + 3D reconstruction)

Treatment

- Limited access treatment (reduction without fixation) for medially displaced fractures without comminution
  - Gilles technique (through temporal region)
  - Keen technique (intra-oral approach)
  - Dingman technique (lateral eyebrow approach)
- ORIF for laterally displaced fractures and those with comminutions
  - Semi-rigid fixation with trans-osseous wires
  - Rigid fixation with miniplates (1.5 and 2.0mm plates)

- Orbital fractures
  - Eye examination is mandatory.
  - If no ophthalmoplegia and fracture is minimally displaced, no treatment.
  - If there is entrapment of orbital contents or muscles, ORIF is done.
  - Miniplates are used for the orbital rims.
  - Consult ophthalmic surgeon.

49.4 Head Injury

With the high number of road traffic accidents and assaults, this is a fairly common injury. Early and proper management is critical in order to avoid death and long-term morbidity.

Investigations
- Radiological in form of CT scan usually more informative than simple skull radiograph.

Management
- Initiate resuscitation measures.
- Document accurately the neurological status with the Glasgow Coma Scale (Table 49.1) or other reliable scale.
- Ensure adequate oxygenation and monitor fluid balance. Avoid over hydration.
- Review regularly every 15 to 30 minutes while awaiting transportation if at level 4 and are not able to manage.
- Arrange immediate referral to a Specialized unit, and provide appropriate transportation and personnel to accompany the patient during transportation.

If at levels 5 to 6:
- Admit patient for hourly neurological observations if:
  - Depressed consciousness level is observed any time after injury.
  - Skull fracture.
  - Focal neurological signs elicited.
  - Elderly patients
- Record hourly neurological observations, to include:
  - Glasgow Coma Scale
  - Blood pressure, pulse, and respiratory rate
  - Pupil size and reaction
  - Limb movements (normal, mild weakness, severe weakness, spastic flexion, extension, no response)
- Check for peripheral deep tendon reflexes
- Carry out appropriate investigations.
- Carry out surgical intervention as needed.
- Rehabilitate as appropriate: Physiotherapy, occupational therapy, and counselling.

☛ ***Regular neurological assessments performed less often than hourly are of no use for interpretation.***

- If there are signs of an intracranial haematoma developing (declining conscious level, pupil signs, onset of confusion):
  - Cross-match and arrange for burr hole surgery as an emergency.
- Compound skull fracture:
  - Thorough wound toilet and haemostasis as an emergency.
  - Crystalline penicillin 2 mega units intravenous QDS and chloramphenicol 500mg intravenous QDS for 1 week then oral for 7 days.
- Depressed skull fractures:
  - Through more than one table, require elevation.
- Basal skull fracture:
  - Bloody CSF coming from the ear or nose is indicative of a basal skull fracture unless other external source of bleeding is seen.
- Give antibiotics benzyl penicillin 1.2g IV 6 hourly and chloramphenicol 1g IV 6 hourly for 1 week, then orally for 1 week.
- Do not give narcotic analgesics to head injury patients.
  - Use paracetamol
- Convulsions must be rigorously controlled.
  - Diazepam 10–20mg intravenous and phenobarbitone 5 make IM daily.

49.5 Spinal Injury

Spinal injury could involve soft tissues (mu**s**cles and ligaments), bones (vertebrae and discs), and neural tissue (spinal cord and nerves). It is important for primary assessment to establish the presence of an injury and initiates immediate treatment to avoid worsening either the primary or the secondary injury.

49.5.1 CAUSES OF SPINAL INJURIES

- Road traffic accidents
- Assault
- Blunt injury
- Penetrating injuries: sharp objects like knives, spears and firearms
- Sports injury
- Falling from a height

Bone injury could be stable or unstable and could be associated with neurological manifestation like paraplegia or quadriplegia depending on the level of injury. The injury could be a compression fracture with retropulsion of bone fragments into the spinal canal, causing spinal cord compression or complete transection of the cord.

Clinical Features
Condition may present as part of the multiply injured patient and caution is needed not to overlook this condition. Neurogenic shock may be present. Neurogenic shock refers to the haemodynamic triad of hypotension, bradycardia, and peripheral vasodilatation resulting from autonomic dysfunction and the interruption of sympathetic nervous system control in acute spinal cord injury.

Spinal shock is defined as the complete loss of all neurological function, including reflexes and rectal tone, below a specific level that is associated with autonomic dysfunction.

Investigations
- Plain spinal radiographs: ***It is critical to maintain cervical stability during transfer and examination.***
- Scans in facilities where available.

Management
For levels 4 and 5:
- Ibuprofen 400mg orally or diclofenac 75mg IM STAT
- If open wound: tetanus toxoid 0.5 STAT and appropriate antibiotic
  - Care of the spinal column should be observed with application of a cervical collar or a hard board. ***Practice log rolling procedure at all times.*** Spinal stabilizing should be provided during transportation. Resuscitation should continue during transportation.
  - Where facilities for surgical toilet for associated injuries are available, this may be performed prior to referral.
  - Refer to a level 6 for acute treatment and thereafter spinal injury unit for rehabilitation. Transfer should be made even if the clinical manifestations of spinal injury are minor.

For level 6:
- Bone injuries addressed through surgery or other means
- Spinal decompression as appropriate for the individual case.
- Skin, bladder, and bowel care.
- Rehabilitation with physiotherapy, occupational therapy, prosthetic and orthotic fittings, etc.

50. General Surgery

50.1 Abdominal Conditions

50.1.1 ACUTE ABDOMEN

Acute abdomen is a clinical term used to describe a syndrome that usually incorporates symptoms and signs in the abdomen. Central to the syndrome is severe, acute abdominal pain. The term “acute abdomen” is a symptomatic diagnosis and not a definitive one. It is critical in these patients that a variety of conditions be suspected and diagnosed or clearly excluded before definitive treatment is initiated.

The common causes of abdominal pain are medications (NSAIDs), gastro-enteritis, peptic ulcer disease, acute erosive gastritis, appendicitis, acute cholecystitis, acute pancreatitis, acute intestinal obstruction, renal colic,

diverticulitis, ectopic pregnancy, ruptured or twisted ovarian cyst, mittelschmerz, urinary tract infection, and pelvic inflammatory disease.

Clinical Features
Meticulous history and physical examination are very important in establishing the diagnosis. The clinical features include abdominal pain, abdominal distension, abdominal guarding and rigidity, altered bowel sounds, and alteration of bowel habits.

A search should be made for signs and symptoms of GIT disease, genitourinary, hepatobiliary and respiratory diseases as well as metabolic disorders (diabetes mellitus, porphyrias), CNS diseases (neuropathies), haematologic diseases (for example, thrombotic crisis in sickle cell disease), and cardiovascular disease.

☛ ***Caution: As a result of organ displacement associated with pregnancy, clinical examination of the abdomen for abdominal pain in a pregnant female can be confusing.***

Investigations
- Haemoglobin, white blood cell count, packed cell volume
- Urea and electrolytes
- Urinalysis
- Plain abdominal radiograph (erect and dorsal decubitus), chest radiograph
- Other investigations as the condition dictate, e.g., ultrasound in suspected cholecystitis, liver abscess or pancreatitis.

Management
Details of the patient's history and condition, as well as an accurate documentation of events are important. Ensure the following:
- Order nil orally.
- Conduct nasogastric suction.
- Prepare wide bore intravenous line or other form of secure intravenous access.
- Catheterize and initiate an input-output chart.
- Perform radiological and other investigations as able in the particular facility.
- Use analgesia cautiously and make sure if used it is documented.
- Arrange transfer to a suitable surgical facility as soon as possible if not able to handle case (level 4 without a surgeon).
- Maintain resuscitation during transfer, nasogastric suction, fluids, and input output chart.
- Manage conservatively if found appropriate: Nil by mouth, nasogastric suction, correct fluid and electrolyte imbalance by intravenous fluids
- Re-evaluate with the appropriate investigations.
- Initiate specific treatment of the underlying cause, e.g., surgery for perforation, peritonitis, ruptured ectopic pregnancy, etc.
- Group and cross-match blood for all laparoscopies.
- Organize post discharge follow up as indicated.

50.1.2 INTESTINAL OBSTRUCTION

Clinical Features

In infants, suspect bowel obstruction if:

- No meconium is evacuated within the first 24 hours of birth.
- There is green or bilious vomiting.
- There is abdominal distension.

In older children and adults, suspect bowel obstruction if:

- There is constipation.
- There is abdominal distension.
- There is fever (if advanced obstruction is present).
- There are features of dehydration.
- There are altered bowel sounds.
- There is abdominal pain with vomiting.

If there is gross abdominal distension with no pain, suspect sigmoid volvulus.

Investigations

- Haemoglobin, white blood count, packed cell volume
- Urinalysis
- Urea and electrolytes
- Radiograph of abdomen (erect AP and dorsal decubitus)
  - Multiple air-fluid levels, gaseous distension of gut, double bubble sign in children, etc.
  - Volvulus

Management

- Initiate resuscitation with nasogastric suction, intravenous fluids and nil orally.
- Monitor vital signs.
- Take radiographs (if available). If not able refer to facility with ability to manage condition.
- Perform definitive management be it surgery or conservative management.

Correct fluid and electrolyte imbalance.

- Group and cross match blood
- Deflate the distended stomach with nasogastric suction. This is more effective for small bowel than in large bowel obstruction.
- Give prophylactic antibiotic at induction: metronidazole 500mg IV stat and cefuroxime 1.5g STAT.
- Note that high enema may be effective for faecal impaction only.
- Remove the cause of the obstruction by surgery or conservative treatment.

- NB. Obstruction due to adhesions from previous surgery may open under conservative treatment.
- Emergency large bowel surgical resection usually involves creation of a de-functioning colostomy rather than performing primary resection and anastomosis if strangulation has taken place (Hartmann's procedure).

50.1.3 PERITONITIS

This is inflammation of the peritoneum. Appreciate that peritonitis could be due to tuberculosis and could also be aseptic. The aseptic type is usually due to chemical irritants like pancreatic juices, etc. Peritonitis usually ends up producing adhesions that may cause future bowel obstructions of varying degrees.

Clinical Features

- Presentation is with an acute tender abdomen, abdominal distension, altered bowel sounds, guarding, rigidity, rebound tenderness, and fever.
- Complications of peritonitis include the following:
  - Abscess formation.
  - Multiple organ failure.
  - Site infection following surgery.
  - Wound dehiscence.
  - Enterocutaneous fistulae.

Investigations

- Full haemogram, PCV.
- Urea and electrolytes.
- Abdominal radiograph (erect AP and dorsal decubitus) – may show air fluid levels or air under the diaphragm in case of perforated viscera.

Management - General

- Correct fluid and electrolyte imbalance. These are usually disturbed by the movement of fluid and electrolytes into the third space. The disturbance could arise or be made worse by vomiting and/or diarrhoea.
- Consider nasogastric suction, which is usually necessary because of organ hypotonia and dilatation.
- Use antibiotics to cover a broad spectrum of bacteria. Combinations advised in order to get the appropriate cover are cefuroxime 750mg 8 hourly + metronidazole 500mg IV 8 hourly for 7 days.
- Alleviate pain only once a diagnosis has been made. Analgesic recommended in such a situation: diclofenac 75mg IM 12 hourly as needed.

Management – Specific

- ☛ *Exploratory laparotomy is a must in secondary peritonitis in order to repair or remove the diseased organ. Laparotomy also facilitates peritoneal lavage of the necrotic debris and pus.*
- Direct attention at the primary cause of peritonitis.
- Send pus for culture and sensitivity.

50.1.4 APPENDICITIS

Clinical Features

Starts classically with diffuse abdominal pain felt most prominently in the periumbilical area. There is anorexia and nausea. Vomiting may follow. Pain then settles in the right lower quadrant and is localized at McBurney's point. The pain may be relieved briefly after perforation but is accentuated by the ensuing diffuse peritonitis. There is localized tenderness in the right lower quadrant, rebound tenderness, muscle guarding, cutaneous hyperaesthesia, and pelvic tenderness

in the right iliac fossa on rectal examination. Rovsing's sign may be positive and the temperature may be elevated.

Investigations
Laboratory examinations are not critical for diagnosis. There is leucocytosis with neutrophilia. Normal values do not rule out appendicitis, however.

Management
- Initiate appropriate resuscitation.
- Once diagnosis is made, give analgesics whilst preparing for surgery.
- Starve the patient before surgery
- Give premedication when there is time (atropine 0.6mg IM stat and morphine 10mg IM stat).
- Appendectomy is the treatment of choice, once a definitive diagnosis is made.

50.1.5 INTESTINAL ATRESIA

During development, the gastrointestinal tract first develops into a tube that later canalizes. Failure of this process during any stage may result in intestinal atresia, which can affect any section of the bowel and can have varying degrees of severity.

Clinical Features
For an upper GIT lesion, bilious vomiting will be the main form of presentation with abdominal distension secondary to gaseous distension. Failure to pass meconium may occur for lower level lesions.

Investigation
- Plain radiograph to confirm fluid levels.
- A thorough check for other anomalies will need to be made.

Management at Levels 4 to 5
- Initiate resuscitation measures with intravenous lines, nasogastric suction and fluid charts. Correct any fluid and electrolyte imbalance present.
- Carry out whatever radiological investigation is possible in the facility.
- Refer immediately to a level 6 facility for specialized surgical management.

Management at Level 6 Facility
- Resuscitation and stabilization.
- Completion of investigations as needed.
- Surgical intervention.

50.1.6 CHILDHOOD HERNIAS

INGUINAL HERNIA

Inguinal hernia is an extension of the processus vaginalis, which fails to close during foetal development. Through this opening abdominal content can herniate to varying extents into the inguinal canal and scrotal sac. The communicating type is the most common form and extends down into the scrotum; the non-communicating one is less common.

Clinical Features
A bulge presents at either the internal or the external rings, or scrotum for males and inguinolabial region for females, that increases in magnitude with straining. There may be associated pain and discomfort, or it may present as an acute abdomen.

Examination findings reveal a reducible mass but cases of irreducible incarceration may occur. Trans-illumination test may be positive.

Investigations
- Usually clinical, but ultrasound may assist in differentials.

Management
- Inguinal hernias do not heal and must be corrected by elective herniorraphy for uncomplicated cases, to avoid complications.
- Emergency surgery if complications like obstruction have set in.

ABDOMINAL HERNIA

This is a protrusion through the abdominal wall due to one of the following:
- Omphalocele, which is due to the failure of development of the anterior abdominal wall at the area of insertion of the umbilicus, with the abdominal contents herniated out with only a peritoneal covering. There may be other associated anomalies. This is the most severe of these types of hernia.
- Gastrochesis, which is a herniation of small bowel contents with no covering at all and is often paraumbilical. Unlike omphaloceles, this condition does not have many associated anomalies.
- Umbilical hernia, which is a mild condition as a result of a defect in the linea alba. The herniated bowel has a covering of subcutaneous tissue and skin.

Clinical Features
There is protrusion of bowel contents through the abdominal wall to varying extents with or without other organs. Covering of the hernia varies and strangulation is a possibility.

Investigations
- Usually a clinical diagnosis is sufficient for these conditions.
- Ultrasound has a role in the antenatal period.

Management
- Conservative management for small umbilical hernias with expectant observation. Suggest referral to higher centre if not sure of conservative management.
- Surgical management best at specialized facility.
- Surgery for omphalocoel and gastrochesis on first day if possible.
- Surgery for strangulations or other surgical complications arising from the hernia.
- Counselling and attending to associated conditions.

50.1.7 IMPERFORATE ANUS

This is failure of the anal opening to canalize and is the commonest cause of intestinal obstruction in the newborn. It presents with a wide variation in anatomical anomalies.

Clinical Features

There is failure to pass meconium, or may pass meconium per urethra or vagina.

Investigation

- Invertogram
- Check for other anomalies

Management

- Surgical management best at specialized facility even for apparently simple malformations.
- Detailed investigations will be performed.
- Definitive surgical intervention, which may range from minor anuloplasty (dilatation, incision) to more complicated pull through procedures at the appropriate facility.
  - Continued dilatation at home
  - Sitz baths
  - Colostomy closure if needed
- For level 4 and 5 without the necessary surgical facilities, perform a colostomy if indicated and refer to level 6 facility.
- Counselling and attending to associated conditions.

50.1.8 INTUSSUSCEPTION

This occurs when a piece of, usually small, bowel invaginates into itself. This invagination may cause strangulation that leads to gangrene formation in the affected portion of the bowel.

Clinical Features

- There is onset of acute abdominal pain sometimes associated with red currant jelly stools.
- Clinical examination reveals a mass of the interssuceptus in the right hypochondrium.

Investigation

- Plain abdominal radiograph may show evidence of obstruction but misses still in identifying intussusceptions in early disease.
- Ultrasound gives better detection rates.

Management at Levels 4 to 5

- Stabilize the patient adequately.
- As appropriate initiate conservative or surgical management.
- If lack facilities are lacking, refer to level 6.

Management at Level 6
- Enema in the radiology unit may be attempted. Ensure that bowel gangrene has not set in.
- Definitive management.

50.1.9 INGUINAL HERNIA (ADULT)

This is usually an acquired condition and is often linked with activity associated with increase of abdominal pressure.

Complications
Complications of this condition include obstruction (when a hollow viscus goes through a ring of variable size and cannot be reduced), and incarceration (when non-hollow organ for example omentum, goes through a ring of variable size and cannot be reduced).

Strangulation is a process in which blood flow into the obstructed viscus is compromised, and if not corrected culminates in ischaemia of the viscus supplied by the involved blood vessels. Pain and tenderness over the hernial area are ominous signs. Sudden change from reducible to irreducible status especially if discolouration of tissues over the area is present is an ominous sign.

Clinical Features
Protrusion in the groin region, initially on straining and later may be spontaneous. There may also be a nagging or painful sensation in the groin or a strangulated, painful groin mass.

Examination
Observation of the bulge with the patient coughing while standing and when lying down, and with a finger invaginated into the external ring, repeating the same examinations. This examination is able to differentiate femoral from inguinal hernia. There is no great advantage of differentiating indirect from direct inguinal hernia, pre-operatively.

Management
Admit for
- Emergency surgery if obstructed or incarcerated.
  - Urgent surgery for children under 1 year.
  - Elective admission for others.
- Emergency surgery after resuscitation (if emergency surgery is not possible at the hospital refer to next level).
- Preoperative preparation as for the preoperative section.
- In strangulation, with obstruction of viscus, especially bowel the usual resuscitative measures are carried out/continued before and after surgery. See details as per obstruction above.
- Elective surgery for non complicated cases.
- Surgical repair is necessary for all inguinal hernias.
- Umbilical, incisional, and lumbar hernias require similar treatment as above in Section 50.1.2.

50.1.10 LOWER GASTROINTESTINAL BLEED

This may be frank bleeding depending on the cause. Common causes are:

- Haemorrhoids
- Anal fistulae and fissures
- Tumours: Benign (leiomyoma, fibromas, polyps) or malignant
- Trauma
- Aiigiodysplasia
- Bleeding disorders

Investigations

- Haemoglobin, white blood count, packed cell volume.
- Stool for microscopy, culture and sensitivity
- Abdominal ultrasound.
- Barium enema (double contrast)
- Proctoscopy/Sigmoidoscopy and biopsy

Management

- Do blood group cross match and transfuse if necessary.
- Continue with resuscitation.
- Identify and treat primary pathology.

50.2 Anorectal Conditions

Clinical Features

There is pain usually on defecation that prevents proper sitting and causes immobility (commonly due to abscess, thrombosed haemorrhoids, or acute fissure-in-ano). Painless bleeding is commonly due to haemorrhoids but may be due to colorectal carcinoma.

A patient with a perianal mass complains of feeling a mass (usually prolapsed haemorrhoids or anal tags) or has anal discharge that is associated with itching and is commonly associated with tumours, proctitis, and helminthic infestations. Perineal discharge, on the other hand, is usually due to fistilae and is common in obese people.

50.2.1 ANAL INCONTINENCE

Causes

A thorough examination of the patient with digital rectal examination are critical for identifying the cause of anal incontinence. The following have been associated with anal incontinence:

- Congenital abnormalities.
- Trauma to the sphincters and anorectal ring, injuring them (obstetric, operative, abuse and accidental).
- Neurological abnormalities (due to spinal cord disease).
- Anorectal disease (rectal prolapse, third degree haemorrhoids and anorectal cancer).

Investigations
- Thoroughly examine the patient locally.
- Do a rectal examination using a proctoscope.

Management
- Is that of predisposing condition?
- Management as per the primary cause.
- Refer to the appropriate level facility according to the primary pathology if not able to manage at the present level..

50.2.2 RECTAL PROLAPSE

Rectal prolapse may be partial (mucosal) or complete (whole thickness of rectal wall). It is a common occurrence in children and the elderly (especially females, who form 85% of affected adults population) but may occur at any age

Clinical Features
Clinically there are three types, categorized as follows:
- Primary prolapse with spontaneous reduction.
- Secondary prolapse with manual reduction.
- Tertiary prolapse that is irreducible.

Most patients present with reducible prolapse, which often occurs during defecation and is associated with discomfort, bleeding, and mucus discharge. Prolapse may also be caused by mild exertion (e.g., through cough or walking) and may also be associated with incontinence of flatus and faeces. When uterine prolapse compounds rectal prolapse, urinary incontinence may also be a feature.

Rectal prolapse is also associated with benign prostatic hypertrophy, constipation, malnutrition, old age, and homosexuality/anal intercourse. Anorectal carcinomas should always be suspected if there are also ulcers, indurations, or masses in this area. During clinical examination it is important to check for patulous anus and for poor sphincter tone (on digital examination).

Management
- Refer all suspected patients to levels 5 and 6 for appropriate management if at level 4.
- May be conservative or operative, depending on the patient. Refer to surgical textbook.
- Primary and secondary prolapse: conservative treatment with stool softeners, e.g., lactulose 15ml 12 hourly.
- Tertiary prolapse – Refer for definitive surgery.
- Complications include irreducibility of the prolapse with ulceration, bleeding, gangrene, and possible rupture of the bowel.

50.2.3 PRURITIS ANI

This is a common condition especially in males. Causal factors include skin conditions (psoriasis, lichen planus, contact eczema), infective conditions

(candidiasis, threadworms), anal-rectal conditions (piles, fissures, fistula, proctitis, polyps), neoplastic disease, anal warts, GIT conditions (irritable bowel syndrome, ulcerative colitis, etc.), drugs (quinidine, colchicine), and obesity.

Management
- Treatment is that of the cause.
- Improved personal hygiene for those affected.

50.2.4 FISSURE IN ANO

This is an elongated longitudinal ulcer of the lower anal canal. The commonest site is the midline posteriorly, followed by midline anteriorly.

Clinical Features
This condition occurs in children, but is more common in females in their midlife. It is uncommon in the elderly. The affected individual experiences pain during defecation that is often intense, may last for an hour or more, but subsides only to come again during the next defecation. The patient is reluctant to open bowels because of the pain and tends to be constipated. The stool is frequently streaked with fresh blood and a slight discharge occurs in chronic cases. A sentinel tag is usually demonstrated, with a tightly closed puckered anus.

Digital rectal examination and proctoscopy are painful, and can be performed at examination under anaesthesia (EUA).

☛ **It is important to consider carcinoma of the anus, anal chancre, tuberculosis ulcer (whose edges are undermined), and proctalgia fugax as important differential diagnoses that must be ruled out.**

Management
- Anaesthetic + anti-inflammatory ointments (3–4 times a day) or suppositories may be tried. Avoid use for more than 1 week consecutively.
- Some heal spontaneously
- Stool softeners, diet, saline sitz bath
- Operative treatment is recommended for cases refractory to conservative treatment.

50.2.5 HAEMORRHOIDS

These are varicosities of the haemorrhoidal plexus often complicated by inflammation, thrombosis, and bleeding. Haemorrhoids are not commonly associated with pregnancy.

Clinical Features
There is painless rectal bleeding and prolapse or sensation of a mass in the anal area (especially during defecation), with mucous anal discharge. Appropriate assessment is digital examination and proctoscopy (use good lght). Haemorrhoids may be complicated by thrombosis, infection, and profuse bleeding, all of which require surgical intervention for appropriate management.

Management
- Advise a high residue diet or bulk laxative to prevent constipation
- Specific treatment includes:
  - Rubber-band ligation for 2°–3° haemorrhoids
  - Manual anal dilatations
  - Injection sclerotherapy.
  - Haemorrhoidectomy (for 2°–3° piles) where other methods have failed.
  - Management of associated compilations.

50.2.6 ANORECTAL ABSCESS

There are four types of abscesses: submucosal, subcutaneous (perianal), ischiorectel, and high intermuscular. Usually there is no apparent cause, but certain underlying diseases such as Crohn's disease, ulcerative colitis, rectal cancer, HIV disease, diabetes mellitus, and active tuberculosis may be present.

Clinical Features
Presents as acute painful swelling with fluctuation not always obvious and there is pain on defecation and blood-stained purulent anal discharge. Complications for anorectal abscess include, fistula formation, recurrence of the abscess, and sinus formation.

Management
- Give tabs diclofenac 50mg 8 hourly or ibuprofen 400mg 8 hourly for the appropriate duration.
- Incise and drain under general anaesthesia (de-roof by making a cruciate incision and excising the four triangles of skin).
- Take a pus swab for culture and sensitivity.
- Advise saline sitz bath and stool softeners.

50.2.7 RECTAL TRAUMA

Rectal trauma may be caused by assault, road accidents, birth trauma, and sexual assault.

Clinical Features
Patients present with pain, bleeding, and purulent rectal discharge. Clinical findings include anal laceration, features of peritonitis, and fever with or without foreign bodies in the rectum.

Management
- Address the primary problem.
- For mild to moderate cases, manage conservatively, which includes:
  - Administration of antibiotics like metronidazole 400mg orally 8 hourly and cefuroxime 750mg IV 8 hourly.
  - Saline sitz bath and analgesics.
  - Diclofenac 50mg orally 8 hourly or ibuprofen 400mg orally 8 hourly.
- For severe cases, carry out surgical interventions.
- Provide counselling and other support services of the patient as needed.

50.2.8 FISTULA IN ANO

This condition may complicate anorectal abscesses, Crohn's disease, ulcerative colitis, tuberculosis, colloid carcinoma of the rectum, LGV, and HIV infections. The types of fistula in ano are subcutaneous (anus to skin), submucous, low anal (open below the anorectal ring), high anal, and pelvirectal.

Clinical Features

There is persistent seropurulent discharge, periodic pain and pouting openings in the neighbourhood of the anal verge. Appropriate examination involves palpating the anal internal opening for a nodule on digital examination; confirmation is made at proctoscopy.

Management

- Determine the primary pathology.
- Deal with the primary pathology as well as the fistula.

50.2.9 DISTAL COLON AND RECTAL CARCINOMA

Distal colon and rectal carcinoma is especially found in elderly patients, presenting with rectal bleeding, change in bowel habits, and sometimes with abdominal or pelvic pain or even intestinal obstruction. It is important to rule out familial conditions in the family history. Clinical examination for patients suspected to have distal colon and rectal carcinoma should include rectal examination.

Investigations

- Proctoscopy, colonoscopy, and biopsy.
- Investigation for spread includes:
  - Ultrasound scans and
  - Where available laparascopy.

Management

- If at level 4, refer urgently to levels 5 and 6 for appropriate management.
- Carry out curative or palliative surgical intervention.

50.3 Abscesses

Clinical Features

An abscess formation is the culmination of an uncontrolled localized infection. There is tissue necrosis with liquefaction (pus formation).

Management

Can be carried out at all levels with referral to higher level for more complicated abscesses or those requiring general anaesthesia. Caution should be exercised for special abscesses like mastoid abscess, as simple incision and drainage of these can result in severe injury or in chronic sinuses. Such sinuses should be referred to higher level for appropriate management.

Treatment involves:
- Incision and drainage.
- Use local anaesthesia lignocaine 2%.
- An abscess needs incision and drainage. Fluctuation may be absent in deep abscess.
- Technique of incision and drainage involves:
  - Prepare the area by cleaning and draping.
  - Test using a needle to aspirate pus if not already done.
  - Make an incision into the soft part of the abscess. Insert finger into the cavity and break all the loculi (pockets) of pus to leave a common cavity for drainage. Leave a wick of gauze (Vaseline) to facilitate drainage.
- Breast abscess may require counter incisions, leaving in a corrugated drain for about 24 hours.
- See ENT Section 54.7 for management of mastoid abscesses.
- The wound(s) is/are allowed to heal by granulation.
- Hand and foot abscesses will require multiple incisions, with counter incisions in some areas and elevation of the limbs.
- Perianal and ischiorectal abscesses require general anaesthesia. They require days to weeks of sitz baths before they heal. Ask the patients to add 3 to 4 tablespoons of salt to the water.
- Recurrent perianal and ischiorectal abscesses necessitate procto-sigmoidoscopy to rule out anal fissures or fistulae. Recurrence may also be seen in patients with immune suppression, tuberculosis, inflammatory bowel diseases, and amongst homosexuals.
- Antibiotics are indicated in hand abscesses as per sensitivity and culture report. Other abscesses may or may not need antibiotics depending on the presence or absence of local cellulites.
- Face abscesses require antibiotic cover. Flucloxacillin 250mg 8 hourly + metronidazol 500mg 8 hourly for 5 days
- Always send specimen of pus (and where possible abscess wall) for culture and sensitivity and histological exam.

50.4 Breast Conditions

Breast disease presents in a variety of forms as lumps, breast pain, nipple discharge, breast ulcers, or eczema.

50.4.1 BREAST ABSCESS

This condition is common during lactation, especially the second week of puerperium, and during pregnancy. It rarely occurs at other times.

Clinical Features

There is severe breast pain and fever and there may be an area of induration. Aspirate with a big bore needle to confirm presence of pus.

Management
The following needs to be emphasized for breast abscess:
- Do not delay incision and dependent drainage. If no pus, biopsy.
- Do not wait for fluctuation or abscess to point.
- Do not stop breastfeeding (unless the nipple is cracked or discharging, and in this case continue to express milk for the baby).
- Give antibiotics early. Most infections are due to Staphylococcus aureus and flucloxicillin 500mg 8 hourly for 1 week is appropriate.

50.4.2 BREAST LUMPS
Breast lumps can be the result of a wide number of conditions, including the following:
- Cystic lesions that may be due to breast abscess, fibrocystic disease, cystsarcoma phylloides (serocystic disease), galactocele, and hydatid cysts.
- Solid lesions that may due to developing breast abscess, antibioma, fibroadenoma, giant fibroadenoma, intraductal papilloma, tuberculosis lymphoma, neurofibrom, or carcinoma of breast

Investigations
- Haemoglobin, white blood count, packed cell volume
- Triple assessment (history and physical examination, FNA, mammography)
- Abdominal ultrasound

Management
Identify primary pathology and treat.

50.5 Central Nervous System

Conditions affecting the central nervous system (CNS) that may require intervention may be classified as follows:
- Congenital disorders (hydrocephalus, microcephaly, encephaloceles, etc.)
- Degenerative disorders
- Vascular disorders
- Infections (e.g., brain abscesses)
- Neoplasms
- Trauma

(See neurosurgical textbooks for greater detail.)

Clinical Features
The features may be generalized or localized. A detailed history and careful examination are necessary to an accurate diagnosis.
- Generalized features include headache, vomiting, and alterations in level of consciousness.
- Localized features include paralysis and/or sensory defect of a part of the body, diplopia, and blurred vision or loss of vision

Investigations
- Full haemogram (severe anaemia should arouse suspicion of metastatic disease and polycythaemia of cerebellar haemangio blastemas)
- Plain radiography (will for example show metastatic disease of the skull, expansion of sutures in children, eroded clinoid processes, vascular markings and hyperostosis in meningiomas, etc.)
- Contrast radiology (ventriculography, angiography, etc.)
- Computerized axial tomography (CT scan) is the main diagnostic tool today for intracranial lesions

50.6 Hydrocephalus

See Paediatrics Section 39.6 for additional information.

Management
- If at level 4, refer to levels 5 and 6 for appropriate management.
- Initiate drainage procedure with shunts.
- Treat underlying pathology if cause of the hydrocephalus is known.
- Manage associated conditions.
- Rehabilitation as appropriate for the particular patient.

50.6.1 INCREASED INTRACRANIAL PRESSURE AND SPACE-OCCUPYING LESIONS

This is usually caused by increases in mass content (e.g., tumour, haemorrhage, oedema, or CSF).

Clinical Features
Principal symptoms are headache, vomiting, and visual disturbance. Papilloedema may be detected. Weight loss and anorexia may be present, especially with tumours. Bradycardia, mild hypertension, and intellectual deterioration are common in later stages. Diagnosis is made on the basis of clinical history, neurological examination (papilloedema), and radiograph examination (plain skull radiographs and CT scan).

Management
- If at level 4, refer urgently to levels 5 to 6 for appropriate management.
- Clear airway and use endotracheal intubation if patient is in a coma.
- Give minimum daily fluid requirement in form of isotonic solution (e.g., Ringer's solution or normal saline).
- Maintain blood pressure at normal or above normal range.
- Administer mannitol, 1g/kg (as 20% solution) intravenously, with frusemide 0.7mg/kg (15 minutes after mannitol). (Do not give mannitol in heart or renal failure, to a hypotensive patient, or in acute intracranial bleeds).
- Consider steroids (e.g., dexamethasone 4mg 8 hourly intravenous), as these can reduce brain oedema in tumours – but avoid in acute head injury.
- Refer patients for:
  - Confirm the diagnosis.

- Carry out definitive management.
- Maintain and input output chart.

50.6.2 BRAIN TUMOURS

- About 50% of intracranial tumours are metastatic: from lung, breast, thyroid, kidney, and prostate.
- The remaining arise from:
  - Meninges (e.g., meningioma – of brain tumours).
  - Skull (e.g., osteomas, histiocytosis, multiple myeloma, etc.).
  - Pituitary and parapituitary adenomas (chromophobe, eosinophilic. basophilic and prolactinomas), and craniopharvngiomas. These will present with headaches, disturbed vision and some form of endocrine change (e.g., Cushing's syndrome, galactorrhoea, diabetic insipidus, etc.).
  - Intracerebral tumours: Gliomas, e.g., astrocytomas and oligodendrogliomas.
  - Ependymomas medulloblastomas. Diagnosis is made on the basis of clinical history and examination findings, CT scanning, angiography, and tumour biopsy.

Management

- Definitive diagnosis through invasive and non invasive investigations including histology
- Definitive treatment as per the final diagnosis

50.6.3 INTRACRANIAL INFECTIONS

These include osteomyelitis of the skull commonly complicating penetrating injuries, post craniotomy infections, intracranial infections complicating otitis media, mastoiditis, paranasal sinusitis, and scalp infections.

Conditions that may arise from infections are skull osteomyelitis, extradural and subdural empyema, cerebral abscess, and meningitis.

Clinical Features

Clinical features will vary depending on the site and spread of infection but will include local tenderness, focal neurological signs, etc., disordered consciousness, epilepsy, or signs of meningitis.

Diagnosis is made on the basis of clinical history and physical and neurological examination. Plain radiographs of skull may show opaque air sinuses or air bubbles in brain. Angiography or CT scan is used to confirm the diagnosis.

Management

- Adequate dose of appropriate antibiotics
- Drainage (multiple burr holes, craniotomy, etc.)
- Excision of infected bone
- Drainage of infected sinuses or mastoid air cells
- Long-term anticonvulsant therapy – phenobarbitone 60–100mg OD with maximum of 180mg, for children 5–8mg daily. Phenitoin 3–4mg/kg daily either

as a single dose or 2 divided doses, for children 5mg daily in 2 divided doses and maximum 300mg daily.

Management at Level 5 and 6
- Take specimens for culture and sensitivity. Commence antibiotic treatment.
- Make sure results are traceable.
- As per the management principles indicated above.
- Arrange and/or provide rehabilitation as needed

50.7 Chest Conditions

50.7.1 CONGENITAL HEART DISEASE

For detailed description of the different congenital heart diseases please see Section 37.3 in Part II, or refer to a suitable textbook.
- Surgical intervention is often needed for some of the congenital defects. For these, carry out a diagnostic work up and refer to level 6 facility for definitive surgery.
- The objectives of surgical intervention are to:
  - Restore anatomy to as near normal as possible.
  - Maintain unidirectional blood flow.
  - Restore deranged physiology to as near normal as possible.
  - Correct electrical anomalies to as near normal as possible.

These can be achieved through various shunts, patches, electrophysiological procedures, and other corrections.

50.7.2 EMPYEMA THORACIS

- In empyema thoracis there is pus in the pleural space. The condition may be classified as acute, sub-acute, or chronic, depending on the duration of the presence. Immunosuppression is commonly associated with chest diseases (investigate in suspicious cases).
- Complications include chronicity with lung destruction, fistula formation, and chronic sinuses through the chest wall.

Clinical Features

Symptoms of underlying condition may be present. There may in addition be shortness of breath, fever, sweating, diasphoresis, tachypnoea, tachycardia, dullness to percussion with reduced air entry on the affected side, and weight loss.

Investigations
- Chest radiograph shows fluid in the affected side or an air fluid level.
- Carry out thoracocentesis (pus should be taken for culture and sensitivity).

Management – General
- Improve general condition of the patient, e.g., nutritional status.

Management – Specific
- Antibiotics directed at the primary pathogen if known: Benzyl penicillin 1.2g IV 6 hourly, gentamicin 80mg 8 hourly IV for at least 2 weeks (take pus for culture and sensitivity and AAFB studies). Treatment choice depends on the sensitivity report.
- Acute empyema: Tube thoracostomy drainage (underwater seal drainage)
- Sub-acute empyema: Tube thoracostomy drainage
- Chronic empyema: Tube drainage; which if fails to resolve proceed to thoracotomy and decortication
- Anti-TB therapy where indicated. Refer to the national guidelines for tuberculosis treatment.
- Admit for underwater seal drainage
- Chest physiotherapy.

Management at Level 4
- Order chest radiograph for a baseline investigation.
- As above, continue with antibiotics and if no change is observed, proceed to chest tube insertion.
- If chest tube drainage fails, refer to a level 5 and above.

Management at Level 5 and Above
- Continue the level 4 treatment or proceed to surgery.
- Initiate thoracotomy and decortication.
- Carry out Other procedures like pneumonectomy, skin flaps, etc., as indicated.

☛ **Remember iatrogenic causes of empyema lead to very severe morbidity. It is therefore imperative to observe strict sterility at all times while carrying out invasive procedures on or in the chest cavity.**

50.7.3 ACHALASIA CARDIA

Main symptom here is dysphagia due to failure of relaxation of the lower oesophageal sphincter. This results in dysphagia with differing degrees of food tasis and regurgitation of feeds.

Clinical Manifestations

There is long-standing dysphagia, more for solids than liquids, and commonly in young patients. Vomiting of feeds also occurs, sometimes of foods taken some days back. Weight loss if present is usually only slight.

Investigations
- Barium swallow, endoscopy, and biopsy
- Manometry

Management at Levels 5 and 6
- Balloon dilatation
- Heller's myotomy

50.7.4 TRACHEOESOPHAGEAL FISTULA (CHILDREN)

This is a communication between the trachea and the oesophagus. The condition tends to have life threatening complications and needs urgent treatment soon after birth. Refer to Table 50.1 for a summary of the various types of this condition. This has been dealt with in Part II, Section 26.13.4.

Table 50.1: Prevalence of the various forms of tracheosophageal fistula

Anatomical characteristics	Percentage of cases
Oesophageal atresia with distal TEF	87
Isolated oesophageal atresia without TEF	8
Isolated TEF	4
Oesophageal atresia with proximal TEF	1
Oesophageal atresia with proximal and distal TEF	1

Management

Surgical correction should be carried out as soon as patient is stabilized for surgery. Usually surgery is recommended within a few days of birth. Repair may be performed as a primary procedure or a staged procedure at higher level of health care. If at level 4, initiate resuscitation measures as for acute abdomen above (suction, antibiotics, fluids) and refer urgently to levels 5 to 6 for appropriate care.

Management at Levels 5 and 6

- Resuscitate and prepare for surgery. Correct any fluid and electrolyte imbalance. Look out for possible infection.
- Perform radiological investigations.
- Carry out urgent surgical correction. This may be performed as a primary procedure or a staged procedure.
  - Primary procedure in principle for mature children with no comobidities or significant infective complications.
  - Secondary repair for premature if infection present .

50.8 Malignant Dysphagia

Difficulty in swallowing on attempted initiation of swallowing and can occur at any stage of the swallowing process. A symptom that is more common than appreciated and can be due to many causes. Carcinoma of the oesophagus/ cardia, for example, is the most common cause in the older age group for adults.

Clinical Presentation

There is progressive dysphagia with weight loss. The presence of regurgitation suggests a cardia lesion. Patients tend to be wasted in the late stages with associated dehydration. Up to 60% of these patients in Kenya will present with underweight (BMI less than 18kg/m^2). Most patients present with late disease.

Investigation
- Barium swallow, oesophagoscopy and biopsy.
- Where facilities available include staging with abdominal ultrasound, CT scan and other endoscopic techniques.

Management
- Conduct curative surgery for early disease and palliative measures (including palliative surgery) for later disease.
- Refer to facility able to deal with condition.

Management at Level 5 and 6
- Investigate the patient, including barium swallow and endoscopy if able at facility.
- Initiate intubation or stenting.
- Carry out surgical resection.
- Administer radiotherapy or chemotherapy.
- Counsel the patient and relatives; it is important that they understand the prognosis of the disease from the onset.

50.9 Lung Neoplasm

More cases are being seen in Kenya and the association with smoking is high . Different histological subtypes occur, of which squamous cell carcinoma is the most common.

Clinical Features
The clinical features of this condition include the following:
- Chronic cough
- Haemoptysis
- Wheezing or stridor
- Lung infection or other sequels of bronchial obstruction
- Features of spread – nodes, malignant effusions, fistulas, etc.
- Systemic symptoms like appetite loss

Investigations
- Chest radiograph
- CT when more detail needed.

Management at Levels 4 and 5
- Evaluate for extent of disease.

Management at Level 6
- Carry out curative resection for early disease.
- Provide palliative care for late disease.
- In general, adopt a multidisciplinary approach to care.

50.10 Genitourinary System

Infections of the urogenital system are characterized by the following symptoms:
- Dysurea
- Urgency in micturition
- Colic pain in either flanks or the loins
- Pain on the lower abdomen due to inflammation of the urinary bladder (cystitis)
- Poor urinary stream
- Dribbling and hesitancy
- Nocturia
- Urinary incontinence
- Urinary retention
- Haematuria
- Renal failure

These symptoms overlap over many specific conditions, so that a thorough examination is required to facilitate an accurate diagnosis. The following need to be done in this regard:
- Ask and check for urethral discharge.
- Palpate the urethra for areas of induration (stricture).
- Palpate the lower abdomen for tenderness, masses in the urinary bladder.
- Bimanually palpate the kidney for masses or tenderness.
- Perform a rectal or vaginal examination:
  - Manually palpate the urinary bladder for masses.
  - Feel for the prostate in a man (size, consistency, nodularity, tenderness, fixation of rectal mucosa to it, etc.).

50.10.1 POSTERIOR URETHAL VALVES

As a developmental anomaly a membrane develops in the posterior urethra of male foetuses and results in bladder neck obstruction. The resulting increase in pressure is associated with developmental alterations from the normal.

Clinical Presentation

Symptoms range from mild symptoms of repeated urinary tract infection to obstructive uropathy. Symptoms may also include distended bladder or dilated ureters and ultimately renal failure.
- It is not unusual for normal newborns not to pass urine for the first 24 hours. Consequently, failure to pass urine within this timeframe does not necessarily suggest posterior urethral valves problem.

Investigation
- Abdominal ultrasound
- Voiding cystourethrogram

Management
- If at level 4 or 5, refer to level 6 for appropriate management.
- Evaluate the patient.

- Conduct surgical resection of the membrane.
- Follow up.

50.10.2 CHILDHOOD HYDROCELE

This is fluid within the processus vaginalis within the scrotum.

Clinical features

Swelling in the scrotal sac that may spread down from the inguinal canal, in the communicating type, or remain localized to the scrotum in the non-communicating type. Communicating types are associated with straining and may develop strangulation if bowel contents enter. In non communication type, one can palpate and grasp the sac towards the scrotum and get above it.

Investigations

- Trans-illumination test is positive
- Communicating type demonstrated on straining

Management

- Communicating hydrocele (or inguinoscrotal hernia with no bowel content) will not close spontaneously and surgery is indicated. This type has a high risk of incarceration.
- Observe infants presenting with non communicating hydrocele, as often these will resolve on their own as the hydrocoel fluid is slowly reabsorbed. The only indications for surgery are: failure to resolve by 2 years, cause discomfort, become infected, or show variations is size.

50.10.3 TESTICULAR TORSION

This is a surgical emergency. A high level of suspicion is needed to avoid unnecessary morbidity.

Clinical Features

There is sudden onset of scrotal pain in a young male. The diagnosis is mostly clinical. Testicular torsion must be differentiated from epididymochitis.

Investigation

- Colour Doppler can be useful, but its absence should not delay diagnosis.

Management

- High index of suspicion needed for this condition.
- Rapid exploration of affected side and orchidopexy for both testes.

50.10.4 CIRCUMCISION

This is excision of the prepuce (foreskin of penis). Indications include ritual (religious, traditional, personal), phimosis, paraphimosis, recurrent herpes genitalis restricted to the prepuce, recurrent balanitis (inflammation of prepuce), balanoposthitis (inflammation of prepuce and glans penis), tight frenulum, long and adherent prepuce.

Method

For circumcision, the following are necessary:

- Clean and drape the perineum
- Use local anaesthesia, lignocaine 0.5% without adrenaline.
- Dilate the prepucial meatus with artery forceps.
- Retract foreskin and clean with warm saline.
- Make circular incision on inner skin approximately 3 cm from the corona, taking care not to injure the urethra and the glans penis.
- Pull foreskin over glands penis and make incision with surgical knife over the coronal sulcus. Leave adequate penile skin.
- Complete circumcision with scissors.
- Control all bleeders with clamps and ligatures.
- Suture incision with 3/0 vicryl on cutting needle.
- Use of Plastibel in circumcision of neonates is not recommended due to frequent injuries and is best left for experienced surgeons.
- Methods for infants, adolescent and adults are as described above. It can be performed under local anaesthetic.
- Do not use adrenaline.

50.10.5 ADOLESCENT HAEMATURIA

This clinical condition can be macroscopic or microscopic blood in the urine. In children, possible causes include glomerulonephritis, anaphylactoid purpura (Henoch-Schönlein purpura), fever, strenuous exercise, mechanical trauma (masturbation), foreign bodies , urinary tract infection (bacterial or parasitic), hypercalciuria/urolithiasis, sickle cell disease/trait, coagulopathy, tumours, drugs/toxins (NSAIDs, anticoagulants, cyclophosphamide, ritonavir, indinavir, anatomic abnormalities (hydronephrosis, polycystic kidney disease, vascular malformations, and hyperuricosuria.

Investigations

- Confirm the presence of and the extent of haematuria, as well as the primary cause.
- Determine secondary problems.

Management

- Treat the primary cause.
- Manage any complications.
- Refer those cases that need specialized investigations or management to a higher levels if they cannot be managed appropriately at present level.

50.10.6 HAEMATURIA IN THE ADULT

This is a common condition that has mostly benign causes. The commonest of these causes is urinary tract infection, while the most feared causes are malignancies of the urinary tract. Other causes include bleeding diathesis, urinary tract calculi, urinary tract trauma and hypertension. Macroscopic haematuria is more likely than microscopic haematuria to be due to urinary tract pathology. Ageing is associated with a higher incidence of significant urinary tract pathology.

Investigation
Should include the following:
- Urine for microscopy cytology
- Urinary tract ultrasound
- Kidney ureter and bladder (KUB), radiograph
- Urine for culture and sensitivity
- Flexible cystoscopy
- Rigid cystoscopy
- IVU
- CT scan abdomen

Management
- Identify and treat the underlying cause. Treatment for bladder cancer needs special emphasis as delay in diagnosis has morbidity and mortality implications.
- Address any complications that may have arisen.

50.10.7 URINARY RETENTION

- This is inability to pass urine while the urinary bladder is full. There is an urge to micturate and if not relieved, there is severe pain with straining. The causes vary with age and gender. The common causes are:
  - For children, meatal stenosis, phimosis or paraphimosis, posterior urethra valves, ruptured urethra after trauma, and constipation.
  - For adults aged 20–50 years, urethral stricture, calculi (bladder and urethral stones), bladder tumours, ruptured urethra (trauma), and postoperative (any perineal operation) clot retention.
  - For male adults older than 50 years, prostatism (benign prostatic enlargement, carcinoma of the prostate, prostatitis, prostatic fibrosis), calculi, urethral strictures, bladder tumours, ruptured urethra (trauma), and postoperative clot retention.
  - For females, bladder tumours, calculi, pelvic tumours (cancer cervix), urethral stenosis, and postoperative clot retention (severe haematuria).

It should be noted that spinal cord compression with paraplegia/quadriplegia results in urinary retention.

Management –- General
- Relieve acute retention by catheterization:
  - Pass a size 20FG Foley's catheter in adults or 10FG in children. If this passes and the bladder is emptied retain it. After urine is drained, the anteverted bladder returns to normal position.
  - All catheters must be well lubricated with non petroleum based gel (xylocaine, K-Y gel, etc.).
  - If catheterization fails, perform a suprapubic puncture 2–3cm above pubic crest
- If catheterization fails, use cystofix or suprapubic cystostomy and refer.

Management – Specific
- Perform circumcision for phimosis or paraphimosis [see circumcision].
- Refer more complicated cases.
- Carry out prostatectomy and urethroplasty as indicated.
- Treat cancer as indicated in cases of malignancy.

50.10.8 URETHRAL STRICTURE

Causes of urethral stricture include congenital, traumatic (usually follows fracture of pelvis), inflammatory (follows gonorrhoea infection, usually earlier in life) and instrumentation that results from indwelling catheter following endoscopy or postoperatively following prostatectomy or after amputation of penis.

Clinical Features

Usually occurs in younger patient (below 50 years). Early symptoms include passage of flakes in urine with early morning urethral discharge while the later symptoms include difficulties in micturition (narrow prolonged stream, dribbling, straining). There is urine retention with a distended urinary bladder.

History of urethral discharge in the past, history of pelvic injury, and history of instrumentation are significant. The urethra should be palpated for induration, and a rectal examination performed on all patients.

Investigations
- Urinalysis and culture and sensitivity
- Urea and electrolytes
- Micturating cystourethrogram and ascending urethrogram

Management
- Carry out suprapubic cystostomy or insert cystofix if there is retention of urine
- Conduct basic investigations as above and treat for urethral discharge before any treatment.
- Refer patient for definitive surgical treatment.

50.10.9 URETHRAL INJURIES

This may result from urethral trauma (for example a fall astride a projecting object, cycling accident), fracture of pelvis in road traffic accident, penetrating wounds (bullet wounds, etc.), and iatrogenic injuries.

Clinical Features
- Patient presents with difficulty or inability in passing urine.
- There may be blood at the external meatus.

Management at Level 4 and 5, or Where There Is No Urologist
- Admit for
  - Resuscitation and suprapubic catheterization.
  - Complications of ruptured urethra
  - Subcutaneous extravasation of urine and urethra stricture. This is made

worse by infection or iatrogenically by inadvertent attempts to catheterize or do urethrography or urethroscopy, early.
- Start on appropriate antibiotic cover.

The following should be noted:
- Do not catheterize the patient per urethra.
- Give analgesia: Morphine or pethidine.
- If bladder is full, empty through a suprapubic cystostotomy, but if the patient has passed urine "leave alone".
- Start antibiotics, first line nitrofurantoin 100mg 6 hourly for 7 days. For injuries at risk of infection with skin pathogens, use amoxicillin + clavulanic acid 625mg orally 8. Group and cross-match blood.
- Order a plain pelvic radiograph. An ascending and descending urethrogram should be ordered thereafter.
- Carry out the following procedure for suprapubic cystostomy under strict aseptic preconditions:
  - Clean the abdomen and hypogastrium well with an antiseptic and drape with sterile towels.
  - Feel for the distended bladder and 2–3cm above the upper pubic margin.
  - Infiltrate local anaesthetic.
  - Make a 2cm transverse incision and dissect the tissues with a haemostat.
  - Open the bladder under direct vision and introduce a 16F Foley's catheter.
  - Close the layers around the catheter with stitches.
  - Balloon the catheter and leave it to drain for 14 days (in the meantime refer the patient).
- Refer to urologist where indicated.

Management at Level 6
Definitive treatment will depend on which part of the urethra is ruptured, anterior (bulbous) or posterior (membranous). This is specialized treatment for which the patient should be referred to a urologist.

50.10.10 RUPTURED BLADDER

This usually follows a blow, a kick, or a fall on a distended bladder, gunshot or stab wounds, passage of instruments, endoscopic resection of prostate or bladder tumour, diathermy coagulation of bladder tumour, and operative procedures in the pelvis (for example, tubal ligation and hysterectomy).

Clinical Features
- The bladder may be injured intraperitoneally or extraperitoneally. Intrapentoneal rupture results in sudden agonizing pain in the hypogastrium, severe shock, with a rigid abdomen that distends slowly. The patient passes no urine. Rectal examination reveals a bulge in the pouch of Douglas. Extraperitoneal rupture displays similar symptoms as in rupture of posterior urethra described above.
- The patient experiences pain, has blood stained urine, and may show other features of the primary pathology.
- Severe peritonitis is an ominous complication that may develop if the patient is

not attended to within 12 hours. In situations of delayed attention, it may have a mortality rate of 100%.

Investigations
- Plain erect radiograph of the abdomen may show "ground glass" appearance of fluid in the lower abdomen.
- Intravenous urography will demonstrate a leak from the bladder.

Management
- Initiate resuscitation measures.
- If there is no fracture of the pelvis, pass a 14F Foley's catheter and a little blood stained urine may drain out.
- If not sure of diagnosis or at level 4, make immediate referral to higher level for appropriate management.
- Conduct laparotomy after resuscitative measures are taken.
- Repair the rupture in the bladder in two layers.
- Leave a urethral catheter in situ for 10–14 days.

50.10.11 BENIGN PROSTATE ENLARGEMENT (BPE)

Benign prostate enlargement causes lower urinary tract symptoms. A big prostate is not always symptomatic or problematic. A large prostate can cause damage to the kidneys, ureter, or bladder with minimal symptoms. Benign prostate enlargement is age related but not in a linear fashion. Symptoms increase with size, but also not in a linear fashion, and the condition does not always require surgery. Symptom evaluation of BPE must include the international prostate symptom score (Table 50.2).

Clinical Examination
Digital rectal examination (DRE) will reveal enlarged prostate, billobular with smooth surfaces (Interpretation of the prostatic specific antigen [PSA] level should be considered in view of the findings of the DRE.)

Investigations
- Urine for culture and sensitivity,
- Ultrasound of the urinary tract, and
- Prostatic specific antigen (PSA).

Management
This includes:
- Watchful waiting is for those with mild symptoms without damage to kidneys and ureters.
- Medical treatment (alpha reductase inhibitors, e.g., finasteride 5mg daily; review treatment after 6 months. Note: May require treatment for several months before benefit is obtained)
- Surgical treatment if necessary.

Surgery is reserved for those with complications, like retention that fails trial without a catheter. Note that retention without such a trial does not qualify as an absolute indication for surgery.

Table 50.2: International prostate symptom score (IPSS)

Name: _____ Date: _____

	Not at all	Less than 1 time in 5	Less than half the time	About half the time	More than half the time	Almost always	**Your score**
Incomplete emptying Over the past month, how often have you had a sensation of not emptying your bladder completely after you finish urinating?	0	1	2	3	4	5	
Frequency Over the past month, how often have you had to urinate again less than two hours after you finished urinating?	0	1	2	3	4	5	
Intermittency Over the past month, how often have you found you stopped and started again several times when you urinated?	0	1	2	3	4	5	
Urgency Over the last month, how difficult have you found it to postpone urination?	0	1	2	3	4	5	
Weak stream Over the past month, how often have you had a weak urinary stream?	0	1	2	3	4	5	
Straining Over the past month, how often have you had to push or strain to begin urination?	0	1	2	3	4	5	

	None	1 time	2 times	3 times	4 times	5 times or more	**Your score**
Nocturia Over the past month, how many times did you most typically get up to urinate from the time you went to bed until the time you got up in the morning?	0	1	2	3	4	5	

Total IPSS score	

Quality of life due to urinary symptoms	Delighted	Pleased	Mostly satisfied	Mixed – about equally satisfied and dissatisfied	Mostly dissatisfied	Unhappy	Terrible
If you were to spend the rest of your life with your urinary condition the way it is now, how would you feel about that?	0	1	2	3	4	5	6

Total score: 0–7 Mildly symptomatic; 8–19 moderately symptomatic; 20–35 severely symptomatic.

Other absolute indications for surgery include:
- Bladder stone
- Bladder diverticulum
- Intractable bleeding
- Raised creatinine
- Dilated ureters and kidney.
- Evaluation of the patient
- Conservative or definitive surgical management.
- Surgery includes:
  - Transurethral resection of the prostate (TURP)
  - Open prostatectomy

50.10.12 PROSTATE CARCINOMA

Clinical Features

There is poor urinary stream, haematuria, back or leg pain, as well as urinary urgency. Other features of secondary spread may also be present. Digital rectal examination typically reveals an irregular, firm prostate or nodule.

nvestigation
- Measurement of PSA levels either total or ratio of free to bound.
- Biopsy for histology; Gleason score suggestive of prognostic outcome.

Management
- Catheterize those with acute retention. If this fails, revert to a suprapubic cystostomy.
- Initiate other emergency treatment as needed.
- Initiate hormonal therapy for advanced disease. Either orchidectomy (surgical) or stilboesterol 1mg 8 hourly or LHRH analoges leuproreline (slow release) 3.75mg subcutaneous of IM, monthly.
- Administer antibiotics for infection according to culture reports. Start on nitrofurantoin 100mg 6 hourly and await cultures.
- Provide nutritional support.
- Assess renal function.

50.11 Ulcers and Tumours of the Skin

The causes of these include the following:
- Infections:
  - Bacterial: Mainly tuberculosis, leprosy, syphilis and anthrax
  - Fungal: For example, histoplasmosis.
  - Parasitic: For example, leishmaniasis
- Tumours:
  - Squamous cell carcinoma
  - Basal cell carcinoma
  - Melanoma
  - Kaposi's sarcoma

- Vascular:
  - Ischaemic (arterial)
  - Venous, venous insufficiency
  - Sickle cell disease
  - Diabetes,
  - Thromboangitis
- Trauma
- Tropical ulcers

Clinical Features

Ulcers are mainly found in the lower limbs but may occur on any part of the body. Examination should be thorough and systematic. The following are, with brief examples, the characteristics to note:

- ***Site:*** For example, 95% of rodent ulcers (basal cell carcinoma) occur on the upper part of the face; carcinoma typically to the lower lip, while syphilitic chancre affects the upper lip.
- ***Size:*** Carcinoma spreads more rapidly than inflammatory ulcer.
- ***Shape:*** Rodent ulcers are usually circular while straight edges are found in dermatitis
- ***Edge:*** Undermined occurs in tuberculosis, rolled edges in basal cell carcinoma, (Rodent), everted edges in squamous cell carcinoma, vertically punched out edges in syphilis and slopping edges in venous and traumatic ulcers.
- ***Base:*** Is palpably indurated in squamous cell carcinoma.
- ***Floor:*** When examined appears granulomatous in tuberculosis.
- ***Discharge:*** Purulent discharge indicates active infection while greenish discharge is seen in pseudomonas infection.
- ***Lymph nodes:*** Are enlarged mainly in malignant tumours.
- ***Pain:*** Occurs generally in malignant, tuberculous, and anal ulcers, while tropical ulcers are painless.

Investigations

This depends on the causative factor and may include:

- Haemogram
- Pus for culture and sensitivity
- Blood sugar
- VDRL
- Arteriography
- Biopsy for histology
- Mantoux test
- HIV screen
- Relevant radiographs to rule out bone involvement and/or infections.

Management

The following are important:

- Give antibiotics for infected wounds – flucloxacillin 500mg orally 6 hourly for 7 days.

- Conduct regular cleaning and dressing with antiseptic for 3 days.
- Give tetanus toxoid 0.5ml IM.
- Identify primary cause and if able to manage at this level, then manage.
- Carry out wound excision/skin graft if no healing of the wound observed.
- Order histology for chronic ulcers to rule out malignant conditions.
- If necessary, treat malignant and varicose ulcers by amputation and stripping of the varicose veins, respectively.

51. Dental and Oral Conditions

Oral health is an integral part of general health. It entails the health of the mouth (the oral cavity), the jaws, the teeth, and all the contiguous structures. Therefore, diseases, disorders, and conditions that may be diagnosed in this area of the body can be particularly diverse. Since the mouth constitutes the main gateway into the entire body, disease processes and disorders elsewhere in the entire body may also be reflected and diagnosed here. This chapter discusses the most common diseases, conditions, and disorders that health clinicians may encounter in their daily practice.

51.1 Bacterial Infections

The mouth is a favourite habitat of a myriad range of disease causing and commensal micro organisms. These include nearly the entire range of aerobes and anaerobes, as well as Gram-positive and Gram-negative microbes.
Commonly, sites and sources of bacterial infection in the orofacial area include:
Carious (decayed) teeth.
Root remnants in the jaws.
Periodontal infection.
Pericoronal infection.
Pre-existing pathology such as bone cysts, bone dysplasia and neoplasms.
Trauma to tissues.

Remarkably, bacterial infections in the oral cavity may take diverse clinical courses and presentations as outlined in the subsequent sections.

51.1.1 DENTAL CARIES AND PULPITIS

Dental caries is a microbial infection characterized by the demineralization of the inorganic component and destruction of the organic component of the teeth. It involves progressive damage of the enamel, dentine, and cementum initiated by microbial activity on any tooth surface in the oral cavity. It is also the most common cause of pulpal disease, which results from bacterial invasion of dentine and eventually the pulp. The spillage of microbial toxins into the tooth pulp through the caries lesion precipitates pulpitis.

DENTAL CARIES WITHOUT PULPITIS

Clinical Features

Clinically the tooth presents with a cavity and the patient complains of mild pain on either chewing or extremes of temperatures.

Management

- Dental radiographs: BBW/IOPA
- Oral hygiene instructions
- Diet counselling
- Fluoride therapy, especially for high caries risk
- Analgesics: Paracetamol 1gm orally 8 hourly or ibuprofen 400mg orally 8 hourly. Adjust dose according to age.
- Restorative procedures for carious teeth Either composite resin, amalgam, glass ionomer cement or compomer restoration.

DENTAL CARIES WITH PULPITIS

Clinical Features

- Sharp severe pain especially at night.
- Extreme tenderness of the affected tooth, which may imply impending pus formation.
- The tooth may be tender to percussion.

Management

In the absence of allergy, amoxicillin 500mg orally 8 hourly and metronidazole 400mg orally 8 hourly remain the most useful drugs.

- Depending on severity, direct or indirect pulp capping with CaOH2 may be considered for permanent teeth. Deciduous teeth where indicated would require pulpotomy and stainless steel crowns.
- Endodontic treatment with restoration of the tooth with irreversible pulpitis. Thereafter, crown prosthesis. For deciduous teeth, pulpectomy followed by restoration and stainless steel crown.
- Incision and drainage in the case of dentoalveolar abscess.
- Tooth extraction for grossly carious teeth.
- Provision of dental prosthesis where necessary.

51.1.2 PERIAPICAL AND DENTOALVEOLAR ABSCESS

Occurs secondary to an infective process in the pulp.

Clinical Features

Clinically presents with pain and localized swelling adjacent to the carious tooth. This swelling can be purulent and can spread to the adjacent mucosa depending on severity.

Treatment

- Initiate analgesics treatment: Ibuprofen 400mg orally 8 hourly.
- In the presence of an abscess: Give amoxicillin 500mg 8 hourly orally and metronidazole 400mg 8 hourly.

- Incise and drain the abscess; swab for culture and sensitivity.
- Institute root canal treatment for the offending tooth.
- Wait 3 days to extract the tooth if it is grossly carious to allow the abscess to subside. Provide dental prosthesis thereafter.

51.1.3 BACTERIAL SIALEDENITIS

Bacterial infection can lead to the inflammation of the salivary glands. Bacterial sialedenitis commonly affects the parotid gland, submandibular glands are rarely affected.

ACUTE BACTERIAL SIALEDENITIS

Clinical Features

This is characterized by sudden onset of unilateral pain at the angle of the mandible. The affected gland is enlarged, tender, and very painful. There is purulent discharge from the Stensen's duct. Patient may be febrile with other signs of inflammation. The condition is common in debilitated and dehydrated patients predisposed to xerostomia.

Management

- Give amoxicillin 500mg 8 hourly orally.
- Initiate analgesics treatment: Ibuprofen 400mg orally 8 hourly.
- Improve oral hygiene of the patient by debridement and irrigation.
- Carry out surgically drainage if indicated using needle aspiration.

CHRONIC BACTERIAL SIALEDENITIS

This is chronic or recurrent and may be idiopathic or associated with factors that cause ductal obstruction. The disease starts as an unilateral swelling at the angle of the mandible. The recurrent type shows periods of remission.

Management

- Give amoxicillin 500mg 8 hourly orally.
- Initiate analgesics treatment: Ibuprofen 400mg orally 8 hourly.
- Excise the sialolith.
- In intractable cases, excise the salivary gland.

51.1.4 CELLULITIS AND ABSCESS FORMATION

Orofacial cellulitis may emanate from any of the sources and sites given earlier. The principal micro-organisms that precipitate cellulitis produce diverse toxins, enzymes, and cytokines that destroy tissue to facilitate infection, which spreads through the contiguous fascial planes. In this way there is always the danger of the spillage of the infection into the bloodstream (septicaemia) and any adjacent vital organs and structures. When an acute infection emanates from the mandibular structures or the floor of the mouth and rapidly spreads to involve the bilateral fascial planes, it often culminates in a deadly condition referred to as Ludwig's Angina.

☛ ***All clinicians must endeavour to recognize these conditions most promptly, since death can occur in a matter of hours.***

Clinical Features
There is massive bilateral upper neck swelling with board-like feel on palpation. Tongue is raised towards the roof of the mouth and the floor is heavily indurated, the tissues having a cauterized-like surface. The patient is severely distressed because of respiratory embarrassment, and ***onset of stridor is ominous because it implies impending death.***

Management
The following management should be carried out:
- Admit the patient and institute specialist consultation promptly.
- Institute potential antimicrobial administration immediately as below.
  - Ensure secure airway during referral and provide competent escort.
  - If Ludwig's Angina is diagnosed, then clinicians consulted may consider surgical intervention including surgical decompression, and/or tracheostomy.
  - Where an abscess is diagnosed, incision and drainage must be performed promptly and antibiotics commenced after culture and sensitivity report.

For most acute bacterial infections in the orofacial area, the following should be done:
- Give amoxicillin 500mg orally 8 hourly for adults and amoxicillin suspension 125–250mg for children remain the most useful for empirical management. In case of allergy, erythromyic 500mg orally 8 orally.
- Consider metronidazole 400mg orally 8 hourly (for children metronidazole suspension 100mg orally 8 hourly) for 5–7 days, in addition to amoxicillin where anaerobic micro-organisms are suspected to play a major role.
  - In cases of severe infections, benzyl penicillin 2.4g IV 6 hourly + metronidazole 500mg IV 8 hourly + gentamicin 80mg IV 8 hourly.
  - Analgesics: Ibuprofen 400mg orally 8 hourly. For severe pain diclofenac 75mg IM 12 hourly.
- Rehydrate the patient with 5% dextrose alternating with normal saline.

☛ ***Clinicians must note that massive antimicrobial administration does not eliminate pus from tissues. Incision and drainage of the established pus is mandatory.***

51.1.5 CERVICOFACIAL NECROTIZING FASCIITIS

This is a bacterial infection that often requires special attention since it is associated with extreme morbidity. It is a mixed bacterial infection whose pathogenesis principally involves extensive and rapid destruction of fascia, almost exclusively around the neck and craniofacial area. The exact pathophysiology of the exclusive fascial damage remains unknown, however. Paradoxically, no specific micro-organisms have been implicated in the pathology of this condition. Once fascia is destroyed, the covering skin remains without nutrients and support, thereby breaking down to expose the underlying structures. Since this condition may not be as uncommon as medical literature may imply, clinicians are prompted to recognize it. The hallmark of the condition is that it may present

with little suppuration and yet there will be extensive fascial necrosis with consequent skin breakdown.

Management
- Admit the patient for rehydration.
- Initiate antibiotics: Amoxicillin + clavulinic acid 1.2g IV 12 hourly + metronidazole 500mg IV 8 hourly + gentamicin 80mg IV 8 hourly and intramuscular diclofenac 75mg IM 12 hourly.
- Swab for culture and sensitivity.
- Conduct surgical consultation for appropriate intervention: Mop out necrotic tissue meticulously with copious antiseptic irrigation (hydrogen peroxide/ povidone iodine).
- Dress exposed tissues appropriately and allow for adequate healing before plastic surgery intervention.

51.1.6 PERIODONTAL (GUM) INFECTIONS

The periodontium is a functional unit whose main roles include the support of the teeth within the jawbones and the provision of sensory information relating to the function of chewing. The components of the periodontium, therefore, include the alveolar bone, cementum, the periodontal ligament, and the gingiva (gum). Acute and chronic periodontal disease is one of the most common ailments affecting mankind. Some evidence of deterioration of the periodontal tissues can be demonstrated in almost all dentate adults. The periodontal tissues, like other tissues, are subject to inflammatory, degenerative, dysplastic, and neoplastic pathological changes.

GINGIVITIS

An inflammatory process that usually originates at the dentogingival junction and affects the functional gingival component of the periodontium. It is primarily a disease of the gingiva but may spread secondarily to the alveolar or oral mucosa. It presents with uneven red colour of the gums, thickened blunted margins, and 48swollen papillae. The gingiva is soft and boggy and may bleed on palpation.

Management
- Oral hygiene instructions.
- Chlorhexidine mouthwash 0.2% rinses or normal saline rinses.
- Dental prophylaxis.
- In severe gingival hypertrophy, gingivoplasty can be recommended.

PERIODONTITIS

Inflammation of the supporting structures of the teeth associated with the loss of attachment and alveolar bone. Characterized by gingivitis, periodontal pocket, gingival recession, tooth mobility.

Management
- Oral hygiene instructions.
- Chlorehexidine mouthwash 0.2% rinses or normal saline rinses.

- Full mouth scaling.
- In severe cases root planing is required, periodontal splinting.
- In severe tooth mobility (>3) tooth extraction may be indicated.
- Comprehensive periodontal management is required for aggressive forms of periodontitis.

PERICORONITIS

Is the inflammation of the gingiva covering a partially erupted or impacted tooth. Presents with deep pain, gingival swelling, pus production and gingivitis of the overlying gum.

Management

- Oral hygiene instructions.
- Chlorehexidine mouthwash 0.2% rinses or normal saline rinses
- In presence of an abscess initiate antibiotic therapy: Amoxicillin 500mg orally 8 hourly + metronidazole 400mg orally 8 hourly. Ibuprofen 400mg orally 8 hourly.

Surgical operculectomy is the modality of treatment. In the presence of an impacted tooth, surgical disimpaction is indicated.

ACUTE ULCERATIVE GINGIVITIS

This disease is reported to be highly prevalent in parts of our African region where it affects children and in groups of persons with congenital disorders such as Down's syndrome. Significantly, nutritional deficiencies arising from the prevalent poor socio-economic status of many of our populations may predispose to the occurrence of most cases that present with acute ulcerative gingival conditions. Poor oral hygiene may be prevalent where economic empowerment is low.

Management

- Oral hygiene with antibiotics and mouth wash with povidone iodine 1% 8 hourly.
- Benzyl penicillin 1.2g IV 6 hourly + metronidazole 500mg IV 8 hourly + gentamicin 80mg IV 8 hourly.
- Try to address the primary cause.
- Definitive management – periodontal cleaning.

GANGRENOUS STOMATITIS (CANCRUM ORIS, NOMA)

This is an infective condition of the orofacial tissues that may cause extensive tissue destruction with severe morbidity. The condition may initially manifest as an acute ulcerative necrotizing gingival infection that rapidly involves a block of the contiguous tissues culminating in their breakdown. Unfortunately, the clinical picture and changes associated with this condition may often be so rapid that even the keenest clinician may not notice the progression of the pathological events.

Management

- Admit the patient for empirical parenteral antimicrobial therapy (benzyl penicillin 1.2g IV 6 hourly and metronidazole 500mg IV 8 hourly).
- Give diclofenac 75mg IM 12 hourly.
- Institute parenteral nutritional support.
- Improve oral hygiene accordingly.
- Initiate prompt specialist consultation where feasible. This will probably require a multidisciplinary approach.

51.1.7 BONE INFECTIONS

Infection in the jawbones may be localized or generalized. Generally, the localized forms of infection are the most common, with the focal osteitis/alveolitis (dry socket) occurring 1 to 7 days following a dental extraction. This probably is the most common bone infection after dental extraction. Patients will complain of much more severe pain than a toothache. The pain is usually throbbing and deep seated. Analgesics often offer little help.

Clinical Features

Examination reveals a denuded, open tooth-socket with a scanty necrotic clot while the bone often appears literally dry hence the term, dry socket. On the other hand, infection may involve a large part of the jawbone, most often the mandible. An infective source may be anywhere within the oral cavity.

Such infection would then be rightly designated as osteomyelitis. In its acute form, severe pain and fever are significant presentations and may eventually develop suppurative osteomyelitis that may lead to sequestration. In other situations the acute phase may progress into the chronic sclerosing type of osteomyelitis that is not associated with sequestration. Fortunately, osteomyelitis of the jawbones has remained relatively uncommon with the improvement of oral health facilities and the availability of antimicrobial therapy in general.

Management of Focal Osteitis/Alveolitis

- Investigate using appropriate radiographs. BBW/IOPA
- ***Under local anaesthesia***, perform measures to debride the sparse necrotic clot and provoke fresh clot formation. Perform surgical curettage and irrigate copiously with normal saline.
- Pack the socket with alvogyl.
- Give tabs ibuprofen 400mg orally 8 hourly.
- Administer metronidazole 400mg orally 8 hourly and amoxicillin 500mg orally 8 hourly as these may be of benefit where there is evidence of infection.

Management of Jaw Osteomyelitis

- Initiate ibuprofen 400mg orally 8 hourly to control pain.
- Acute forms will require parenteral administration of an appropriate antimicrobial agent, e.g., clindamycin 300mg IM 6 hourly
- Eliminate any focus of infection where diagnosed.
- For chronic suppurative types, consider surgical intervention where sequestration has occurred.
- Investigate all patients to ascertain their immunological status.

51.2 Trauma of the Orofacial Tissues

Injury to the teeth and the supporting alveolar bone occurs quite frequently, especially among children. Other more severe injuries to the soft and skeletal tissues of the orofacial area commonly arise through road traffic accidents, sporting activities, and interpersonal violence. Such violence where guns and other missiles are used may lead to extensive tissue destruction with high morbidity.

Injuries of the tissues in the maxillofacial area can at first appear daunting, but it is important to follow the basic principles of resuscitation: secure the airway, maintain breathing, and ensure circulation as a priority.

51.2.1 OROFACIAL INJURIES

Management of All Orofacial Injuries

- Stabilize as appropriate and maintain an airway.
- Administer tetanus toxoid 0.5ml IM STAT.
- Give analgesics: Ibuprofen 400mg orally 8 hourly.
- If in level 4, refer to a higher levels for appropriate management.

Management of Jaw Fractures and Severe Soft Tissue Injuries

Mandibular fractures may present with swelling, pain and loss of function due to the derangement of occlusion: antimicrobial and analgesic cover is then mandatory.

- Give amoxicillin 500mg orally 8 hourly + metronidazole 400mg orally 8 hourly.
- For analgesia, give ibuprofen 400mg orally 8 hourly.
- Ensure that the fractured fragments are adequately bandaged: Use of a crepe bandage around the jaw and over the head should minimize fragment movement.
- Order an orthopantomogram, as this is he most useful radiographic investigation and should reveal the nature and severity of the fracture.
- Refer the patient for specialist surgical management.

Primary care for gunshot and missile-associated injuries entails the control of haemorrhage, surgical toilet, and suturing. Appropriate packing with antiseptic dressings (povidone iodine 10%) may be indicated in deep cavitating injuries where there is severe tissue loss.

☛ ***Do not be too aggressive at the primary surgical toilet procedure.*** Useful tissue may be salvaged by employing multiple staged procedures. This facilitates easier reconstructive procedures afterwards.

- For all severe injuries of the mid and lower face, protect the cervical spine. Hence choose any imaging investigation carefully. Where feasible and available, a CT scan of the full neck and cranium may be the most useful primary investigation.
- Avoid unnecessary plain radiographic views.

Criteria for the Admission of a Patient with a Craniofacial Injury

- Prolonged loss of consciousness reported.
- Clinician is not able to predict the consciousness status.
- There is evidence of severe blood loss necessitating replacement.
- There is persistent/recurrent headache.
- There is massive oedema in the facial region and especially in the floor of the mouth.
- Any condition that may adversely influence the stability of the airway.
- Evidence of general confusion of the patient.
- Clinician must use discretion to evaluate the minimum criteria that will necessitate the admission of an injured patient for appropriate management.

51.2.2 DENTAL INJURIES

Often teeth are injured during trauma and are fractured, displaced, or completely avulsed.

- Antimicrobial cover is then prescribed appropriately: amoxicillin 500mg orally 8 hourly + metronidazole 400mg orally 8 hourly.
- Meticulous oral hygiene should be emphasized.
- Soft diet is advised.

UNCOMPLICATED CROWN FRACTURE

Clinical Findings

- Fracture involves enamel or dentin and enamel.
- The pulp is not exposed.
- Pulp test may have a false negative initially.
- Observe pulp until a definitive pulpal diagnosis can be made.

Radiographic Findings

Fracture involves enamel and/or dentin. Pulp is not exposed.

- 3 angulations radiographs should be taken to rule out displacement or fracture of the root.
- Radiograph of lip or cheek lacerations is recommended to search for tooth fragments or foreign material.

Treatment

- If tooth fragment is available, consider whether it can be bonded to the tooth.
- Restore the tooth with composite resin.
- In case of severe crown fracture, consider a fixed prosthesis (crown).
- Primary teeth: Smooth sharp edges. If possible the tooth can be restored with glass ionomer filling material or composite filling.

COMPLICATED CROWN FRACTURE

Clinical Features

- Fracture involves enamel and dentin and the pulp is exposed.
- Pulp test may have a false negative initially.
- Observe pulp until a definitive pulpal diagnosis can be made.

Radiographic Findings

Fracture involves enamel and dentine and the pulp is exposed

- 3 angulations radiographs should be taken to rule out displacement or fracture of the root.
- Radiograph of lip or cheek lacerations is recommended to search for tooth fragments or foreign material.

Treatment

- In immature teeth, pulp capping (exposure <1mm) or partial pulpotomy with CaOH2. This treatment is also the choice in young patients with completely formed teeth.
- In older patients, root canal treatment can be the treatment of choice, although pulp capping or partial pulpotomy be considered.
- If exposure is >24 hours between accident and treatment root canal treatment is indicated.
- In extensive crown fractures, fixed prosthesis can be considered (crown)
- Extraction may be the last option.
- Primary teeth: Pulpotomy is indicated with subsequent restoration with a stainless steel crown thereafter. If not, extraction is the choice of treatment.

ROOT FRACTURE

Clinical Finding

- The coronal segment may be mobile and may be displaced.
- The tooth may be tender to percussion.
- Pulp test may have a false negative initially.
- Observe pulp until a definitive pulpal diagnosis
- Transient crown discoloration (red or grey) may occur.

Radiographic Findings

- The fracture involves the root of the tooth and is in a horizontal or diagonal plane.

Treatment

- Reposition, if displaced, the coronal segment of the tooth as soon as possible.
- Check position radiographically.
- Stabilize the tooth with a flexible splint for 4 weeks. If the root fracture is near the cervical area of the tooth, stabilization is beneficial for a longer period of time (up to 4 months). But this has poor prognosis.
- Monitor healing up to one year to determine pulpal status.
- If pulp necrosis develops, root canal treatment of the coronal tooth segment to the fracture line is indicated.
- In case of poor prognosis, extraction of the tooth is advised

Primary teeth: If the coronal fragment is displaced, extract only that fragment. The apical fragment should be left to be resorbed.

51.2.3 DENTAL-ALVEOLAR FRACTURE

Clinical findings

- The fracture involves the alveolar bone and may extend to adjacent bone.
- Segment mobility and dislocation are common findings.
- An occlusal change due to misalignment of the fractured alveolar segment is often noted.
- Sensibility testing may or may not be positive.

Radiographic Findings

- Fractures lines may be located at any level, from the marginal bone to the root apex.
- The panoramic technique is of great help in determining the course and position of fracture lines.

Treatment

- Reposition any displaced segment and then splint.
- Stabilize the segment for 4 weeks.
- Primary teeth: Same treatment as permanent. However, monitor permanent teeth in the fracture line.

51.2.4 CONCUSSION

Clinical Findings

- The tooth is tender to touch or tapping. No displacement, no mobility.
- Pulp tests are positive.
- Radiological findings are normal

Treatment

- No treatment is needed; same for primary teeth.
- Monitor pulpal condition for at least one year.

51.2.5 SUBLUXATION

Clinical Findings

- The tooth is tender to touch or tapping and has increased mobility but has not been displaced.
- Bleeding from gingival crevice may be noted.
- May get a false negative pulp test.

Radiological Findings

Radiographic abnormalities are usually not found.

Treatment

- A flexible splint to stabilize the tooth for patient comfort can be used for up to 2 weeks
- Primary teeth: Same treatment as permanent.

51.2.6 INTRUSIVE LUXATION

Clinical Findings

- The tooth is displaced axially into the alveolar bone. It is immobile and percussion may give a high, metallic (ankylotic) sound.
- Pulp test will give negative result. In immature, not fully developed teeth, pulpal revascularization may occur.

Radiographic Findings

The periodontal ligament space may be absent from all or part of the root.

Treatment

- Teeth with incomplete root formation: Allow spontaneous repositioning to take place. If no movement is noted within 3 weeks, recommend rapid orthodontic repositioning.
- Teeth with complete root formation: Reposition the tooth either orthodontically or surgically as soon as possible. The pulp will likely be necrotic and root canal treatment using a temporary filling with calcium hydroxide is recommended to retain the tooth.
- Primary teeth: If the apex is displaced toward or through the labial bone plate, leave the tooth for spontaneous repositioning. If the apex is displaced into the developing tooth germ, extract.

51.2.7 LATERAL LUXATION

Clinical Findings

The tooth is displaced, usually in a palatal/lingual or labial direction.

Radiological Findings

The widened periodontal ligament space is best seen on eccentric or occlusal exposures.

Treatment

- Reposition the tooth with forceps to disengage it from its bony lock and gently reposition it into its original location.
- Stabilize the tooth for 4 weeks using a flexible splint.
- Monitor the pulpal condition. If the pulp becomes necrotic, root canal treatment is indicated.
- In immature, developing teeth, confirm revascularization radiographically by evidence of continued root formation and possibly by positive sensibility testing.
- Primary teeth: If there is no occlusal interference, as is often the case in anterior open bite, allow the tooth to reposition spontaneously. When there is occlusal interference, with the use of local anaesthesia, gently reposition the tooth by combined labial and palatal pressure.
- In severe displacement, when the crown is dislocated in a labial direction, extract. If minor occlusal interference, slight grinding is indicated.

51.2.8 EXTRUSIVE LUXATION

Clinical Findings

The tooth appears elongated and is excessively mobile. Sensibility tests will likely give negative results.

Radiological Findings

Increased periodontal ligament space apically.

Treatment

- Reposition the tooth by gently reinserting it into the tooth socket.
- Stabilize the tooth for 2 weeks using a flexible splint.
- Primary teeth: Determine treatment on the basis of the degree of displacement, mobility, root formation, and the ability of the child to cope with the emergency situation. For minor extrusion (<3mm) in an immature developing tooth, careful repositioning or leaving the tooth for spontaneous alignment are acceptable treatment options. Extraction is the treatment of choice for severe extrusion in a fully formed primary tooth.

51.2.9 AVULSION

Clinical Findings

The tooth is completely out of the socket.

Treatment

- Reimplant immediately.
- Cleanse tooth with clean water. Storage/transport medium should include buccal succus, milk, normal saline, or saliva.
- Splint tooth for 4 weeks using a flexible splint.
- Primary teeth: DO NOT reimplant.

51.3 Orofacial Congenital and Dysplastic Conditions

Clefts of the lip and palate constitute the most commonly encountered congenital malformations. When they are particularly severe, they may pose feeding problems for the affected babies from birth. Special methods for feeding the affected children have to be instituted to facilitate normal growth and weight gain while awaiting surgical intervention Fortunately severe forms of this condition that necessitate such drastic and innovative feeding methods are rare.

Dysplastic lesions may include those that lead to aberrant tissue growths such as congenital epulides and natal and neonatal teeth. Dysplastic lesions of bone may manifest much later in life and should be easy to recognize. Although rare, some bone dysplasias may manifest with endocrine disorders that could have generalized effects. In the presence of any tissue malformation, therefore, clinicians are advised to institute a full investigation of the affected patient.

Ankyloglossia is a common condition in newborns that interferes with breastfeeding and with speech at a later age.

Management

- For cases with severe clefts, ensure adequate feeding.
- Where facilities are available special feeding devices can be fabricated.
- Otherwise nasogastric feeding should be the most important.
- Natal and neonatal teeth do not generally cause any impairment. Refer for their removal to allay parent anxiety that they could be inhaled or swallowed.
- Most congenital epulides may be excised under local analgesia, e.g., lignocaine 2% + adrenaline 1:80,000 local infiltration. They hardly recur.
- Bone dysplasias may be monitored appropriately until criteria for surgical intervention are defined.
- Cases with clefts should be advised for immediate follow-up and management at an appropriate facility.
- Speech therapy is advisable in all cases of cleft palate.
- Surgical excision of ankyloglossia should be carried out to avoid speech disturbance.

51.4 Cysts and Benign Tumours of the Orofacial Region

Cysts may occur in soft tissues or facial bones. They are generally slow growing and painless. Eventually they cause swelling and disfigurement. As for the bony cysts, pain may manifest due to tissue tension and/or supervening infection.

Similarly, benign tumours of the orofacial region may originate from either soft tissue or bone. Those originating from bone are much more common and often manifest late when function and disfigurement prevail. Among these neoplasms, ameloblastoma is the most important since it is the most common and particularly locally infiltrative. Early identification of this condition is extremely important because of the capacity of this tumour to infiltrate the surrounding tissues. The ossifying/cementifying fibroma is the next most important benign tumour that should be diagnosed early since it can also cause severe disfigurement.

Management

- Institute appropriate radiographic imaging to define the nature of the lesion.
- Aspiration of soft tissue lesions for cytological analysis where feasible is useful.
- Incisional biopsy or Excision biopsy for all benign tumours is mandatory.
- The odontogenic keratocyst has now been classified as a benign infiltrative tumour of the jawbones. A diagnostic incisional biopsy must, therefore, be performed to ascertain its existence before surgical extirpation is executed.
- Surgical management includes enucleation or marsupialization

51.5 Malignant Neoplasms of the Orofacial Region

- It must be recognized at the outset that the mouth, jaws, and facial region constitute an area of the body that manifests the highest diversity of neoplastic pathology. All clinicians ought to be particularly vigilant to this reality.

- Embryologically and developmentally, the oral cavity and the jaws consist of tissues and organs originating from all the three embryonic stem tissues: the ectoderm, mesoderm and endoderm. Basically, the classification of malignant neoplastic pathology anywhere in the body essentially follows this premise.
- These neoplasms may be broadly classified as those of epithelial, mesenchymal, and vasorformative in origin.
- Owing to its prevalence, oral squamous cell carcinoma (OSCC) constitutes the most important malignant neoplasm of epithelial origin. The aetiological factors associated with this neoplasm include tobacco use and sustained alcohol consumption. Apparently, immunosuppressive conditions may precipitate the prevalence of OSCC. Malignant neoplasms whose cells of origin are mesenchymal in nature are broadly classified as sarcomas. As a group almost all these lesions have hardly any identified definite aetiological associations. Sadly, effective management of almost all the lesions remains most disheartening.
- Cells of the mononuclear-macrophage system (the reticulo-endothelial systems) may also give rise to malignant neoplasms manifesting in the orofacial region.
- Among these, lymphomas are common, with Burkitt's lymphoma being the most common type.

Management

- Order appropriate radiographic imaging, as it may be of value.
- Refer the patient immediately for a diagnostic biopsy procedure.
- Identify a centre that can deal effectively with specific neoplastic lesions and advise the patient accordingly.
- Where necessary, give analgesia: Ibuprofen 400mg orally 8 hourly .

51.6 Neuropathies of the Orofacial Region

51.6.1 PAROXYSMAL TRIGEMINAL NEURALGIA

This condition carries very high morbidity because of the severe often intractable pain associated with it. This disease is common among middle-aged and elderly persons. Patients may report sequential symmetrical tooth extraction with no relief of pain. There is no known aetiological factor. The pain will be reported as severe and lancinating, lasting only a few seconds at particular sites (trigger zones) known to the patient. Often, sleep may not be disturbed at night. During the day there are usually multiple attacks of pain.

Management

- Listen to the history of the pain carefully.
- Establish that there are no other lesions that may precipitate similar pain.
- Give analgesia – Diclofenac 100mg orally once daily for 3 days. After 3 days reassess.
- Always examine the patient while you have a syringe loaded with local anaesthetic with lignocaine 2% (preferably a dental syringe).
- In the event that an attack occurs, quickly infiltrate the anaesthetic directly at

the trigger zone. The patient will report immediate pain relief. This is diagnostic of the condition.
- Institute treatment accordingly: Carbamazepine 100–200mg orally nocte ***OR*** 100mg orally 12 hourly constitute the mainstay of treatment. Always start with the lowest recommended dosage of either formulation. Monitor the condition for at least 1 week and adjust the dosages appropriately. Get a physician's review. Since this treatment is often open-ended, review the patients regularly and evaluate haematological indexes accordingly. An assay of the drug in the serum may also be necessary.
- For patients who may have suffered for lengthy periods without treatment, emotional instability will be clinically apparent. Therefore, provide backup treatment with a tricyclic antidepressant e.g., amitriptyline 25mg orally 8 hourly for a week, then 50mg nocte as maintenance.
- Note that suicidal tendencies among patients whose pain is poorly managed are remarkable.

51.6.2 FACIAL PALSY

Facial palsy may manifest as a result of a variety of factors, including trauma, deep seated craniofacial neoplastic lesions, and non-specific viral infections. More commonly, the idiopathic type of facial palsy (Bell's palsy) is seen. The history of the condition is often short and there may be no clear-cut associated aetiological events.

Management
- Take a clear history to try to determine the type of facial palsy.
- Order craniofacial radiographic imaging and/or magnetic resonance imaging where indicated.
- Use an eye pad to protect the eye on the affected side.
- Institute steroid treatment over a 10 day period. Tabs prednisolone 15mg 8 hourly for 2 days then 10mg 8 hourly for the next 2 days then 5mg 8 hourly for the next 3 days, then 5mg 12 hourly for the remaining 3 days.
- Refer for any long-term definitive management.

51.6.3 HERPETIC INFECTIONS

The herpes group of viruses and especially Herpes zoster constitutes one of the most common causes of vesiculo-bullous lesions in the orofacial region. The lesions are usually of acute onset manifesting with irritating pain. Where there is underlying immunosuppression due to HIV infection, fulminating Herpes zoster infection may cause extensive
damage of the periodontium leading to spontaneous tooth exfoliation from the affected jaw segments. After the acute phase of the herpetic infections, the cutaneous lesions heal with scarification accompanied by hyperaesthesia over the affected area. This post-herpetic facial neuralgia is often difficult to manage effectively.

Investigations
Investigate for HIV, carry out Mantoux and examine the sputum.

Management

- Diagnosis of the acute lesions is often made clinically as the crops of vesicles are typical.
- ***Do not touch these lesions without gloved hands.***
- In the acute phase, administration of tabs aciclovir 200mg orally 5 times daily for 7 days is the mainstay of treatment. In immunocompromised, patients give 500mg orally 8 hourly for 10 days.
- Apply lignocaine 1% cream PRN 5–7 days to manage hyperaesthesia.
- Diclofenac 100mg orally once daily may be chosen where pain is persistent (post-herpetic neuralgia). Add carbamazepine 200mg orally 12 hourly if pain persists.

51.7 Temperomandibular Joint (TMJ) Disorders

51.7.1 TEMPOROMANDIBULAR JOINT DYSFUNCTION

Temporomandibular joint pain and dysfunction remain enigmatic in terms of aetiology and pathogenesis. The condition may be intertwined with stressful life events that are often difficult to elucidate clinically. The condition has become particularly common in persons in their 2nd decade of life and above.

Generally, TMJ pain can be most variable in quality, may be nonspecific and without any clear-cut associated local events. However, it is often possible to correlate the manifestation of TMj pain with painful conditions in other areas such as the spine, recurrent headaches, and even abdominal cramps. No radiographic or other imaging modality may demonstrate a tangible biologic basis for the dysfunction and pain. Currently, professional consensus worldwide indicates that this group of conditions should be referred to as temporomandibular joint disorders (TMDS).

Management of TMDS

- Essentially, manage emerging symptoms and especially pain.
- Tricyclic antidepressants: amitriptylline 25mg orally 8 hourly for 7 days, remains useful.
- Ibuprofen 400mg orally 8 hourly.

Investigate selectively to rule out any "organic" changes in TMJs.

- Note that, overall, expensive and extensive high tech investigations may yield little value in the management of the individual.
- Evaluate the patient and collectively settle on a management modality that the patient feels offers relief.
- Avoid active invasive surgical intervention unless there is firm evidence that surgery would offer help.
- Consult for alternative opinion – maxillofacial surgeons.

51.7.2 TMJ DISLOCATION

This is the excursion of the mandibular condyle beyond the normal range, where it is displaced out of the glenoid fossa, much anteriorly beyond the articular emminence, but still remaining within the TMJ capsule.

Management
- Analgesia paracetamol 1,000mg orally hourly or Ibuprofen 400mg 8 hourly.
- In acute dislocation, manipulation for reduction with or without anaesthesia. Local or general anaesthesia may be required. Muscle relaxants or sedatives may also be indicated.
- In chronic recurrent dislocation:
  - Mandibilar manipulation for reduction with intermaxillary fixation to limit the mouth opening. (crepe bandage may be used as a substitute).
  - Surgical intervention, e.g., eminectomy, capsule tightening, or creation of a mechanical block may be necessary.

51.8 Oroantral Communication and Fistula

This is an unnatural communication between the oral cavity and the maxillary sinus. Commonly occurs after the extraction of the upper posterior teeth.

Clinical Features
- Escape of fluids from the oral to the nasal cavity
- Epistaxis
- Escape of air from the mouth to the nose
- Pain
- Persistent purulent or mucopurulent nasal discharge

Management
- Amoxicillin 500mg 8 hourly orally.
- Ibuprofen 400mg 8 hourly orally
- 0.9% normal saline nasal drops
- Surgical intervention

51.9 Edentulism

Teeth are missing as a result of trauma or disease, or congenitally missing.

Management
- Removable prosthesis: Partial dentures, complete dentures, or overdentures.
- Fixed prosthesis: Crowns, bridge, or implants.
- In deciduous dentition, space management should be considered to prevent loss of arch length.

51.10 Malocclusion

This is a deviation from the ideal occlusion. It can be a result of skeletal or dental discrepancy.

Management
- Removable orthodontic treatment
- Fixed orthodontic treatment
- Orthognathic treatment with orthodontic treatment

51.11 Dental Fluorosis

This is a disturbance of the tooth structure caused by excessive intake of fluoride during the tooth development stage. It is characterized by hypomineralization of the inorganic component, which will present with tooth discoloration, pitting of the teeth and in severe cases brown discoloration of the teeth with destruction of the surface. In some cases there is extreme sensitivity to temperature extremes.

Management
- Topical fluoride therapy where there is sensitivity.
- Microabrasion or bleaching may be attempted.
- Restorative techniques to restore aesthetics: Composite masking, porcelain veneers, porcelain crowns.

52. Ophthalmology

52.1 Clinical Guidelines For Eye Care

In Kenya eye diseases are ranked eighth among the top 10 causes of morbidity. Blindness prevalence is estimated at 0.7%. At the current population this translates to about 224,000 people being blind, with close to 672,000 suffering from low vision. Eighty per cent of the causes of blindness are either curable or preventable through primary eye care (MOH, 2004).

52.1.1 WHAT IS IMPORTANT TO KNOW
- Always check the vision for all patients using the Snellen's chart.
- Take good eye history.
- Do eye examination using a torch.

52.1.2 WHAT TO BE CAUTIOUS ABOUT
- Never use steroid containing medicines on the eye without a prescription from an eye specialist.
- Never put any medicines on any eye that may have been perforated.
- Never use atropine drops or ointment without a prescription from an eye specialist.
- Never use traditional eye medicines in the eye.

52.2 Ophthalmia Neonatorum (Conjunctivitis of the Newborn)

Clinical Features
There is bilateral copious pus discharge in the first month of life.

Management
- If signs of ophthalmia neonatorum develop, refer to higher level to attend eye clinic immediately.
- Apply tetracycline eye ointment 8 hourly.
- Apply gentamycin eye drops both eyes 2 hourly ***OR***
- Give IM gentamycin 5mg/kg single dose or Kanamycin 25mg single dose.
- Give doxycycline eye ointment to all newborns at birth.
- Manage complications like corneal ulcer when they are observed.

52.3 Congenital Cataract

Opacification of the lens that may be progressive and not detectable at birth.

Clinical Features
There is loss of or irregular red reflex. Check CNS and ears for other possible associated anomalies.

Management
- Refer to specialized centres for childhood eye diseases.
- Carry out cataract surgery or other treatments as needed.

52.4 Senile Cataract

It is estimated that 43% of blindness in Kenya is due to cataract. The senile form is a slow lens thickening secondary to degeneration. The condition is highly amenable to correction.

Clinical Features
There is slowly progressive painless visual loss or blurring affecting one or both eyes with increasing glare, showing a white pupil.

Management
- Lens extraction is the definitive management.

52.5 Childhood Blindness

Approximately 10,000 cases of childhood blindness occur annually. The causes include congenital cataract, corneal diseases, measles disease, congenital glaucoma. and retinoblastoma.

Clinical Features
The features are dependent on underlying condition but may include:
- Poor vision (older child)
- Squint (lazy eye)
- White pupil
- Growth in the eye
- Protruding eyeball

Management
Refer to eye specialist for appropriate management.

52.6 Retinoblastoma

This condition usually occurs among under-5's and is diagnosed on average at about 24 months of age. It may present as a unilateral or bilateral lesion. Retinoblastoma is associated with increased risk of developing pineal tumour. Up to 40% of this condition is hereditary.

Clinical Features
- Leukocoria – White pupillary reflex
- Crossed eye or strabismus
- Red painful eye
- Poor vision

Investigations
- Indirect opthalmoscopy
- Examination under anaesthesia
- Skull and other radiographs + CT
- Metastatic screen

Management
- At level 4
  - For advanced disease, perform enucleation.
- At level 5 and 6
  - Laser and cryotherapy
  - Radiation techniques used but external beam associated with spread of disease through radiation induced tumours.

52.7 Trachoma

- Trachoma is the leading cause of preventable blindness in Kenya and accounts for 19% of blindness.
- Eighteen districts are trachoma endemic: Baringo, Kajiado, Narok, West Pokot, Turkana, Marsabit, Samburu, Koibatek, Meru North, Laikipia, Murang'a, Mbeere, Isiolo, Mwingi, Transmara, Kitui, Makueni, Moyale.

Clinical Features
There is mucopurulant discharge associated with conjunctiva and corneal scarring and inward turning of eye lids and lashes, causing pain and ulceration. There is loss of vision.

Management
- Give tetracycline eye ointment 3 times daily for 6 weeks ***OR***
- Give tabs azithromycin 1g annually for 3 years as mass treatment.
- Promote regular face washing.

- Improve environmental sanitation and disseminate health education.
- Correct entropion/trichiasis surgically.

52.8 Glaucoma

Glaucoma is associated with approximately 25,000 blind cases in Kenya.

Clinical Features
- There is unexplained gradual decrease in central or peripheral vision.
- In children, the cornea is bigger and hazy.

Management
- Treat at level 4 and above.
- Topical beta-blockers, e.g., timolol or betaxolol, 1 drop BD.
- Surgery is definitive.

52.9 Refractive Errors

Clinical Features
These include the following:
- Decreased vision
- Frontal headaches
- Squinting
- Inappropriate viewing distance
- Eye strain

Management
Refer to eye specialist for management of refractive errors.

52.10 Vitamin A Deficiency

Clinical Features
These include the following;
- Dry eye
- Foreign body sensation
- Eye pain
- Night blindness
- Severe loss of vision
- In most cases features are of gradual onset
- Complications include:
  - Corneal ulcers

Management
- Give vitamin A supplement, 200,000IU as capsules once in 6 months, starting at 6 months to age 5 years.
- Immunize against measles.
- Manage complications.

52.11 Herpes Zoster Ophthalmicus (HZO)

Clinical Features
The following features occur:
- Acute vesicular skin rash that follows the 5th cranial nerve dermatome
- Blurred vision
- Eye pain
- Red eye
- Fever
- Malaise

Management
- For pain relief – Diclofenac 50mg orally 8 hourly for 3 days or carbamazepine 200mg 12 hourly orally for 7 days
- Tetracycline eye ointment TDS.
- Pad the eye.
- Refer to eye clinic immediately.

52.12 Chalazion

This is an inflammation of the meibomian glands of the eyelid that typically forms a granulomatous inflammatory mass.

Clinical Features
The affected patient complains of eye discomfort. Typically there is a hard, painless eyelid swelling away from the lid margin.

Management
- Incision and drainage.

52.13 Painful Red Eye

A condition that should not be underestimated and one that signifies some underlying inflammatory process. A good history and physical examination may aid in identifying the primary cause. It is important to rule out emergency ophthalmic conditions and refer these immediately.

Management
- Analgesics – Paracetamol 1g TDS.
- Refer to eye clinic especially if there is visual loss, significant trauma, and tearing.

52.14 Unexplained Loss of Vision

This frightening condition can have many causes, some of which are associated with poor prognosis. Obvious causes like space occupying lesions, metabolic disorders, blood disorders, and HIV/AIDS should be looked for.

Management
Refer to eye specialist for appropriate management.

52.15 Allergic Conjunctivitis

This is an immune mediated conjunctivitis that may present seasonally or without a specific pattern.

Clinical Features
- Itching, which may be bilateral
- Watery discharge
- Redness
- Photophobia

Management
Management of this condition includes the following:
- Application of cold compress
- Antihistamines – sodium chromoglycate eye drops TDS
- Add steroid eye drops to the treatment.

52.16 Viral and Purulent Conjunctivitis

Clinical Features
- Watery eye or pus in the eye
- Redness of the eye

Management
Management of this condition includes the following:
- Tetracycline eye ointment 1% 8 hourly for 7 days ***OR***
- Gentamicin eye drops 0.3% 6 hourly for 7 days.
- Prevention is by good eye hygiene.
- Refer if no improvement.

52.17 Asthenopia (Eye Strain)

Clinical Features
There is normal vision but pain while reading

Management
- Reassurance
- If pain persists refer to an eye specialist for appropriate management.

52.18 Corneal Ulcers

These commonly occur and involve loss of epithelium and usually heal spontaneously. Some form of trauma is associated with these ulcers in most cases.

Clinical Features
- Red eye
- Photophobia (intolerance of light)
- Sensation of foreign body in eye
- Tearing
- Pain

Management
- Tetracycline eye ointment 4 times daily, then refer to eye clinic immediately.
- Gentamicin eye drops 2 hourly as alternative.
- Eye pad.
- Manage complications.

52.19 Stye

This is an infection of the follicles or tarsal glands and is localized to the eyelids.

Clinical Features
There is an acute painful swelling localized on the lid margin that may cause swelling of the entire eyelid. On examination ensure the underside of the eyelid is examined.

Management
- Warm water compresses.
- Tetracycline eye ointment 1% 8 hourly for 1 week.
- If no improvement within a week refer to eye specialist.
- At specialized centres – surgical drainage.

52.20 Eye Trauma

The eye is a delicate external organ and it is easy for it to be injured. Eye injuries are generally classified as penetrating and non penetrating and include corneal and conjunctiva foreign bodies and abrasions, burns (dry heat and chemical burns), blunt trauma (contusion), penetrating injuries to the eye ball (perforations), injuries to eyelids, orbital injuries, and cranial nerve injuries.

A good evaluation of eye injury includes the following:
- Checking vision for all patients.
- Good lighting and magnifying lens make eye examination easier.
- Eye examination to be carried out should be thorough, noting that a small entry wound does not always equate to minimal injury.

Management
- Corneal and conjuctival abrasions:
  - Pad the eye with doxycycline eye ointment 1% for 24 hours.
  - Stain with flourescein and then manage accordingly.

- Foreign bodies:
  - Use moist cotton swabs.
  - Remove under local anaesthesia (by a trained person) then pad the eye.
  - Apply doxycycline eye ointment 1% 3 times a day.
  - Refer to higher level if at 4 or 5 and un able to remove or if the instruments are lacking.
- Blunt trauma:
  - Give analgesics.
  - Rest the eye.
  - Caution as this may be a ruptured eyeball.
  - Deal with or refer those with poor vision and/or blood in the eye (hyphaema) immediately to next level if not able to manage.
- Chemical burn:
  - Urgently irrigate the eye with plenty of water or normal saline for 30 minutes. Note that washing the face is not enough.
  - Use local anaesthetic ophthalmic drugs, e.g., lignocaine 4% eye drops.
  - Pad with tetracycline eye ointment 1%.
  - Refer immediately to higher centre, preferably with an eye specialist.
  - Deal with complications or refer to eye specialist very urgently. Complications depend on the concentration of the chemical and the duration it stayed in the eye.
- Penetrating eye injuries
  - Give an injection of tetanus toxoid (IM) STAT.
  - DO NOT apply topical medications to the eye.
  - Protect the eye with a clean pad or shield.
  - Refer without delay to a resident eye specialist. Communicate directly with specialist prior to transfer.
- Lid injuries
  - Dress wound.
  - Give tetanus toxoid.
  - Lids have very good blood supply and so healing is good.
  - Stitch minor cut not involving lid margin if you are a trained person.
  - Avoid distorting the lid margin.
  - Refer if tissue loss and all patients injured lacrimal drainage system (nasal angle of the eye).
  - Septic lacerations should be cleaned and covered with systemic antibiotics benzyl penicillin 1.2g IV 6 hourly + gentamicin 80mg IM 8 hourly for 7 days.
  - Note: Refer all patients with injuries involving the lid margin.
- Orbital injuries
  - Proptosis (protruding eye) or diplopia (double vision) suggest serious eye injury for which specialist assessment and treatment are required.
  - Tetanus toxoid injection STAT should be given if there is an open wound.
  - Take orbital x-ray of patients with suspected fractures of the orbit.
  - Give systemic antibiotics (penicillins: amoxicillin 500mg 8 hourly or amoxicillin + clavulanic acid 625mg 12 hourly), and analgesics (paracetamol 1g orally 8 hourly and for children refer to appropriate appendix).
  - Refer for specialized treatment.

52.21 Orbital Cellulitis

This is a deadly ophthalmic emergency. It present with severe periorbital pain and swelling, proptosis, spiking temperatures and restricted eye movements. May complicate with cerebral involvement.

Management
- Aggressive as for meningitis.
  - Ceftriaxone 1g BD injection with metronidazole 500mg IV TDS for 10 days.
- Strict monitoring of vital signs.

52.22 HIV and the Eye

Examination
- Painless blurring or loss of vision.
- Flash lights and floating spots.
- Retinal haemorrhages and cotton wool spots.

Treatment
- Anti retroviral medications (see Section 2.1.6)
- Intra vitreous foscanate (pellet)

53. Orthopaedics and Fractures

53.1 Fractures

- Definition – Discontinuity of bone
- Classification
  - Open (compound)
  - Closed

Most fractures are secondary to trauma, although pathological fractures secondary to tumours, infections, osteoporosis, and congenital deformities also occur. Fractured bone segments may communicate with wound while the skin over it is intact (closed fractures) or with the skin broken and therefore exposed to the outside (open or compound). Compound fractures are always contaminated.

53.1.1 OPEN / COMPOUND FRACTURE

- The treatment is as for closed fractures except that these are contaminated and the following should be done first:
  - Thorough surgical toilet and debridement (in theatre)
  - Give tetanus toxoid and antibiotics
  - External fixation is preferred for these fractures

- Note that delayed healing may occur due to:
  - Poor immobilization
  - Poor reduction
  - Poor blood supply
  - Infections
  - Soft tissue interposition and
  - Systemic diseases
- Complications of compound fractures include fat embolism, neurovascular injuries, infections, joints stiffness, non union, mal-union, and delayed union

Management
- Rehabilitation
- Physiotherapy, orthotic fitting
- Occupational therapy
- Orthotic fitting.

53.1.2 CLOSED FRACTURES
The bone fragments do not communicate through the skin.

Clinical Features
- Pain
- Swelling
- Loss of function
- Abnormal movements/deformity/crepitus
- Signs of blood loss and neurovascular complications, e.g., pulselessness, cold extremity, and bleeding. Always look for compartment syndromes.

Investigations
- Haemoglobin, packed cell volume
- Group and cross match blood for fractures of major bones
- AP and Lateral radiographs of the affected bones. Some fractures may need special views, e.g., hip fractures.

Management
- Give ibuprofen 400mg TDS.
- Splint the fracture; this prevents soft tissue damage and also reduces pain. Familiarize yourself with the Thomas splint and how to apply it appropriately.
- Must check the peripheral circulation and innervation within 24 hours of plaster application.
- Reduce fracture under sedation or general anaesthesia.
- Immobilize with POP (plaster of paris) traction, or splints, e.g., Thomas or Braun splint. (Refer to Table 53.1 for the period of immobilization in plaster.)
- Fixation: This operative procedure can be internal or external fixation. Internal fixation is recommended for femoral fractures.
- At levels 5 and 6, carry out all the above and manage complicated fractures e.g., associated vascular and nerve injuries.
- Check radiograph before removing the splint.

Table 53.1: Period of immobilization in plaster

	Adults	Children
Upper limbs	6–8 weeks	3–4 weeks
Lower limbs		
Femur only for children below 6 years		6 weeks
Tibia	8–10 weeks	4–5 weeks

For all fractures it is essential to check for neurovascular complications pre and post cast application. If present, immediately split the plaster or decompress the affected compartment.
Hazards of POP consist of the following:
- Compartment syndrome
- Gangrene and even loss of limb
- Stiffness of joint
- Contractures
- Skin reactions
- When POP harbours insects

53.2 Joint and Tendon Injuries

These injuries are usually due to sports injuries, road accidents, assault and occupational hazards. They should be handled as emergencies. They can be classified as:
- Dislocations
- Fracture dislocations
- Haemarthrosis, which may occur as a complication of any of the above injuries or may occur spontaneously as in haemophilia.
- Ligamentous injuries may occur following twisting, traction or bending forces

Usual sites of joint and tendon injuries include:
- The knee: Commonly affected are the medial and lateral, collateral, and the cruciate ligaments, occasionally the menisci.
- The ankle joint: This is a major weight-bearing joint and its stability depends on the surrounding ligaments. Proper diagnosis and accurate reduction is important if congruency of the joint is to be maintained.
- The elbow: Dislocations here occur in the posterior direction resulting from a fall on an outstretched hand. Spasm of the triceps muscle then locks the elbow in the dislocated position.

Clinical Features
In general joint injuries present with the following:
- Pain
- Swelling
- Loss of function
- Deformity
- Crepitus (if there is an associated fracture)
- Neurovascular complications

Diagnosis
This is made after clinical examination and radiology.

Management
Treatment of dislocation should be urgent because of possible damage to neurovascular structures.
- Relieve pain and inflammation with ibuprofen 400mg TDS.
- Splint of the dislocation/fracture
- Urgently reduce and immobilize. If you are not familiar with the procedure do not attempt reduction; refer immediately.
- Check radiograph and refer if reduction is not accurate.
- Reduce dislocation under general anaesthesia if need be.
- Stabilize reduced joint.
- Initiate physiotherapy and occupational therapy.
- Immobilize for 2 to 3 weeks.

53.3 Club Foot (Typical Talipes Equinovarus)

- Deformity
  - Heel inverted
  - Forefoot and mid foot inverted and adducted (Varus)
  - Ankle in equinius (the foot is planterflexed with toes at a lower level than heel)
- Incidence: Clubfoot is one of more common congenital deformities of the foot, as indicated in Table 53.2.
  - It is bilateral in 50% of cases, and heredity plays a role:
    - Monozygotic twins: 32.5%
    - Dizygotic twins: 2.9%
  - There is rapid decrease in incidence from first to second to third degree relatives (2.9% of siblings, 0.6% of aunts and uncles, and 0.2% of cousins.
  - It is thought that intra-uterine mechanical factors may also play a role.

Table 53.2: Prevalence of clubfoot

Sex ratio	Male: Female ratio 2:1
Race incidence:	
Caucasian	1.12 cases per thousand births
Japanese	0.53 cases per thousand births
Chinese	0.39 cases per thousand births
South African Black	3.50 cases per thousand births
Polynesian	6.81 cases per thousand births

Management
- Early serial splinting is important. An above the knee cast is applied with the knee in 90° of flexion. Cast is changed once to twice weekly.
- Ponseti technique of casting has a greater chance of succeeding in foot correction.

- Where available, a foot abduction splint is used for several weeks after achieving foot correction.
- Complications
  - Pressure sores due to tight casts.
  - Rocker bottom deformity of the foot.
  - Failure to achieve correction.
- Where conservative treatment fails, refer the baby to an appropriate facility.

53.4 Acute Osteomyelitis

This is caused by haematogenous spread of bacteria from a primary source, which may or may not be obvious. The commonest causative agent is Staphylococcus aureus. Other organisms that may be responsible include Streptococcus pyogenes, Pneumococus pneumoniae, Staphylococci albus, and sometimes Salmonella typhi in sickle cell disease.

Clinical Features

- Pain is the major presenting symptom. The severity increases with time. There is accompanying fever and the patient becomes toxic. The main physical signs are localized tenderness, loss of function of the limb, and swelling. Commonly involved bones are proximal tibia, distal femur, and distal humeri.
- The clinician needs to have a high index of suspicion for this condition, especially in children following a minor fall.

Investigations

- Haemogram: A leucocytosis will be demonstrated.
- Radiograph of affected limb may not show any changes in the early stages; peritoneal elevation is a late feature (2–3 weeks).
- Blood cultures and sensitivity.
- Sickling test in suspected cases of sick cell disease.
- Pus culture and sensitivity.

Management

- Relieve pain.
- Elevate and rest the limb.
- Administer appropriate parenteral antibiotic therapy for 3 weeks:
  - Flucloxacillin: 50–100mg/kg per day IV 6 hourly ***OR***
  - For MRSA (methicillin resistant Staph. aureus): Parenteral vancomycin 12 hourly.
- If there is any indication that the situation is not changing or is deteriorating within about 24 to 48 hours, refer immediately if at level 4 or 5.
- Perform surgical drainage if fever and tenderness persist after 24 hours of appropriate antibiotic therapy and pus is present. Always submit pus for cultures.
- Where fractures occur, refer to a level 5 or 6 facility.
- Address issues related to primary cause if possible.

53.5 Chronic Osteomyelitis

This follows inadequate management of acute osteomyelitis, infected compound fractures, spread from infected tissue including prosthesis, and bone surgery.

Clinical Features
Infection may remain quiescent, with acute or sub-acute exacerbations that manifest as discharging sinuses.

Investigations
As for acute osteomyelitis.

Management
- Antibiotic therapy, as per culture/sensitivity results.
- Surgical drainage, sequestrectomy, and irrigation as indicated.
- Any complications that may develop refer to level 5 or 6.

53.6 Septic Arthritis

This is an acute infection of the joint space.

Aetiology
- Haematogenous spread from a primary focus elsewhere in the body.
- Direct penetrating injuries into the joint.
- Extension of infection from a compound fracture of the neighbouring bone.
- The commonest causative organisms are Staphylococcus aureus, Streptococcus pyogenes, and Haemophilias influenza, and to a lesser extent Salmonella typhimurium or typhi.
- Large joints such as shoulder, knee, ankle, and hip are more often affected.
- Septic arthritis is most common in children under 3 years of age.

Clinical Features
- Fever, chills and irritability
- Swollen, warm, very tender joint(s)
- Pseudoparalysis of the joint
- Multiple joints may be affected

Investigations
- Haemogram – Anaemia and leucocytosis present
- Pus for culture and sensitivity
- Radiograph of the affected joint shows increased joint space, synovial thickening, and later rarefaction of the adjacent bone surfaces.

Management
- Admit the patient
- Take pus sample for culture and sensitivity.
- Start on antibiotics: Flucloxacillin 50–100mg/kg 6 IV hourly. Change according to culture and sensitivity results and continue for a period of 4–6 weeks.
- Splint the joint and initiate physiotherapy.

- Give analgesics and antipyretics: tabs Ibuprofen 400mg orally 8 hourly ***OR*** aspirin 600mg orally 8 hourly for 3 days
- Aspirate the joint; if there is frank pus then perform an arthrotomy. Review daily until discharge.
- Review monthly after discharge.
- Watch for features of a worsening condition, which include the following:
  - The fever persists for more than 7 days of full treatment.
  - The joint swelling does not subside within 3 weeks.
  - New joints get involved while on treatment.
- As much as possible, refer the patient to an appropriate facility before the following complications have developed, or refer immediately if they present with any of these complications:
  - The affected joint starts to discharge pus spontaneously.
  - Shortening of the limb occurs.
  - There is persistent deformity of the joint.
  - There is loss of function related to the infection.

53.7 Osteosarcoma

This is a highly malignant bone tumour of late childhood and early adulthood. Commonly involves long bones, i.e., distal femur and proximal humerus. This tumour presents with pain, noticeable swelling, tenderness, or pathological fractures.

Investigations
X-ray affected limb:
- Radiological findings show periosteal elevation with new bone formation (Codmann's triangle), sunray appearance; chest radiograph may show metastatic lesions.

Management
Carry out further appropriate investigations if malignancy is suspected and refer to appropriate units for management.

53.8 Lower Back Pain

Aetiological factors
- Trauma
- Inflammatory, e.g., rheumatoid arthritis, ankylosing spondylitis, etc.
- Degenerative: Spondylosis (degenerative disease), prolapsed intervertebral disc, spondylolisthesis
- Neoplastic: Usually secondary tumours
- Infection: Pyogenic, non-pyogenic (Tuberculosis – Pott's disease)
- Spinal stenosis: Congenital, degenerative
- Others: Kyphoscoliosis

Clinical Features

- History at presentation includes the following:
  - Pain: Sharp and localized, chronic and diffuse
  - Referred pain (sciatica): Pain radiates into the lower limb, may be aggravated by coughing, straining, etc.
  - Stiffness
  - Deformity, e.g., TB spine
- Numbness or parasthesia in the lower limb
- Urinary retention or incontinence (can be due to pressure on cauda equina)
- There may be history of trauma, heavy lifting, neoplasm, connective tissue disorder like rheumatoid arthritis.
- Physical findings at presentation are demonstrable by:
  - Inspection
    - Skin – may show scars, pigmentation, abnormal hair.
    - Shape and posture may be abnormal and suggestive.
  - Palpation
    - Feeling for tenderness is likely to elicit it.
    - Motion – May be impaired.
    - Sensation – May be diminished if nerves are involved.
    - Reflexes – May be diminished if nerves are involved.
    - Straight leg raising test - Discloses lumbosacral root tension.
  - Examining the other systems.

Investigations

- Plain radiographs: Anteroposterior, lateral, and oblique views of spine may show:
  - Osteophytes and disc degeneration in spondylosis
  - Loss of lumber lordosis, which signifies muscle spasm due to pain
  - Anterior shifts of an upper segment upon lower, which indicates spondylolisthesis.
  - Bone destruction with sparing of intervertebral discs is noted in tumours
  - Sclerotic metastases are seen in Ca prostate
  - Bone destruction in infective conditions, e.g., TB. There may be a gibbus (sharp angulation) deformity.
  - Fracture in traumatic cases.
- Radioisotope scanning: May pick up areas of increased activity suggesting a fracture, silent metastasis, or local inflammatory lesion.
- Computed tomography: May pick up structural bone changes, e.g., fracture, tumour, and intervertebral discs prolapse.
- Magnetic resonance imaging (MRI): Discs, nerves, and other soft tissues are clearly seen.
- Other investigations include:
  - Those based on the likely working diagnosis, e.g., abdominal ultrasound in suspected tumours.
  - Erythrocyte sedimentation rates in suspected tumour, TB, connective tissue disease.

Management

Most cases of disc prolapse will improve on conservative management.

- Give analgesics to control pain ibuprofen 400mg TDS. In suspected tuberculosis without neurological deficit, a trial of anti tuberculosis therapy can be given. If there is no improvement in 3 to 4 weeks, refer patient to the specialist.
- Initiate physiotherapy for spondylosis and spondylolisthesis, and where nothing specific is picked up on imaging.
- Stable fractures will heal conservatively on bed rest (orthopaedic bed). A hard lumbosacral corset may be fitted after 6–8 weeks and used for a further 4–6 weeks or until the pain is bearable. For unstable fractures, refer to a suitable facility for further management.
- In suspected tumours, neurological deficit, pain that is not improving, etc., refer the patient to a level 5 facility and above.

54. Ear, Nose, and Throat Conditions

54.1 Epistaxis

Bleeding through the nose, due to nose picking, trauma (fall in games, assault, etc.), nasal and paranasal neoplasms, nasal infection, systemic derangements, e.g., acute fevers, hypertension, renal disease with uraemia, abnormalities of blood clotting, and foreign bodies in the nose.

Management

- Immediate: Sit the patient up (to avoid aspiration).;
- Pinch the nose for 10–20 minutes. This is usually sufficient to stop bleeding.
- Apply ice or cold packs on the bridge of the nose.
  - To pack the nose, remove clots as aspirate. Apply lignocaine nasal spray 4%, then pack (preferably using Tiley's forceps) with ribbon gauze or narrow strip of gauze impregnated with liquid paraffin. Start packing from the floor of the nose towards the roof. The pack should fit lightly to be effective. Do not use adrenaline.
- Remove paraffin pack within 24-48 hours.
- Put a patient with a nasal pack on:
  - Broad spectrum antimicrobial, e.g., cotrimoxazole or amoxicillin for 7 days.
  - Analgesic, e.g., paracetamol 500mg 8 hourly for 5 days (children 40mg/kg/day QDS).
- Attend to primary cause. Patient may require inpatient treatment of the underlying causative factor. Treat the underlying cause and provide additional treatment with cautery or endoscopic therapies.
- Admit the patient if fluid replacement or blood transfusion is required.
- In an adult, the cause should be identified as epistaxis is a more sinister sign in an adult. Rule out malignancy.

54.2 Foreign Bodies in the Ears

The types of foreign bodies include metallic pieces (hair clips, smooth pellets, needles, etc.), wooden items (e.g., match sticks), vegetable matter like seeds, and insects.

Clinical Features

- Obvious history of foreign body insertion into the ear, conductive deafness, pain or discomfort in ear. Discharging ear, disturbing noise (insects), and bleeding (traumatic insertion especially by a child).
- Danger signs: Foreign bodies in the ear with bleeding from the ear and external evidence of trauma suggest foreign body entry into the middle ear.

Management

- Analgesia: Paracetamol 7.5mg/kg body weight orally 4–6 hourly if painful.
- Most foreign bodies can be removed fairly easily with crocodile forceps, a hook, an ear probe or by suction and gentle syringing with warm, clean water.
- Rounded objects may rupture the eardrum if pushed further into the ear. Refer these cases.
- If a complication such as perforation of the eardrum or a foreign body in the middle ear is suspected, refer.
- Removal, especially if general anaesthesia needed as in some children.
- Examine patient for possible other pathologies.
- If you lack the instruments for extraction of foreign bodies, please refer.
- Complications:
  - Conductive deafness.
  - Vegetable matter is hygroscopic, thus it is advisable not to syringe As this can lead to inflammatory reaction in the canal walls resulting in otitis externa.
- See Section 27.6.1 for more details.

54.3 Foreign Bodies in the Nose

This is covered under Section 27.6.2 in these guidelines.

54.4 Foreign Bodies in the Oesophagus

The commonest objects are fish bones or meat in adults. The commonest objects encountered in children are coins. All other forms of foreign bodies can be found in psychiatric patients.

Clinical Features

There is pain in retrosternal area and/or in the back, dysphagia, pooling of saliva in the mouth, or regurgitation of food. The affected patient may present with dyspnoea and hoarseness if there is laryngeal oedema from compression by the foreign body and localized tenderness in the lower part of the neck. As a number

of children are not able to communicate their problem, child may present later with complaints relating to the presence of a foreign body.

Investigations
Plain radiographs, antero-posterior and lateral views, may show opaque objects. Radiolucent objects are not seen on radiographs. However, an increase in the prevertebral soft tissue exceeding 1/3 of the antero-posterior distance of the patient's vertebral body is highly suggestive of the presence of a foreign body.

Management
- Removal.
- For sharp sided foreign bodies, refer immediately if not equipped to deal with them.
- Oesophagoscopy and removal of the foreign body.
- Other surgical procedure(s) should this fail.

54.5 Foreign Bodies in the Laryngotracheobronchial Tree

More common in children. The common objects are vegetable seeds (animate) and beads (inanimate).

Clinical Features
- Child has a sudden attack of cough, choking, and wheezing (A high index of suspicion is needed.)
- The child may present with stridor and/or dyspnoea.
- Auscultation may reveal reduced air entry on one side of the chest.

Investigation and Management
- Chest radiograph.
- Bronchoscopy for diagnosis and removal of foreign body.
- For long-standing cases, refer for surgery.

54.6 Hearing Impairment

A high index of suspicion and proper history is important, especially among children born prematurely, those born with low birth-weight, those born after difficult delivery, those who develop yellowness of eye (neonatal jaundice), those whose mothers had febrile illness during pregnancy, and those treated for meningitis. Do not ignore parents' complaint of a child not hearing or a child who is slow to develop speech. Use changing voice intensity to assess grossly the state of hearing. If hearing loss is suspected, refer at whatever age to higher level for appropriate management. A child who does not hear can be helped at any age, but the earlier the better.

Refer to an institution specializing in dealing with hearing impairment with facilities for audiometry, tympanometry, and rehabilitation.

54.7 Mastoiditis

This is an infection of the mastoid air cells and mastoid bone occurring as a complication of acute otitis media or chronic suppurative otitis media.

Clinical Features
There is a painful swelling above the ear in children under 2 years of age. There is tenderness, oedema, and possible flatulence behind the ear in other children, often with preceding otitis media and mastoid tenderness. There is fever and sagging of the posterosuperior meatal wall. Complications include squint or facial nerve palsy on the same side as the mastoiditis.

Management
- Admit.
- Give antibiotics as for otitis media. Intravenous co-amoxyclavulinv 1.2g BD or cefuroxime sodium 750mg TDS.
- If the swelling points and/or bursts to discharge pus, refer to higher centre as this condition requires a formal mastoidetomy to adequately clear all the pus and infected material. Inadequate incision and drainage will result in a chronic sinus.
- Manage appropriately if child develops signs of meningitis (see Section 13.4, meningitis) or brain abscess or other complications.

54.8 Laryngeal Trauma

These can be blunt or penetrating injuries. The priority is to secure and maintain an airway, then refer urgently to an ENT specialist for endoscopy and repair.

54.9 Allergic Rhinitis

Immunoglobulin IgE-mediated rhinitis is characterized by seasonal or perennial sneezing, nasal congestion, pruritus, and often conjunctivitis and pharyngitis. Symptoms vary in severity from day today or hour to hour.

Management
- Avoid/remove the allergen (precipitating factor).
- Give antihistamines: Chlorphenamine 4mg 6 hourly adults and 0.35mg/kg in children in 4 divided doses.
- Give topical steroids, as these are safe and effective: Budesonide nasal spray two puffs per day.
- Refer to a higher level if the following present:
  - Gross nasal obstruction (hypertrophied inferior turbinates).
  - Polyps.
  - Chronic sinusitis.
  - Deviated nasal septum.

- Give systemic steroids in severe cases for 7 days, then taper off. Dose: prednisone or prednisolone 10mg TDS to start and taper off gradually with time.
- Carry out any corrective procedure as may be necessary, e.g., turbinectomy.

54.10 Parotid Mass

These may be true parotid swellings (e.g., parotitis, parotid abscess, cysts, dialecticism, tumours, etc.), or pseudoparotomegaly due to swellings in nearby structure (e.g., hypertrophy of the masseter, jaw swellings, parapharyngeal masses, lymph enlargement, facial nerve tumours, etc.). Parotid swellings may also occur in other systemic conditions (e.g., malnutrition, diabetes mellitus, HIV/AIDS, Sjogren's syndrome).

Infective masses may be associated with other features of infection like fever and pain and there is local inflammation or discharge from the opening of the parotid duct. Most parotid swellings are painless unless infected or malignant. Presence of facial nerve palsy is highly suggestive of malignant process.

Investigations

- Haematological tests, e.g., white blood counts, erythrocyte sedimentation rate, serum protein, HIV antibodies.
- Fine needle aspirate (FNA) for cytology.
- Open biopsy is contraindicated because of:
  - Risk of seeding of tumour in neoplastic conditions.
  - Risk of injury to the facial nerve or its branches.
- Should FNA report not be conclusive, then superficial or total parotidectomy (depending on suspected condition) is needed. Always look out for neurovascular complication.
- Radiology: Plain radiographs may show radio-opaque stones in the duct or gland, but these are rare in the parotid gland. They are commonest in the submandibular gland.
- Sialography may be done to confirm sialectasis.
- CT scan will show the extent of the mass and its relation to other structures, and is an essential preoperative investigation.

Management

- Viral parotitis may not require more than analgesics and bed rest. In the presence of bacterial infection, clindamycin is the antibiotic of choice. Give 3–6mg/kg 6 hourly in children and 150–300mg 6 hourly in adults for 10 days or 450mg QID in severe cases.
- Where an underlying systemic disease is the causative factor for parotomegaly, manage the condition as appropriate.
- Surgical intervention as may be required.

54.11 Acute Otitis Media

This is covered in Paediatrics, Section 27.1, of these guidelines.

54.12 Chronic Suppurative Otitis Media (CSOM)

There are 2 types of CSOM: Tubo-tympanic and attico-antral.

54.12.1 TUBO-TYMPANIC TYPE

There is discharge of pus from one or both ears for more than 2 weeks following untreated or unresolved acute otitis media with a central perforation. There is recurrent ear discharge usually after URTI. Secondary infection may be present with Gram-negative organisms, yeast, and fungi.

Clinical Features

A purulent discharge from the ear for more than 2 weeks, usually not foul smelling. There is impaired hearing with a central perforation in the ear drum.

Management

- Admission is NOT necessary.
- If no antibiotics were administered recently, treat with antibiotics as in acute otitis media.
- Dry the ear by wicking, and show the mother how to do this:
  - Roll a piece of clean absorbent cloth or cotton wool into a wick on an applicator and insert it in the child's ear gently,
  - Roll the wick in the ear, then remove it and replace it with a clean wick.
  - Watch the mother repeat this until the wick is dry when it comes out.
- Instil local antibiotic ear drops, e.g., ciprofloxacin ear drops.
- Tell the mother to continue to dry the ear by wicking at home at least 4 times a day until the wick stays dry. Tell her to observe strict ear hygiene and use cotton wool balls when washing.
- Reassess the child weekly. If the mother needs assistance in keeping the ear dry, reassess more frequently.
- Refer if:
  - The patient develops mastoiditis (see Section 6.1. mastoiditis).
  - There is no improvement after 4 weeks.
  - The patient will benefit from tympanoplasty surgery.
  - The patient has attico-antral type of CSOM.
  - Patient complains of headache, earache, vertigo, or facial paralysis, which indicate complications.

54.12.2 ATTICO ANTRAL

Clinical Features

There is foul smelling discharge and hearing impairment with attic or marginal perforation with cholesteatoma.

Management
Do not syringe such ears. Refer to ENT for management.

54.13 Ear, Nose and Throat Manifestations of HIV/AIDS

An estimated 40% of AIDS patients present with otolaryngological symptoms. These include:

- Infections: These can be viral, bacterial, or fungal, e.g., rhinitis, sinusitis, pharyngitis, glossitis, tonsillitis, laryngitis, parotitis, deep neck space cellulitis and abscesses, otitis externa, otitis media, and labyrinthitis.
- Tumours: There is an increase in head and neck cancers associated with HIV/AIDS, especially Kaposi's sarcoma, lymphomas, squamous cell carcinoma and salivary gland tumours.
- Other features: Adenoid hypertrophy, oropharyngeal and oral ulcers, atrophic rhinitis, lymphadenopathy, parotid cysts, otitis media with effusion, vertigo, deafness, tinnitus, and cranial nerve palsies.

Management
Is directed at the presenting lesion.

54.14 Tracheostomy

This is an artificial opening into the trachea through the neck in order to by pass an obstruction of the airway and/or to provide access to the lower airway to facilitate ventilatory support. This procedure should only be performed at level 4 and above.

Indications for this procedure include:

- Emergency tracheostomy: Foreign bodies (in the upper airway), maxillofacial trauma (patient cannot breath and endotracheal intubation impossible), inflammatory conditions such as epiglottis, Ludwig's angina, retropharyngeal and other oropharyngeal abscesses with respiratory obstruction, tumours of head and neck with acute obstruction to airway (due to oedema, bleeding, infection, etc.).
- Elective tracheostomy (ventilation likely to continue for more than 2 weeks): Surgery for tumours of head and neck, major reconstructive facial surgery, prolonged ventilatory support surgery, e.g., in flail chest, acute respiratory distress syndrome, pneumonia, Guillain-Barre syndrome.

Methods

- In case of complete acute upper respiratory tract obstruction:
  - Give oxygen through a big bore needle or a cannula inserted through cricothyroid membrane (Cricothyrotomy).
  - Quickly extend the neck over a rolled up towel or pillow.
  - Feel for the cricoid prominence (Adam's apple) and the depression just distal to its membrane.

  - Insert a big bore needle or cannula to the trachea (with or without local anaesthetic depending on circumstances).
- Tracheostomy technique:
  - Ideally performed in theatre, with patient properly cleaned and draped.
  - Position patient supine with neck extended over a pillow and head stabilized in tracheostomy position.
- Anaesthesia:
  - General anaesthesia through a tracheal tube if possible.
  - Local anaesthesia (lignocaine 1% with adrenaline), in extreme circumstances.
- Incision and fixing of endotracheal tube:
  - Transverse incision, 2 cm below the lower angle of cricoid cartilage. Incision made through the skin, subcutaneous fat, and deep cervical fascia.
  - Blunt dissection, then expose the anterior jugular vein, infrahyoid muscles, and occasionally thyroid isthmus (which should be ligated and divided).
  - A cruciate incision or a circular window is then made through the third and fourth tracheal rings.
  - A tracheostomy, endotracheal, or other tube is then inserted.
  - The skin incision is closed loosely around the tube.
  - Fix the tube securely with well tied tapes.

NB Use as short a time as possible through this simple procedure. Humidification of the gases/air and frequent suction through the tube must be done. When a clear passageway has been established and ventilation restored, refer the patient. For continued care of the tracheostomy, decannulation, etc., refer to a relevant textbook for detail.

54.15 Nasopharangeal Carcinoma

Clinical Features
Commonly first presents as neck mass. As a general rule of thumb, any mass in the angle of the mandible can be assumed to be nasopharangeal carcinoma until proved otherwise. Other non specific symptoms may include congestion, rhinorrhea, epistaxis, and ear pain, to mention a few.

Investigations
- Chest radiograph
- CT scan
- Neck ultrasound
- At level 6: Endoscopy +/- tracheostomy and biopsy

Management
- Radiotherapy alone
- Surgery – Laryngectomy with radiotherapy

54.16 Carcinoma of the Larynx

Clinical Features
- Commonly first presents as neck mass. As a general rule of thumb any mass in the angle of the mandible can be assumed to be nasopharangeal carcinoma until proved otherwise.
- Non specific symptoms may include congestion, rhinorrhea, epistaxis, ear pain, and others.

Investigation
- Endoscopy and biopsy
- CT and MRI to evaluate spread of disease
- Ultrasound

Management
Management at level 4–5:
- Refer all cases to a level 6 for further evaluation and management.
- Receive all cases referred back from level 6 for follow up care as per prescribed schedule.

Management at level 6:
- Radiotherapy mainstay of treatment.
- Prognosis particularly poor when evidence of extensive spread present like cervical nodes of basal skull invasion.

55. Referral Systems for the Surgical Patient (Hospitals)

An efficient, smoothly operating pyramidal referral system is essential for the effective management of surgery patients. This is especially important in the emergency situation so as to provide rapid and effective surgical treatment to the patients

Referral systems can be 2-way; upward referral and downward referrals. Upward referral seeks specialist and subspecialist referral services or in a few cases referral out of country. Downward referral is made to the local health facility nearest to the patient's home environment and best able to cope with the patient's needs. An efficient referral system ensures that the mix of patients admitted in health facilities countrywide is appropriate for the different health facilities. Beside referral between facilities, there are also referrals within institutions that are equally important to patient wellbeing.

All referrals must be directed to the correct facility while maintaining the normal pyramidal referral system of flow within the health system as much as possible.

For surgical conditions presenting at level 2 and 3 that are their capacity, referral to the district hospital level with the surgeon should be initiated. Hospitals should take on only cases they are able to handle. Where they cannot manage, they must refer to the next appropriate facility. All referrals must be carefully evaluated and the risks and benefits assessed critically before the decision to refer is made.

On completion of treatment at the higher centre, there will be a need to refer the patient back to the initial facility or to rehabilitation. The basic guidelines for upward referral are as follows and will vary a little depending on the level in question.

55.1 Procedure for Upward Referral

1. Make the decision to refer on the basis of critical evaluation:
   a. Individual doctor decision (team leader)
   b. Team decision
   c. Ministry or other body making decision
2. Prepare documentation to accompany the patient:
   a. Admission details
   b. Diagnostic details and investigations carried out
   c. Medications and treatments initiated
   d. Reason for the transfer
3. Communicate with receiving unit, casualty, or clinic
4. Communicate with relatives
5. Prepare appropriate transportation
   a. Efficient and reliable for the job
   b. Exclusively allocated for the job
6. Appoint an appropriately qualified escort
7. Check on resuscitation equipment to accompany patient

55.2 Procedure for Downward Referral

1. Make the decision to refer.
2. Prepare documentation detailing:
   a. Admission identification details
   b. Final diagnosis
   c. Procedures carried out
   d. Medications
   e. Follow-up details, any rehabilitation requirement, etc.
3. Ensure that there are 3 legible copies of the referral note, 1 for the patient, another for the receiving unit, and third copy for the file.
4. In case of terminal disease, involve the hospice in the case.
5. Communicate with the receiving unit as appropriate and provide feedback as appropriate. This as a valuable impact on improvement of services.
6. Communicate with relatives.
7. Prepare appropriate transportation.

8. Appoint appropriately qualified escort . Usually the relatives will suffice.
9. Book patent for review in SOPC or ensure follow up in receiving unit.

55.3 Procedure for Internal Referral

Just as important to patient care is the institutional referral system, which needs to be clear and functional. Each facility should have a system for both the upward and downward flow of patients to mirror that at the national level. A simple guide for institutional referral system would include:

- Conduct casualty department review: Unit referrals and admission decisions are made here.
- Make a correct diagnosis.
- Call appropriate unit on call.
- Ensure patient is reviewed
- Ensure patient is handed over to the unit on-call doctor
- Ensure documentation accurate.
- Decide whether to treat as outpatient or to admit.
- If admission, admit and ensure handed over to the admitting ward doctor.
- If for outpatient treatment, ensure correct referral is made.
- NB: In event of incorrect clinic referral, the doctor should be responsible for correcting this error, not the patient.
- Refer to specialized clinics if not admitted.
- Refer to National Referral Centre (decision made by team leader).

55.4 Constraints to an Effective Referral System

All team members at all levels need to be conscious of the dangers that face a coordinated referral system. Efforts need to be made to avoid these dangers to the referral system

1. Lack of confidence in the facility by the community and tendency to bypass facility to the nearest suitable
   a. Poor community relationships
   b. Poor manpower utilization
2. Infrastructure that is non-functional
   a. Strengthening of the middle level facilities
   b. Ensuring communication related infrastructure in place
   c. Treating patients at inappropriate level
   d. At higher level same disease costs more to treat so no money for supplies, etc.
3. Poor communication within and with the outside of the facility
   a. Ensure management practices are improved within facility
   b. Involve the community in services
4. Lack of or poor utilization of human resources
   a. Brain drain
   b. Poor distribution of staff
   c. Frustration in the workplace
   d. Need for better working relationships

5. Lack of drugs and other equipment
   a. Issues of finance and planning
6. Accurate diagnosis and treatment plans
   a. Training of personnel

☛ **Referrals should be respected.**

56. Disaster Management

A major disaster is a situation where the number, type and severity of injuries require extra-ordinary arrangement by the hospital to cope with. These include road accidents, train accidents, airline, boat and ferry accidents, factory fires and bomb blasts.

56.1 Requirements for a Disaster Plan

Every hospital should have in place (and periodically test) a plan for handling major emergencies. The plan should make provisions for:
- Immediate mobilization of a designated disaster team headed by a Team Leader
- Arrangements for emergency equipment and drugs
- Transport
- Communication equipment

The plan is carried out on multiple levels, including pre-hospital organization (e.g., at the scene), hospital organization (ensuring all systems are geared up to cope with an influx of injured), and other aspects of disaster management.

56.1.1 PRE-HOSPITAL ORGANIZATION

Important activities:
- Crowd control.
- Security and safety for the team and victims.
- Preliminary assessment of the casualties – Triage starts here.
- Transport to various medical facilities depends on the number of casualties and availability of facilities.
- The triage sieve.

56.1.2 HOSPITAL ORGANIZATION

The key to success of the management of a major disaster is command and control. Each facility needs to establish an effective control centre staffed by senior medical, nursing, and administrative coordinators with appropriate support staff.

56.1.3 THE TRIAGE SIEVE

This a flow chart that will assist you to identity the priority patients and respond appropriately in a disaster situation. Action steps are itemized in Section 56.2.

56.1.4 WHAT TO CONSIDER WHEN CHOOSING THE TRANSPORT

Transport to various medical facilities depends on the number of casualties and availability of facilities. Considerations include:

- Capacity: A bus may be more suitable for a large number of “delayed” priority casualties.
- Availability: Save the ambulances for the seriously injured.
- Suitability: Do you need a wheeled or a tracked vehicle? Is a helicopter more suitable?

56.1.5 WHEN YOU HAVE LOADED A PATIENT

Move to an appropriate hospital (are you going straight to a specialist centre?)
Observe in transit. What equipment do you need?
Verify the treatment before departure (do you have enough oxygen, fluids or analgesics.
Escort if necessary – Doctor, nurse or paramedic.

56.2 Triage Sort

Actions on receiving notification of a “Major Incident Declared – Activate Plan”
Coordinators meet and establish the control centre, if no prior warning.
The medical-incident officer is dispatched to the scene to:.

- Liaise with the ambulance service about the details and status of the incident.
- Establish whether mobile medical teams are required.

- Disaster protocol is made available to all hospital personnel.
- The necessary supplies for emergency response are made available including the interagency emergency kit.

The Team Leader and coordinators:

- Collect the teams, ensure the members are properly clothed and equipped, and dispatch them to the scene.
- Establish a triage point.
- Clear the accident and emergency department of existing casualties and prepare for the reception of casualties.
- Warn theatres, the intensive care unit, pharmacy, laboratory service, x-ray service, and outpatient department about the possible disruption of activities; ask the intensive care unit to clear beds if possible.
- Establish an accurate bed state.
- Designate a ward for reception of admitted casualties and start emptying it of existing patients.
- Call all off duty staff.

- Organize staff as they arrive.
- Make the disaster protocol available to all hospital personnel.
- Make the necessary supplies for emergency response should be made available, including the interagency emergency kit.

☛ **Each member of the disaster team – no matter how small their involvement – must be crystal clear about their role during the execution of the disaster plan.**

56.3 Triage Activities

☛ ***The most surgically experienced person should triage (grade) the casualties:***

56.3.1 TRIAGE I

Patients who have life threatening injuries such as penetrating chest or abdominal wounds, head injuries, or hypovolaemic shock.
These are patients who can be saved by way of urgent surgery.

56.3.2 TRIAGE II

Patients who have such severe injuries that they are likely to die anyway.

56.3.3 TRIAGE III

Patients who have only minor injuries and will probably recover even if treatment is delayed.
Operate this group last.

☛ ***The decision as to what to do with each patient is made by the triage officer. This is a continuing process and patients are reassessed regularly.***

PART IV
Obstetrics and Gynaecology and Related Disciplines

IN THIS SECTION:

57. Gynaecology

This section involves mainly the cohorts of pregnant women and the newborn, adult women of reproductive age (WRA), postmenopausal women, and sometimes infants and children in relation to sexual assault.

57.1 Abortion (Miscarriage)

The old working clinical definition of abortion denotes termination of pregnancy before the 28th week of gestation. With advancement in modern neonatology the technical definition denotes termination of pregnancy to a foetus weighing less than 500g. There are several types and clinical stages of abortion, as summarized in Table 57.1.

57.1.1 THERAPEUTIC ABORTION

Where the health of the mother and/or foetus is at risk, therapeutic abortion may be performed if recommended by two senior and experienced doctors as per the Penal Code section 240 and the Medical Practitioners and Dentists Board Code of Ethics and Professional Conduct 2003. These are excerpted in the box below.

- **The punishment for unlawful termination of pregnancy is provided for in Penal Code sections 158, 159, and 160.**

57.1.2 UNSAFE ABORTION

WHO defines unsafe abortion as a procedure for terminating an unwanted pregnancy either by persons lacking the necessary skills or in an environment lacking the minimal medical standards or both. Illegally induced unsafe abortion by mainly unqualified people is associated with incompleteness, sepsis, genital

The Law and Guidelines Regarding Induced Abortion in Kenya

Penal Code Section 240
"A person is not criminally responsible for performing in good faith and with reasonable care and skill a surgical operation upon any person for his benefit, or upon an unborn child for the preservation of the mother's life, if the performance of the operation is reasonable, having regard to the patient's state at the time and to all the circumstances of the case".

Medical Practitioners and Dentists Board Code of Ethics and Professional Conduct 2003
"The Laws of Kenya do not allow for termination of pregnancy 'on demand' and severe penalties are meted out to those found guilty of procuring or attempting to procure an abortion or miscarriage. There is room, however, for carrying out termination when in the opinion of the attending doctors it is necessary in the interest of the health of the mother or baby. In these circumstances, it is strongly advised that the practitioner consults with at least two senior and experienced colleagues, obtains their opinion in writing, and performs the operation openly in hospital if he considers himself competent to do so in the absence of a gynaecologist. In all cases of illegal termination of pregnancies, the sentences shall be suspension or erasure".

Table 57.1: Diagnosis and management of various types and stages of abortion

Types of abortion	Diagnosis	Management
Threatened abortion	Mild abdominal pain and mild PV bleeding Cervix closed	Bed rest Mild sedation Follow up Treat any underlying cause
Inevitable abortion	Abdominal pains PV Bleeding Cervix open All POCs still in uterus	Expedite expulsion by oxytocin 20IU in 500ml normal saline drip to be run over 4 hours ***OR*** Misoprostal 600µg per vaginum if greater than 14 weeks (include on EML) Evacuate if less or some POCs retained after expulsion
Incomplete abortion	Abdominal pains PV bleeding Cervix open Some POCs retained	Evacuate uterus by MVA under paracervical block (2.5ml of 1% Lignocaine Hcl Inj at 2, 4, 8, and 10 o'clock positions).Ensure it is not intra-vascular *OR* misoprostrol 600µg orally Antibiotics: Doxycycline 100mg BD and metronidazole 400mg TDS for 7 days. Analgesia: Ibuprofen 400mg TDS for 5 days
Complete abortion	Little or no bleeding or pain Uterus contracted Cervix closed	Observe Reassure Discharge
Missed abortion	History of amenorrhoea Symptoms of pregnancy regress, uterine size smaller than dates Mild PV bleeding	Induce if more than 12 weeks Evacuate if less than 12 weeks (Ultra sound scan if available) *OR* Misoprostrol 800µg orally for less than 12 weeks
Molar abortion	Presents as threatened or incomplete, uterine size larger, grapelike vesicles Ultrasound if available	Evacuate or induce as in missed abortion. X-match and drip for evacuation as excess bleeding is a risk. Strict follow up for possible choriocarcinoma. Manage as per details in Sections 57.1.11 and 57.1.12.
Septic abortion	Any of the above with symptoms and signs of infection	Parenteral broad spectrum antibiotics Evacuate with MVA in severe cases without delay Or in mild cases misoprostrol 600µg orally. Manage as per details in Section 57.1.6.
Habitual abortion	Three or more consecutive spontaneous abortions	Treat emergency. Management depends on underlying cause; refer to Section 57.1.8.
Therapeutic abortion	Life threatening conditions in woman/foetus, compliance with law and MPDB guideline	Manage as per details in Section 57.1.1.

and visceral injuries, and death. This is usually an obstetric emergency (Table 57.2). Investigations and management are as for septic abortion (Section 57.1.6, below).Repair of genital and visceral injuries is mandatory.

57.1.3 THREATENED ABORTION

Clinical Features

As shown in Table 57.1.

Investigations

- Haemogram and blood group
- Blood slide for malaria parasites in endemic malarious areas
- Urinalysis and microscopy
- Ultrasound examination to exclude "Blighted Ovum" or hydatidiform mole, and is reassuring if normal intrauterine pregnancy is seen
- VDRL

Management

- Order bed rest at home or in facility.
- For pain, offer hyoscine butylbromide 20mg TDS and/or paracetamol 1g TDS for 5 days.
- Sedate with phenobarbitone 30mg TDS for 5 days ***OR*** diazepam 5mg TDS for 5 days, to help allay anxiety and enforce bed rest.
- Evacuate uterus if more bleeding and signs of progression to incomplete abortion occur.

Patient Education

- If on bed rest at home, return to health facility if features of progression to incomplete abortion intensify, e.g., more bleeding.

Table 57.2: Recommended emergency abortion care activities by level of health care facility and staff

Level	Staff may include	Abortion care provided
First referral (Level 4: District, sub-district, mission hospital, nursing home)	Nurses, trained midwives, general practitioners, specialists with training in obstetrics and gynaecology	All activities as in Table 54.1 plus: Emergency uterine evacuation through the second trimester treatment of most abortion complications, blood cross match and transfusion; local and general anaesthesia; counselling; laparotomy and indicated surgery are available
Diagnosis & referral for severe complications, e.g., septicaemia, peritonitis, renal failure		
Secondary & tertiary referral (Levels 5 & 6)	Nurses, trained midwives, general practitioners, obstetrics and gynaecology specialists.	All activities above plus: Uterine evacuation as indicated for all emergency abortion treatment of severe complications (including bowel injury, tetanus, renal failure, gas gangrene, severe sepsis); treatment of coagulopathy and counselling

Source: Adapted from *Clinical Management of Abortion Complications: A Practical Guide* (WHO, 1994).

- Abstain from sexual intercourse for at least 2 weeks to prevent progression to incomplete abortion and risk of infection.

57.1.4 COMPLETE ABORTION

Clinical Features

As shown in Table 57.1.

Investigations

As for threatened abortion.

Management

- Resuscitate first with IV fluids (normal saline and dextrose) if the patient is in shock, consider blood transfusion if necessary. Free running till state of rehydration achieved.
- Administer antibiotics: amoxicillin-clavulanate 625g BD ***OR*** doxycycline 500mg QDS for 7 days and metronidazole 400mg TDS for 7 days.
- Give ferrous sulphate 200mg TDS and folic acid 5mg OD in standard dosage for 3 months. Ferrous sulphate should be given ***after*** completing the course of doxycycline.

Patient Education

- If further pregnancy is desired, investigate further as under habitual abortion (Section 57.1.8).
- If further pregnancy is not desired, discuss and offer appropriate contraception.

57.1.5 INCOMPLETE ABORTION

Clinical Features

As shown in Table 57.1 as for threatened abortion.

Management

- Resuscitate with fluids (normal saline and dextrose). If the patient is in shock, transfer to higher level for appropriate management.
- Give oxytocin 10 IU IM or ergometrine 0.5mg IM STAT.
- Remove POC from cervical os digitally or with ovum forceps.
- Evacuate the uterus, preferably with manual vacuum aspiration (MVA) as soon as possible under para-cervical nerve block (10ml of 2% lignocaine HCL: 2.5ml injected at 2, 4, 8, and 10 o'clock positions of the cervix). NB: The uterus can be evacuated with either MVA or medication.
  - Misoprostrol 300μg orally in a single dose will achieve completion in over 90% of the cases.
  - For pain, IM diclofenac 75mg STAT
- Give antibiotics: Doxycycline 500mg QDS + metronidazole 400mg TDS for 7 days.

Patient Education

As for complete abortion.

57.1.6 SEPTIC ABORTION

Clinical Features

As shown in Table 57.1.

Investigations

- As for threatened abortion
- Blood cultures for patients in endotoxic shock

Management

- Admit:
  - All cases having evidence of septic abortion
  - All patients in endotoxic shock
  - Where laparotomy is indicated.
  - Where pelvic abscess develops
- Resuscitate as in incomplete abortion.
- If presentation is late or the sepsis is severe: Give IV crystalline penicillin 3 mega units 6 hourly and IV gentamicin 80mg 8 hourly + IV metronidazole 500mg 8 hourly for 3–5 days, also, IM diclofenac 75mg 12 hourly.
- If presentation is early and sepsis is mild: Give PO doxycycline 100mg 12 hourly ***OR*** PO amoxicillin/clavulanate 375mg 8 hourly.
- Plus PO metronidazole 500mg 8 hourly for 7 days plus PO ibuprofen 400mg 8 hourly for 5 days.
- In severe cases, evacuate the uterus with MVA soon after initial antibiotic doses. In mild cases give misoprostrol 600μg orally to achieve expulsion of the POCs.
- Once stable, then may discharge on the above oral antibiotics and a pain killer.

Patient Education

As in complete abortion.

57.1.7 MISSED ABORTION

Clinical Features

As shown in Table 57.1.

Investigations

- As for threatened abortion
- Ultrasound, where available, will confirm foetal death
- Bleeding and clotting time in case disseminated intravascular coagulopathy (DIC) has developed.

Management

- Admit the patient for definitive treatment.
- If more than 12 weeks, induce with the prostaglandin tabs misoprostrol 400μg per vagina. Observe for spontaneous onset of abortion process, then examine for complete abortion; if incomplete do MVA.
- Then if less than 12 weeks, evacuate the uterus with MVA or misoprostrol 800μg orally. Start on antibiotics PO doxycycline 100mg 12 hourly, PO

metronidazole 400mg 8 hourly for 5 days, and PO ibuprofen 400mg 8 hourly for 3 days on discharge.
- If complicated with DIC, fresh blood transfusion or fresh frozen plasma is life-saving.

Patient Education
- As for complete abortion (Section 57.1.4)

57.1.8 HABITUAL ABORTION

All cases of habitual abortion should be reviewed by a gynaecologist.

Clinical Features
As shown in Table 57.1.

Investigations
- As in threatened abortion, and
- Blood sugar
- Urine C&S
- Blood grouping
- Brucella titres
- Widal test
- Blood urea
- Pelvic U/S
- VDRL/RPR
- HIV screening

Management
Management depends on the cause of the habitual abortion.
- Correct any anaemia and ensure positive general health.
- If VDRL serology is positive, confirm syphilis infection with TPHA test, treat patient plus spouse with benzathine penicillin 2.4 mega units IM weekly for 3 doses. More often a single injection will suffice. In penicillin sensitivity, use erythromycin 500mg QDS for 15 days.
- Control blood pressure to normal pre-pregnant levels.
- Ensure diabetes is controlled.
- For cases of recurrent urinary tract infections, order repeated urine cultures and appropriate chemotherapy.
- For brucellosis positive cases, give doxycycline 500mg QDS for 3 weeks + streptomycin 1g IM daily for 3 weeks. If pregnant, substitute cotrimoxazole for doxycycline.
- Offer cervical cerclage in next pregnancy in cases of cervical incompetence.
- For cases with poor luteal function, give a progestin early in pregnancy, e.g., hydroxyprogesterone 500mg weekly until gestational age is 14 weeks. Then continue with oral gestanon 5mg TDS up to the 6th month.

57.1.9 TERMINATION OF PREGNANCY

Therapeutic abortion is termination of pregnancy for medical indications (refer also to Section 57.1.1, above).

Method of Therapeutic Abortion
May be surgical or medical

Surgical:
- After 12 weeks: MVA or EVA
- In 13th–18th week, dilatation and evacuation (D&E) after cervical priming with misoprostrol 400μg for 3 hours.
- D&E should only be performed by skilled and experienced doctors.

Medical:
In 13–22 weeks:
- Give mifepristone 200mg orally, followed after 36–48 hours by misoprostrol 400μg orally every 3 hours for 5 doses.
- Or misoprostrol 400μg orally every 3 hours for 5 doses. Refer also to Table 57.3.

Table 57.3: Medication for therapeutic abortion

Option	Gestational age	Mifepristone Day 1	Misoprostol			Efficacy
			Dose	Route	Timing	
Recommended option	Up to 9 weeks	200mg orally (one 200mg tablet)	800μg (four 200μg tablets)	Bucally or sub lingually	Day 3	95–98%
Other options	Up to 9 weeks	200mg orally (one 200mg tablet)	800μg (four 200μg tablets)	Vaginally	Day 2 or 3	93–97%
		200mg orally (one 200mg tablet)	800μg (four 200μg tablets) Repeat after ±7 days if not aborted	Vaginally	6–24 hours	95–98%
	Up to 7 weeks	200mg orally (one 200mg tablet)	400μg (two 200μg tablets)	Orally	Day 2 or 3	89–93%

Sources: Ashok, 2002; Britton, 2007; Creinin, 2004; Middleton, 2005; Shannon, 2006; Tang, 2003; von Hertzen, 2003; WHO, 2000.

57.1.10 POST ABORTION CARE (PAC)

Unsafe abortion is common in Kenya and is often associated with serious medical and psychosocial complications/problems. All women should have access to comprehensive quality services for the management of post-abortion complications. PAC services include resuscitation, evacuation of uterus by MVA, post-abortion counselling, education, and linkages to other reproductive health and support services. Fertility may return soon (11 days) after an abortion. It also includes community participation. Family planning services help reduce repeat unsafe abortions. Midlevel providers (nurses and clinical officers) can be trained to provide PAC.

57.1.11 MOLAR ABORTION (HYDATIDIFORM MOLE)

Hydatidiform mole should be managed in levels 4, 5, and 6 because of its potential to progress to choriocarcinoma.

Clinical Features

A hydatidiform mole usually presents as a threatened or incomplete abortion. In the threatened stage, before the cervix opens, the diagnosis of hydatidiform mole is suspected if bleeding does not settle within a week of bed rest. The uterine size is larger than gestational age and foetal parts are not palpable.

Foetal movements are not felt at gestation 18–20 weeks and beyond. Features of hyperemesis gravidarum, nausea, vomiting, and ptyalism are still present and severe after 3 months. When the cervix opens, passage of typical grape-like vesicles confirms the diagnosis. Bleeding may be very heavy when a mole aborts spontaneously.

Investigations

- Positive pregnancy test in dilutions after 12 weeks gestation
- Confirmation is by ultrasound

Management

- Treat shock with IV fluids or blood as necessary.
- Put up oxytocin drip (20 IU in 500ml litre of normal saline or 5% dextrose at 20 drops per minute) for 4 hours or until drip is over and give IV antibiotics crystalline penicillin 3 mega units 6 hourly, gentamycin 80mg 8 hourly, and PO ibuprofen 400mg TDS.
- Evacuate the mole with suction curettage; after evacuation continue oxytocin drip once the patient has stabilized. discharge home on oral antibiotics (doxycycline 100mg 12 hourly and PO metronidazole 400mg 8 hourly for 5 days) and ibuprofen 400mg 8 hourly for 5 days, and advise patient to return for admission for sharp curettage after 2 weeks.
- Repeat sharp curettage to make sure all remains of the mole have been evacuated and send tissues for histology.
- Provide reliable contraception for 1 year: combined pill, e.g., levonorgestrel 150μg thinylestradiol, 30μg (microgynon or nordette) once daily for 3 weeks with breaks of 1 week in between is the best choice. Follow up monthly for pelvic examination and repeat pregnancy tests.

57.1.12 CHORIOCARCINOMA

Choriocarcinoma is confirmed while following the protocol of management of hydatidiform mole. The condition needs to be reviewed by a gynaecologist. Treatment depends on risk classification. Criteria for high risk (poor prognosis) is indicated by the following:

- Duration of antecedent pregnancy event >4 months.
- Beta HCG levels > 40,000 IU/ML.
- Metastases to brain, liver, or GIT.
- Failed chemotherapy (recurrence).
- Following term pregnancy.

57.2 Ectopic Pregnancy

Ectopic pregnancy is a pregnancy outside the uterine cavity, most of which are in the fallopian tube. It is usually due to partial tube blockage and therefore the patient is often subfertile. There are two types: acute ectopic pregnancy and chronic (slow leak) ectopic pregnancy. Differential diagnoses for this condition include pelvic inflammatory disease (PID), appendicitis, abortion, and ruptured ovarian cyst.

Clinical Features

For acute rupture ectopic pregnancy:

- Amenorrhoea 6–9 weeks.
- Abdominal pain of sudden onset.
- Shock and anaemia.
- Abdominal distension and tenderness.
- Shoulder tip pain due to haemoperitoneal diaphragmatic irritation.
- Cervical excitation tenderness present.

For chronic (slow-leak) ectopic pregnancy:

- Abdominal pain.
- Irregular PV bleeding, usually dark blood (amenorrhoea may be present).
- Anaemia, fainting attacks.
- Low grade fever.
- Low abdominal and pelvic tenderness and possibly a mass.
- Cervical excitation present.

Investigations

- Paracentesis of non-clotting blood is diagnostic in acute and some chronic cases.
- Culdocentesis in experienced hands is positive with dark blood, especially in chronic cases.
- Group and cross-match blood. Haematocrit and/or haemoglobin estimation.

Management

- **Admit to comprehensive emergency obstetric care facility all patients suspected to have ectopic pregnancy.**
- Start IV line with saline and plasma expanders after obtaining specimen for grouping and cross-matching to treat shock.
- Perform emergency laparotomy.
- Perform routine salpingectomy of damaged tube. Make a note of the condition of the other tube and ovary in the record and discharge summary.
- Where experienced gynaecologist is available, initiate conservative management of affected tube.
- Transfuse if necessary.
- Discharge on haematinics.
- Review in outpatient gynaecology clinic to offer contraceptives or further evaluate sub-fertility status.

57.3 Infertility

Infertility is usually defined as the failure to conceive after 1 year of sexual intercourse without contraception. It is divided into 2 categories:
- Primary: The woman has never conceived in spite of having unprotected sexual intercourse for at least 12 months
- Secondary: The woman has previously conceived but is subsequently unable to conceive for 12 months despite unprotected sexual intercourse.

Causes of infertility include the following:
- Tubal factor: There is bilateral occlusion of fallopian tubes as a result of PID.
- Male factor: The sperm ducts are damaged as a result of previous STIs leading to abnormalities of sperm function.
- Endocrine disorders affecting the woman.
- Tropical diseases in male and female, including leprosy, filariasis, schistosomiasis, or tuberculosis.
- Cervical mucus abnormalities.
- Congenital disorders.

Any couple desiring children who do not achieve a pregnancy within 1 year of adequate exposure should have a systematic evaluation of their reproductive function. Most patients will require a detailed work-up, thus patients should be referred to a gynaecologist after a good history and examination rule out immediately treatable causes. Since infertility results from female *OR* male problems, both partners should be prepared to undergo evaluation. Diagnosis depends on:
- History from couple and individually.
- Physical examination of both partners.

Investigations
- Basal body temperature
- Semenalysis
- HSG for tubal patency
- Hormone assays where indicated
- Dye laparoscopy.

Management
- Definitive treatment depends on the cause as per the investigations above and may include:
- Counselling on sexual technique and fertility awareness
- Ovulation induction: Clomiphene citrate 50mg OD for 5 days starting from day 2–5 of menstrual cycle
- Tubal surgery
- Vas surgery
- Assisted reproduction
- Adoption

57.4 Pelvic Masses

Do simple screening by history and physical examination for any lower abdominal swellings, but refer to higher level for appropriate management, which may include further investigations. The differential diagnoses for pelvic masses include normal pregnancy, distended urinary bladder, uterine fibroids, pelvic abscess, tubal-ovarian mass, and ovarian cyst.

57.4.1 NORMAL PREGNANCY

Is easy to diagnose from menstrual history, clinical signs, and ultrasound if available

57.4.2 DISTENDED URINARY BLADDER

Acute retention of urine is the commonest. It is commonly associated with acute urinary tract infection in young girls and may be associated with other pelvic tumours in older women. Catheterization, urine examination (urinalysis, microscopy, culture, and sensitivity), and appropriate antibiotic based on culture will suffice in urinary tract infection (UTI).

57.4.3 UTERINE FIBROIDS

Clinical Features

Benign uterine growths may be sub-serous, interstitial, or submucous. They occur commonly in age group about 30 years and above and are associated with nulliparity, low parity, sub-fertility, and infertility. The condition presents with features of mass in the lower abdomen or dysmenorrhoea or heavy periods. Vaginal examination reveals a mass that is firm, nodular, and non-tender, and moves with the cervix. Diagnosis is essentially clinical.

Investigations

- Haemoglobin, VDRL, blood group, blood urea, urinalysis
- IVU in selected cases
- Hysterosalpingography in subfertile and infertility cases
- Ultrasound where facilities exist.

Management

- Treat associated pelvic inflammatory disease: Antibiotics – amoxicillin/clavunate 625mg BD for 7 days ***OR*** doxycillin 100mg BD for 7 days + metronidazole 400mg TDS for 7 days. NSAIDs –ibuprofen 400mg TDS for 3 days.
- Correct any anaemia associated with menorrhagia by haematinics (ferrous sulphate 200mg TDS and folic acid 5mg OD for 1 month) or blood transfusion.
- Where fertility is desired, plan myomectomy and where obstetric career is complete, plan hysterectomy with conservation of 1 ovary in women under 45 years of age.

57.4.4 PELVIC ABSCESS AND TUBO-OVARIAN MASS

Clinical Features

Essential features for diagnosis of this condition include the following:

- History of STI or pelvic infection
- Lower abdominal and pelvic pain
- Nausea and vomiting
- Tender adnexal mass
- Fever and tachycardia
- Rebound tenderness

Investigations

- Haemogram, ESR
- Urinalysis
- Urea and electrolytes
- Blood sugar
- Group and cross-match
- Ultrasound
- Culdocentesis

Management

- Give parenteral broad spectrum antibiotics ceftriaxone 1g BD IV + gentamycin 80mg TDS IV, metronidazole 500mg TDS IV, for 3–7 days. Then change to oral medications.
- Carry out appropriate surgery: Laparotomy and drainage/excision.
- Initiate physiotherapy.

57.5 Ovarian Cysts

Clinical Features

- These are usually benign and may occur in women of any age group. Menses are usually normal in simple cysts. Abnormal menses including amenorrhoea occur in functional cysts. Ovarian cysts may undergo torsion to cause acute pain.
- A cystic mass in one or other side of pelvis is essential for diagnosis.

Investigations

- Haemogram, urinalysis
- Plain abdominal x-ray may be useful in calcified tumours and some dermoid cysts
- Ultrasound

Management

- Cysts greater than 4cm need laparotomy.
- Cystectomy or salpingo-oophorectomy and histology.

Patient Education

- Annual pelvic examination and ultrasound.

57.6 Menstrual Disturbances

Most women suffer some form of menstrual disturbance in their lifetime. The common types are mentioned here.

57.6.1 AMENORRHOEA

Amenorrhoea means the absence of menstruation for 2 cycles or more. It is a symptom and not a disease. Primary amenorrhoea refers to a patient who at any age has never menstruated. Secondary amenorrhoea refers to cessation of the periods after menstruation has been established. There are 2 varieties of amenorrhoea: cryptomenorrhoea (hidden periods) and true amenorrhoea (primary and secondary).

CRYPTOMENORRHOEA

Clinical Features

The menstrual fluid is retained in the genital tract. The commonest variety seen is imperforate hymen occurring after menarche (12–14 years) with cyclic abdominal pains. Vulval inspection will reveal bluish bulging hymen. There may or may not be lower abdominal mass.

Management

- Admit to hospital for cruciate incision, which is a cure for imperforate hymen.
- Give antibiotics and analgesics (PO amoxicillin/clavulanate 625mg 12 hourly and ibuprofen 400mg 8 hourly for 5 days)
- Ascertain whether healing; if so, follow up is not necessary.

TRUE AMENORRHOEA

True amenorrhoea can be physiological as the period before puberty, during pregnancy, during lactation, and after the menopause. It may also be pathological.

Clinical Features

The clinical features depend on age of presentation in physiological type and on the level of disturbance in the pathological type of amenorrhoea.

Investigations

- In the physiological type of amenorrhoea, a good menstrual history and physical examination are usually sufficient to confirm physiological amenorrhoea. A pregnancy test and/or ultrasound usually confirm early pregnancy.
- In the pathological type, the causes may be uterine lesions, ovarian lesions, pituitary disorders, other endocrine disorders, psychiatric illness or emotional stress, and severe general illness. Primary amenorrhoea is investigated after age 18 and secondary amenorrhoea at any age when 2 or more cycles are missed. Refer to a gynaecologist.

Management
- In physiological amenorrhoea, reassurance is sufficient.
- In the pathological type, management depends on the cause.

57.6.2 DYSFUNCTIONAL UTERINE BLEEDING (DUB)

A normal menstrual period lasts 2–7 days, average 3–5 days, and a normal cycle lasts between 21 and 35 days. Menorrhagia is excessive bleeding at the menstrual periods. Polymenorrhoea refers to frequent cycles shorter than 21 days. Epimenorrhoea refers to frequent and heavy periods. Metrorrhagia refers to irregular uterine bleeding independent of or in between regular periods.

Dysfunctional uterine bleeding refers to those cases in which the bleeding is due neither to some obvious local disorder, such as pelvic infection or new growth, nor to some complication of pregnancy. This denotes some form of hormonal imbalance to be confirmed or excluded on MVA histology and hormonal assays.

Metropathia haemorrhagica describes periods of amenorrhoea of 6–12 weeks followed by prolonged spotting 2–4 weeks. On curettage and histology there is cystic glandular hyperplasia.

Clinical Features
Irregular periods associated with lack of ovulation, which are commonest at puberty and during perimenopausal period and at times during the reproductive years (14–44 years). As a consequence, there may be anaemia and poor health.

At puberty it may be associated with changes in climate and environment, school examinations, stress, intercurrent illness, and pregnancy. It is important to exclude abortion, ectopic pregnancy, and fibroids during the reproductive years, while pregnancy and uterine and cervical cancers should be excluded during perimenopausal years.

Investigations
- Haemoglobin estimation
- Pregnancy test
- Curettage and histology (avoid in young girls)
- HSG and semen analysis in those with associated infertility

Management
- At puberty, reassurance may suffice
- Women whose irregular periods are with associated anovulation need hormonal therapy at any age. Those with associated infertility can be given ovulation inducers such as clomiphene after HSG and semen analysis. Those not desiring children can have cyclicity of periods re-established using contraceptive pills for 3 cycles.

Follow up is not necessary after healing is ascertained.
- Manage cases of fibroids and genital cancer as appropriate.

- Those with pregnancy complications can be similarly managed, as appropriate.
- Those with anaemia require transfusion or haematinics with iron and folate in standard doses.
- Sometimes and more often, curettage is curative but it may be so in patients amenable to spontaneous cure. Follow up is as appropriate.

57.6.3 DYSMENORRHOEA

Dysmenorrhoea is pain before or during period, sufficient to interfere with the woman's normal occupation. It may be associated with nausea, vomiting and disturbance of bowel function. There are 2 types of dysmenorrhoea, primary and secondary.

PRIMARY DYSMENORRHOEA

Clinical Features

Primary dysmenorrhoea is the more common type, occurring in girls or young women less than 20 years of age. The pain is spasmodic or colicky in nature. It starts on the first day, and may last a few hours or throughout the period. It may be associated with nausea, vomiting, and/or diarrhoea or constipation. It may be incapacitating and interfere with normal daily activity. Good history and examination are necessary to rule out co-existing disease.

Investigations

- Haemoglobin estimation in cases of anaemia

Management

- Reassure.
- Counsel on stress and treat as appropriate.
- Analgesics: paracetamol 1g TDS or ibuprofen 200mg TDS.
- Suppression of ovulation by use of contraceptive pill for 3 cycles, for example microgynon.
- MVA or D&C are not recommended as a remedy in young girls.
- Note that in a majority of cases, pain may cease after first delivery. Follow up as appropriate.

SECONDARY DYSMENORRHOEA

Clinical Features

This is secondary to organic disease, for example PID, fibroids, and associated infertility. Features of underlying cause may be evident. Often the pain precedes the onset of a period by a week to 10 days.

Investigations

- In line with underlying cause

Management

- Administer paracetamol 1g TDS or ibuprofen 200mg TDS as in primary dysmenorrhoea
- Treat underlying cause.

57.6.4 PREMENSTRUAL TENSION SYNDROME

Clinical Features

This manifests as premenstrual discomfort in lower abdomen and back 7–10 days preceding menses. It gives a sensation of distension or pelvic engorgement. There is relief after flow begins. It is accompanied by nervous irritability, depression, headache, listlessness, and discomfort in breasts. Occasionally there is fluid retention. A good history and physical examination are important for accurate diagnosis.

Management

- Reassurance
- Mild tranquillizers: Phenobarbitone 30mg nocte ***OR*** diazepam 5mg nocte.
- Norethisterone (progestin) 5mg BD orally days 19–26 of cycle for 3 cycles.

57.7 Neoplasms (Potentially Malignant Conditions)

Health service providers should sensitize community members on symptoms of gynaecological cancer and advise them to seek help from health facilities. Women should also be encouraged to have routine annual gynaecological checkups by qualified health personnel. Health service providers should use simple cancer screening technologies such as visual inspection with acetic acid (VIA), visual inspection with Lugol's Iodine (VILI), and breast examination. They should refer suspicious cases to higher levels for appropriate management.

Neoplasms may present as pelvic masses. Refer to Section 57.4 on pelvic masses.

57.7.1 OVARIAN CANCER

Clinical Features

Usually occurs in women aged 40 years and above. Usually presents late with mass in lower abdomen. Pain and irregular vaginal bleeding are late features. Ascites and wasting are further late features. In late cases the mass is usually irregular and fixed. Diagnosis is essentially clinical but confirmed with biopsy.

Investigations

- Haemoglobin, blood group, urinalysis, blood urea
- Ultrasound
- Intravenous urogram (IVU)
- Ascitic tap for cytology
- Fine needle aspiration and cytology (FNAC)
- Laparotomy for biopsy and histology and staging

Management

Surgery is the mainstay treatment. To prepare:

- Improve general health with high protein diet and transfusion where necessary.
- Carry out palliative surgery in inoperable cases and staging.
- Perform total abdominal hysterectomy and bilateral salpingo-oophorectomy in operable cases.

- Administer chemotherapy in addition to surgery; available drugs include vincristine, vinblastine, alkeran, cyclophosphamide, and cisplatinum, as directed by the oncologist.
- Admit level 4–6 for
  - Surgery and/or chemotherapy.
  - Confirmation of diagnosis.

Prevention
Annual pelvic examination and pelvic ultrasound are recommended as preventive measures for early detection and management.

57.7.2 CANCER OF THE CERVIX

This is the most common gynaecological cancer. The risk factors for this condition are early age of first coitus, multiple sexual partners, having spouses with multiple sexual partners, high parity, infection with human papilloma virus (HPV), and infection with Herpes simplex type II.

Clinical Features
- Commonest in age group 30 and above.
- There is post-coital bleeding.
- There is post-menopausal bleeding.
- There is foul smelling vaginal discharge.
- There is intermenstrual PV bleeding.
- Many patients present late with advanced disease.
- Pain, anaemia, cachexia are late presenting features.
- Diagnosis is confirmed by histology.

Investigations
- Speculum examination shows easily bleeding lesion on the cervix
- Haemoglobin
- Biopsy

☛ **A high index of suspicion is essential as early detection is important**

Management
- Provide general supportive care, e.g., correction of anaemia.
- Undertake examination under anaesthesia for staging and biopsy of the lesion, for confirmation by histology.
- Provide supportive treatment, surgery, and/or radiotherapy.
- Refer to a specialist as appropriate.
- If histology confirms malignancy, admit for investigations.

Prevention
- Avoid risk factors listed above.
- Pap smear every 3 years for early detection.
- Visual inspection (of cervix) with acetic acid (VIA) or Lugol's iodine (VILI) are simple screening methods that can be used for all women from sexual debut.
- HPV vaccine before sexual debut and for those HPV negative.

57.7.3 CARCINOMA OF THE ENDOMETRIUM

Is a probably the third commonest cancer in women in Kenya after cervix and breast. Main age is peri and post menopausal. Associated with low parity, obesity, diabetes, and hypertension and may be preceded by endometrial hyperplasia due to unopposed oestrogen stimulation of endometrium. Presents with abnormal uterine bleeding at the perimenopausal or post-menopausal period.

Clinical findings may be unremarkable in early disease but enlarged uterus and evidence of metastasis may be evident in late cases. Diagnosis is confirmed by histology of endometrial biopsy obtained through MVA, fractional curettage, or Novak or Kevorkian curets. Treatment is by extended total abdominal hysteretomy (TAH) but adjuvant chemotherapy and/or radiation may be needed in advanced cases. High doses of progesterone are especially useful in advanced disease.

Management

Management is by a gynaecologist in conjunction with an oncologist.

57.7.4 CARCINOMA OF THE VULVA

This accounts for 3–4% of all gynaecological cancers.

Clinical Features

- Majority of patients present after the menopause.
- It may be preceded by pruritic conditions of the vulva.
- Presents as an ulcer on the vulva.
- May have inguinal lymphadenopathy.
- Diagnosis is by clinical features and confirmed by biopsy and histology.
- Differential diagnoses include granuloma inguinale, lymphogranuloma venereum, syphilitic chancre or gummata, and chancroid.

Management

- Suspicious lesions should be referred to a gynaecologist.
- Treatment is by surgery (radical vulvectomy).
- Extent of surgery will depend on the primary tumour.
- Radiotherapy and chemotherapy and surgery for advanced disease.

57.7.5 CARCINOMA OF THE VAGINA

- Accounts for 1% of gynaecologic malignancies. Peak incidence is from age 45 to 65.

Clinical Features

There is post-coital bleeding, dyspareunia, watery discharge, urinary frequency or urgency, and painful defecation. Cancers are commonly found in the upper part of the vagina on posterior wall. Speculum and digital examination reveals growth in the vaginal wall.

Investigations
- Pap smear: Reveals carcinomatous cells
- Schiller's test
- Biopsy

Management
- Depends on location and extent of the disease
- A tumour localized in the upper 1/3 of the vagina is treated either by radical hysterectomy with upper vaginectomy and pelvic lymph node dissection or with radium and external radiotherapy
- Treatment of secondary carcinomas and 1° carcinoma is usually combined and may be either radiotherapy or radical surgery. The 5-year survival rate without recurrence is about 30%.

57.8 Pelvic Inflammatory Disease (PID)

Pelvic inflammatory disease is the inflammation of pelvic structures above the cervical os. It is essentially a consequence of STI (gonorrhoea and Chlamydia trachomatis), but can follow puerperal sepsis or abortion. Gonorrhoea and Chlamydia trachomatis principally result in endosalpingitis, whereas puerperal and post-abortion sepsis result in exosalpingitis. PID may be acute, subacute, acute on chronic, or chronic. Tuberculosis is another important cause of PID.

Clinical Features
Acute PID is diagnosed by:
- Lower abdominal pain usually starting soon after a menstrual period
- Fever
- Signs of pelvic peritonitis in lower abdomen
- Bilateral adnexal tenderness and positive cervical excitation on vaginal examination
- The patient may be toxic with vomiting

Chronic PID is diagnosed by:
- Chronic or recurrent lower abdominal pains
- Dyspareunia,
- Infertility
- Mucopurulent cervical discharge
- Bilateral adnexal tenderness
- Adnexal induration and/or masses (tubo-ovarian)

☛ **Diagnosis is mainly clinical.**

☛ **Tuberculosis is diagnosed by biopsy: endometrial or pelvic.**

Investigations
- Urethral and cervical smears may be helpful in acute cases for Gram-stain and culture

- Haemoglobin
- BS for MPs
- Urinalysis
- VDRL

Management

- Acute PID: Mild to moderate where the patient is not toxic and there are no features of peritonitis:
  - PO amoxicillin/clavulanate 625mg 12 hourly for 7 days ***OR*** doxycycline 100mg BD for 7 days 12 hourly with PO metronidazole 400mg 8 hourly for 7 days; avoid alcohol. Add PO ibuprofen 400mg 8 hourly and hyoscine butyl bromide 20mg PO 8 hourly for 5 days.
  - STI related PID:
  - Amoxicillin 3g STAT + amoxicillin-clavulanate 625mg STAT + probenecid 1g + doxycycline 500mg QDS for 10 days. In pregnancy use erythromycin 500mg QDS for 10 days + metronidazole 400mg TDS for 10 days.
- Acute PID – Severe cases with toxicity and features of peritonitis:
  - Start IV fluids.
  - Parenteral or oral analgesic, e.g., morphine 10mg IM PRN (3 doses), then change to PO ibuprofen 400mg TDS for 7 days.
- IV crystalline penicillin 3 mega units 6 hourly ***OR*** ceftriaxone 1gm BD + IV gentamicin 80mg 8 hourly + metronidazole 500mg IV 8 hourly for 3–5 days. Then give PO metronidazole 400mg 8 hourly and doxycycline 100mg 12 hourly for 10 days and PO ibuprofen 400mg 8 hourly for 5 days.
- If fever persists after 48–72 hrs of antibiotic cover:
  - Perform bimanual pelvic examination. Confirm with pelvic ultrasound.

If there is pelvic collection (bulge in pouch of Douglas) and/or adnexal masses, pelvic abscess is suspected and laparotomy for drainage done.

- At laparotomy, do drainage and peritoneal toilet with warm saline; leave drain in situ for about 3 days and continue parenteral antibiotics postoperatively.
- Chronic PID
  - Antibiotics as for mild to moderate acute PID.
  - Spouse or sexual partner is also investigated and treated for STI.
  - Physiotherapy for chronic pelvic pain.
- Admit level 4 or above in presence of:
  - Severe PID, which is indicated by
    - Dehydration
    - Suspicion of abscess
    - Febrile patient
    - Suspicion of induced abortion
  - Acute PID if
    - There is vomiting
    - Follow up cannot be guaranteed

Patient Education

In case of partner(s), trace and treat contacts and advise on condom use to avoid re-infection.

57.9 Abscesses and Fistulas

57.9.1 BARTHOLIN'S ABSCESS

Bartholin's glands are located bilaterally in the vulva, adjacent to the vaginal orifice. Cysts arise when the glands' ducts become occluded. Bartholin's abscesses occur when the gland becomes secondarily infected with one of many common bacterial pathogens.

Clinical Features

Patient may complain of any combination of symptoms that include local pain, low-grade fever, perineal discomfort, labial swelling, dyspareunia, purulent PV discharge, and difficulty in sitting. Physical examination may reveal tender, fluctuant abscess lateral to and near the posterior fourchette, local swelling, erythema, labial oedema, and painful inguinal adenopathy. Most abscesses develop over 2–3 days and spontaneous rupture often occurs within 72 hours.

Management

- Treatment of acute phase includes bed rest, analgesics, e.g., PO ibuprofen 400mg TDS for 5 days, hot wet compresses.
- PO doxycycline, 100mg BD for 7 days, then re-evaluate.
- When abscess formation is obvious, incision and drainage as follows:
  - Apply local anaesthesia lignocaine 1%.
  - Incise distended mucosa as close to hymenal ring as possible or through skin if point of abscess is obvious.
  - Marsupialize to prevent recurrence.
  - Pack cavity with gauze impregnated with liquid paraffin for 24 hours.
- Continue with warm sitz (saline) baths till the wound is healed.

57.9.2 GENITAL FISTULAS

This is communication between the genital tract and the urinary or alimentary tracts and may occur singly or in combination. It is due to:

- Obstetrical injury: Obstructed labour usually leads to pressure necrosis of the bladder and vaginal wall and the rectum. Necrotic tissue sloughs off, leading to vesicovaginal fistula (VVF) and recto-vesical fistula (RVF).
- Instrumental delivery may cause perforation of the vagina and rectum.
- Operative injury: A fistula may be caused during total abdominal hysterectomy and caesarean section.
- Extension of disease: Malignancy of the bowel or any pelvic abscess may perforate into the rectum and posterior vaginal wall.
- Radiotherapy: Heavy radiation of the pelvis causes ischaemic necrosis of the bladder wall and bowel, causing urinary or faecal fistula.

Clinical Features

The patient complains of urinary or faecal incontinence or both. Secondary amenorrhoea is common.

Management
- Confirm diagnosis using Sims' speculum.
- Examination under anaesthesia is always mandatory for the diagnosis and definition of fistula. In case of recently formed VVF, continuous bladder drainage for 2 weeks is useful because a small fistula may close or a large fistula may reduce in size.
- Vulval excoriation is treated by water repellent substances, e.g., KY jelly, to be applied before repair is done. If a VVF co-exists with RVF, the VVF is repaired first.
- Admit for
  - Confirmation of diagnosis and definition to plan treatment.
  - Physiotherapy for sphincter strengthening and for lower limb weakness.
- Refer to higher level if
  - Diagnosis is confirmed after examination.
  - Reconstructive surgery is deferred 3 months after the initial injury or after a previous attempt at repair to allow all tissue reaction to subside.

57.10 Sexual Assault

(See also National Guidelines for Medical Management of Rape and Sexual Assault – DRH/MOH)

Sexual assault (rape) is a violent crime directed predominantly against women. Under Kenyan laws rape is defined as carnal knowledge of a woman without her consent or by use of force, duress, or pretence. A girl below 18 years of age is not legally deemed to be able to give consent (Children Act). Neither are mentally retarded or psychiatric women.

Clinical Features
These will range from none or mild to very severe injuries that may be life threatening. The medical personnel must approach the rape victim with great understanding, respect, and concern for her wellbeing. The patient may appear deceptively calm, and is usually withdrawn and detached. Careful history and medical record are important because this information will be required in court. If the patient has eaten, drunk, bathed, or douched, this may affect the outcome of laboratory tests. History must be taken to evaluate the risk of sexually transmitted disease and pregnancy.

During physical examination, it is important to document location, nature, and extent of any external trauma to face, neck, breast, trunk, limbs, the genitalia, and vagina; in addition, cervical trauma must be documented. Clothes and attire are retained as exhibits. Psychological trauma is evaluated and managed.

Investigations
- Swabs for microscopy and culture from:
  - Vagina
  - Throat

  - Rectum
  - Urethra
- Swab the cervix and vagina for sperm microscopy. Pap smear may preserve sperms for later identification.
- Pubic hair combings and clippings.
- Scraping of fingernails for DNA studies for purposes of identification of the assailant
- Blood for baseline RPR and HIV serology; repeated after 3 months.
- Urine for baseline pregnancy test; repeated after 4 weeks.

Management
- Encourage patients and relatives to report all cases to the police. Discourage private deals by perpetrators to evade the law.
- Treat physical injuries, noting that some tears or cuts may require surgical repair.
- Administer tetanus toxoid for soiled lacerations,
- Give prophylactic treatment to prevent pregnancy after ruling out already existing pregnancy. This is ethynyl oestradiol 50µg + levonorgestrel 150µg 2 tabs STAT and 2 tabs 12 hours later, ***OR*** ethynyl oestradiol 30µg + levonorgestrel 150µg 4 tablets STAT followed by 4 after 12 hours, ***OR*** levonorgestrel 750µg/L STAT and 1 after 12 hours.
- Give prophylaxis against sexually transmitted disease.
- Give HIV post exposure prophylaxis (see Section 2.1.8).
- The patient may be put on tranquillisers, e.g., POP diazepam 5–10mg 8 hourly for about 10 days.
- If the perpetrator is available for examination, document clinical evidence that may connect him/her with the victim/survivor (hair, blood, semen, scratch or teeth marks) and take specimens accordingly.
- Ensure psychological and psychiatric review; this is essential.
  - Long-term psychological and psychiatric care may be required.
- Initiate major or reconstructive surgery as required.

58. Obstetrics

In this section the attention turns to the care and treatment of the woman during pregnancy and before, during, and after the birth of the child, as well as on the welfare of the child. This focus is consistent with the first cohort defined by the Kenya Essential Package for Health (KEPH) – pregnancy and the newborn (up to 2 weeks).

58.1 Antenatal Care and Complications

Uncomplicated antenatal care can be provided at all levels of the health care system, while complicated antenatal care should be carried out only at levels 4 to 6.

58.1.1 ANTENATAL CARE

Antenatal care is organized to achieve several main objectives:
Prevention and treatment of pregnancy complications.
Provision of nutritional, social, emotional, or physical support.
Detection and treatment of disorders or diseases.
Provision of patient education.
Planning for labour and delivery.

CONDUCT OF ANTENATAL CARE

Antenatal care should start as early as possible. The first visit should be in the first trimester. During this visit a detailed history is taken. It should include age, marital status, occupation, education, ethnic origin, area of residence, drinking, smoking and any substance abuse habits, as well as past obstetric and gynaecological history. Records of each pregnancy in chronological order should include date, place, maturity, labour, delivery, weight, sex and fate of the infant, and any puerperal morbidity.

The patient's past medical and surgical history is recorded, as is any family history of diabetes, hypertension, TB, hereditary diseases, and multiple pregnancy. The history of the current pregnancy is enquired into: last menstrual period (LMP), estimated delivery date (EDD), maturity at present, any problems encountered so far, e.g., bleeding. LMP is the first day of LMP; gestation is calculated in weeks from LMP; EDD is calculated by adding 7 days to LMP and 9 to the month, e.g., LMP 1/1/93, EDD 8/10/93.

Physical exam is then done, to include:

- BP, weight, urinalysis
- General physical exam
- Abdominal exam: Fundal height, lie, presentation, foetal heart sounds, presence of multiple gestation, sizes of liver and spleen, and presence of other masses.
- Vaginal exam: This is indicated as follows:
  - At early pregnancy to confirm and date pregnancy.
  - In late pregnancy at 36 weeks to assess pelvic adequacy.
  - In labour to confirm diagnosis and monitor progress.
  - Other times to evaluate symptoms and complaints from patient.

Investigations

Should include a minimum of:

- Blood group: ABO + Rhesus, VDRL, haemoglobin, HIV screening
- Other tests as appropriate for individual patient.

58.1.2 SCREENING FOR NEW WHO MODEL OF FOCUSED ANTENATAL CARE

This is a classification mechanism, presented in Figures 58.1 and 58.2. Those who check NO for all questions follow the 4 visits model, while those with

Table 58.1: Common complaints in pregnancy

Complaint	What to do	What to avoid
Abdominal pain, backache	Exclude UTI and local lesion; if none reassure. Physiotherapy	Avoid unnecessary medication
Morning sickness (nausea & vomiting)	Reassure up to 3 months. If severe with dehydration admit for hydration. Exclude UTI, malaria, and typhoid	Avoid anti-emetics
Indigestion (flatulence, heartburn & constipation)	High roughage diet. If severe give mild laxative and antacid, e.g., Bisacodyl 5mg in the morning 2 at bedtime x 5 days. Magnesium trisilicate 10ml TDS x 5 days	Avoid strong laxatives or enema
Ptyalism (Excessive salivation)	Reassurance	Avoid anti-cholinergic drugs
Food fads; pica (Craving for unusual foods and substances)	Advise on balanced diet. Eat according to desire. Give haematinic supplements as for prophylaxis	Discourage harmful and contaminated materials, e.g., soil
Generalized pruritus	Reassurance: Mild anti-pruritic (chlopheniramine 4mg TDS) 5 days; Exclude skin and systemic diseases	Avoid steroids
Pruritus vulvae	See under vaginal discharge	Avoid douching
Muscle cramps	Calcium lactate 300mg daily Physiotherapy	Avoid NSAIDs
Fatigue	Reassurance; bed rest 3–7 days Advise on balanced diet	Avoid drugs
Breast tenderness	Reassure; advise on breast support	Avoid NSAIDs and breast massaging
Bleeding gums	Oral hygiene, massage gums, vitamins ABC Refer to dentist if necessary	Do not excise hypertrophied gums (epulis)

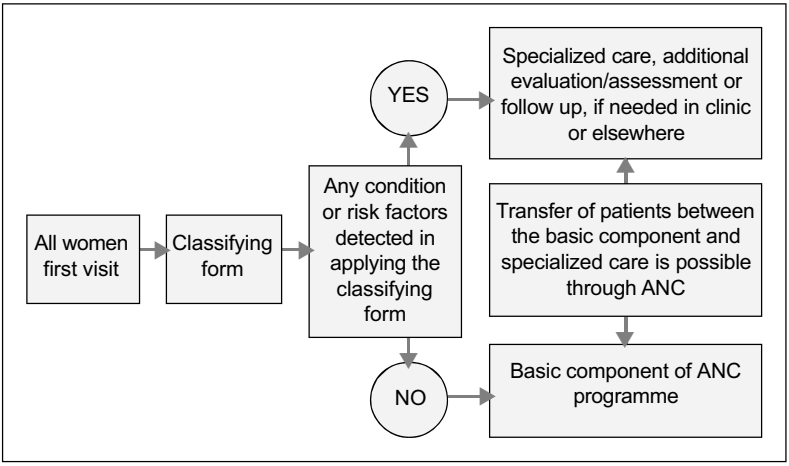
problems may require extra visits. The 4 visits are 1st by 16 weeks, 2nd at 24–28, 3rd at 32 weeks, and 4th at 36 weeks. At each return visit antenatal care should include:

- Interval history of symptomatology and/or problems. Date of first foetal movements.
- Weight: amount and pattern of weight change. Blood pressure, check for oedema.
- Urinalysis for glucose, proteins, ketones. Obstetric examination, vaginal examination/speculum as indicated.
- Repeat laboratory tests, if necessary, e.g.,
  - PCV at 28–36 weeks
  - Serology for syphilis and HIV at 36 weeks
  - If Rh –ve, indirect Coomb's test every 4 weeks.

Special laboratory tests as indicated for individual patients to assess maternal/foetal wellbeing:

- Examination of amniotic fluid.
- Foetal-heart movements monitoring and evaluation.

Figure 58.1: The new WHO antenatal care model



Other issues include the following:

- Decisions on place and expected mode of delivery should be made and agreed with the patient not later than 36 weeks of gestation.
- Counselling should be provided for family planning in general and for postpartum voluntary surgical contraception (VSC). Duly signed informed consent forms should be available at admission.
- Patients should be advised to report to the health facility promptly if they have PV bleeding, draining of amniotic fluid, blurred vision, or labour pains.

58.1.3 MANAGEMENT OF HIGH RISK PREGNANCIES

Every pregnancy faces risks. Although it is necessary to detect current problems or complications and manage them, it is not possible to predict future complications and prevent them. All pregnant women need to be assisted to recognize danger signs and to report for management of complications at all time.

☛ ***High risk patients should be managed at levels 4 to 6.***

In the past the following have been considered high risk criteria (history or current):

- Extremes of reproductive age: Below 18 and above 35.
- Primigravida: Especially too young, too short, too old.
- High parity 5+, short birth interval.
- Large infants: 4,000g or above.
- Prematurity: LBW below 2,500g.
- Obstructed and difficult labours.
- Still births, neonatal deaths, abortions, caesarean section.

Figure 58.2: Criteria for classifying women in the basic component of the new antenatal care model

Name of patient: _____ Clinic record number: ☐☐☐☐☐☐

Address: _____ Telephone: _____

INSTRUCTIONS: Answer all of the following questions by placing a cross mark in the corresponding box.

	OBSTETRIC HISTORY	**No**	**Yes**
1.	Previous stillbirth or neonatal loss?	☐	☐
2.	History of 3 or more consecutive spontaneous abortions?	☐	☐
3.	Birthweight of last baby < 2500g?	☐	☐
4.	Birthweight of last baby > 4500g?	☐	☐
5.	Last pregnancy: hospital admission for hypertension or pre-eclampsia/eclampsia?	☐	☐
6.	Previous surgery on reproductive tract? (Myomectomy, removal of septum, cone biopsy, classical CS, cervical cerclage)	☐	☐

	CURRENT PREGNANCY	**No**	**Yes**
7.	Diagnosed or suspected multiple pregnancy?	☐	☐
8.	Age less than 16 years?	☐	☐
9.	Age more than 40 years?	☐	☐
10.	Isoimmunization Rh (-) in current or in previous pregnancy?	☐	☐
11.	Vaginal bleeding?	☐	☐
12.	Pelvic mass?	☐	☐
13.	Diastolic blood pressure 90mm Hg or more at booking?	☐	☐

	GENERAL MEDICAL	**No**	**Yes**
14.	Insulin-dependent diabetes mellitus?	☐	☐
15.	Renal disease?	☐	☐
16.	Cardiac disease?	☐	☐
17.	Known 'substance' abuse (including heavy alcohol drinking)?	☐	☐
18.	Any other severe medical disease or condition?	☐	☐

Please specify _____

_____

A "Yes" answer to any ONE of the above questions (i.e. ONE shaded box marked with a cross) means that the woman is not eligible for the basic component of the new antenatal care model.

Is the woman eligible? (circle) **NO** **YES**

If NO, she is referred to _____

Date _____ Name _____ Signature _____

(staff responsible for ANC)

- Genetic or familial diseases.
- Medical diseases: Diabetes, cardiac, renal, hypertension, Rhesus, anaemia, HIV infection.
- Antepartum haemorrhage, postpartum haemorrhage, DVT, IUGR, PROM, postdates, CPD, and multiple pregnancy.

Principles of management include:
- Prenatal investigations and counselling in appropriate cases
- Early start of antenatal care
- Close medical supervision during pregnancy
- Special tests and examinations to evaluate foetal development and well being as well as maternal wellbeing
- Timely intervention for therapy and delivery.

58.2 Anaemia in Pregnancy

Anaemia in pregnancy is a major obstetric problem in Kenya. Locally, anaemia is generally accepted as Hb < 10g%. Mild anaemia Hb 8–10g, moderate Hb 6–7g, severe Hb 4–5g, very severe below Hb 4g. In severe anaemia the pregnancy is in danger of abortion, premature labour, or IUFD, while in very severe anaemia the mother's life is also in danger.

Most cases are due to iron deficiency as a result of dietary deficiency or blood loss from hookworm infestations. Anaemia is also due to haemolysis due to malaria, sickle cell disease, and folate deficiency due to inadequate intake especially in urban areas. Iron deficiency and folic acid deficiency often occur together causing "Dimorphic Anaemia".

Clinical Features
There is general weakness, dizziness, pallor, and oedema; in addition, in haemolytic anaemia there is jaundice and hepatosplenomegaly.

Investigations
- Full haemogram
- Stool for hookworm ova and schistosomal ova, where applicable
- Urine urobilinogen and schistosomal ova, where applicable
- Blood slide for malaria parasites
- Sickling test

Prevention
- Balanced diet
- Prophylaxis iron (ferrous sulphate 200mg TDS + folate 5mg OD), throughout pregnancy
- Antimalaria prophylaxis (ITP)
- Early detection
- Routine antenatal Hb screening at first visit and near term

Management

As summarized in Table 58.2, principles of management include:

- Raise Hb (oral or parenteral haematinics, transfusion – refer if needed).
- Remove cause - dietary deficiency, treat malaria, treat hookworms, give haematinics if dietary deficiency exists.
- Prevent recurrence.

☛ **Whereas mild anaemia can be cared for at all levels of health care, moderate to severe anaemia needs to be taken care of at 4 to 6 level facilities.**

Table 58.2: Management of anaemia in pregnancy

Severity	Hb (g%)	Management
Mild	8–10	Treat cause. Oral haematinics, ferrous sulphate 200mg TDS and folic acid 5mg for 1 month. Improved diet.
Moderate	6–7	Give ferrous sulphate 200mg TDS and folic acid 5mg OD for 3 months. Improved diet.
Severe	4–5	Transfusion of blood and give ferrous sulphate 200mg TDS and folic acid 5mg OD for 3 months. Improved diet.
Very severe	Below 4	Resuscitation and treatment as for severe cases.

58.2.1 USE OF BLOOD TRANSFUSION IN PREGNANCY

For severe and very severe anaemia, especially where cardiac failure or labour is imminent (see Section 58.3, antepartum haemorrhage, and 58.14.3, postpartum haemorrhage), do the following:

- Transfuse slowly: 500ml whole blood in 4–6 hours with branula G18.
- Give frusemide 80mg IV STAT.
- Give packed cells, if available; cover with malaria PO AI full course.

In very severe anaemia, transfuse blood bearing in mind the AIDS risk in blood transfusion: Use screened blood only and sparingly.

58.2.2 COMPLICATIONS OF ANAEMIA IN PREGNANCY

The complications of anaemia in pregnancy include the following:

- Cardiac failure, which may lead to death.
- May worsen effects of minor PPH leading to death.
- May worsen effects of minor hypoxia during anaesthesia, causing death.
- Reduces resistance to infection.
- Causes late abortions, premature labours.
- Increases perinatal mortality and morbidity even in term babies.
- Results in babies becoming anaemic (iron deficiency) after 2–3 months of life.
- Administer prophylactic haematinics.

58.3 Antepartum Haemorrhage (APH)

Antepartum haemorrhage (APH) is defined as vaginal bleeding after the 20th week of pregnancy. APH is associated with increased foetal and maternal

morbidity and mortality. The foetal and maternal status will depend on amount, duration, and cause of bleeding. The causes of APH are:

- ***Extraplacental bleeding:*** From sites other than the placental surface, including cervical lesions, e.g., trauma, cancer of the cervix, cervical polyps; vaginal lesions, e.g., tears/lacerations (rare), and infections; and vulvoperineal tears (rare).
- ***Placental causes:***
  - Placental abruption (abruptio placentae): This is defined as occurring when a normally implanted placenta separates from the uterine wall (decidua basalis) after the 20th week and prior to the 3rd stage of labour. Bleeding may be absent, mild, moderate, or severe (this does not reflect extent of separation or severity). Bleeding may be concealed when little or no bleeding is seen PV or revealed when bleeding PV is evident.
  - Placenta praevia: This occurs when any part of the placenta implants in lower part/segment of the uterus. Further clinical classification is feasible depending on the relationship to internal cervical as:
    - Minor degree:
      - Type 1: Placenta in the lower uterine segment but not encroaching the internal os.
      - Type 2: Placenta partially encroaches internal os but not during labour.
    - Major degree:
      - Type 3: Placenta partially encroaches the internal os and remains the same even during labour.
      - Type 4: Placenta totally covers the internal os and this relationship does not change during labour.
- ***Vasa praevia:*** This is a rare cause of antepartum haemorrhage in which the umbilical cord is inserted into placental membranes with blood vessels traversing and presenting over the internal cervical os.

Investigations

- Haemoglobin
- Urinalysis: Haematuria, proteinuria
- Bedside clotting time
- Bleeding time
- Platelet count
- Others: Ultrasound, which offers a high degree of diagnostic accuracy in antepartum haemorrhage

Management – General

Always admit to hospital a patient with a history of antepartum haemorrhage even if bleeding is not apparent and the patient appears quite well.

- ***Take a careful history and note:***
  - Amount and character of bleeding
  - Any associated pain
  - History of bleeding earlier in pregnancy
  - History of trauma
- ***Do a thorough physical exam, including abdominal examination for:***
  - Tenderness/guarding

- Contractions
- Foetal heart presence

- ***Carry out speculum examination:***
  - Bleeding from uterus
  - Other sites of bleeding
  - Cervical dilatation
- ***In patients with antepartum haemorrhage:***
  - Quickly evaluate the maternal and foetal status.
  - Take blood for grouping and cross-matching.
  - Start IV 5% dextrose or normal saline using a wide bore branula.
  - Monitor vital signs; blood pressure, respiratory rate, pulse rate, temperature and insert an indwelling urethral catheter.
- ***If bleeding is severe or patient is in shock then:***
  - Ensure open airway and breathing.
  - Establish and maintain adequate circulation: may transfuse whole blood or packed cells.
  - Monitor fluid input and output: insert an indwelling Foley's catheter.
- ***Management – Specific management depends generally on:***
  - Gestational maturity
  - Condition of foetus
  - Continuous bleeding or not
  - Onset of spontaneous labour

Management – Specific

Essentials of diagnosis:

- Abruptio placentae
  - Continuous abdominal and/or back pain
  - Irritable, tender and often hypertonic uterus
  - Visible or concealed haemorrhage
  - Board-like rigidity
  - Evidence of foetal distress
- Rupture of the uterus may be confused with abruptio placentae. The following features suggest rupture of the uterus:
  - Efforts at resuscitation of the mother unrewarding (e.g., blood pressure remains low while the pulse remains rapid and thready).
  - Uterine contractions absent.
  - Difficulties in determining shape and outline of the uterus (due to peritoneal irritation and the empty uterus): ***This is a very important sign.***
  - For mothers who have been in labour, recession of the foetal presenting part and disappearance of foetal heart sounds suggest rupture of the uterus.
- Once rupture of the uterus has been ruled out, then treatment for abruptio placentae should be instituted.

Principles of treatment:

- Rapid correction of hypovolaemia/shock or anaemia, as above
- Correction of coagulation defect:
  - Whole blood
  - Fresh frozen plasma

- Early uterine emptying
- Vaginal delivery whenever possible
- Prevention of postpartum haemorrhage
- Thorough physical examination, including abdominal examination for:
  - Tenderness/guarding
  - Contractions
  - Foetal heart presence
- Speculum examination: Bleeding from uterus, other sites of bleeding, cervical dilatation
- If above measures do not establish diagnosis, then do examinations under anaesthesia (EUA) in theatre; rule out placenta praevia then do:
  - Artificial rupture of membranes, start oxytocin infusion (if no contraindications) 5 units in 500ml of 5% dextrose(10 drops per minute for 30 minutes and increase by 10 drops every half hourly to a maximum of 60 drops per minute or 3 contractions per 10 minutes, whichever is earlier) . This is done when vaginal delivery is evaluated as imminent and feasible.
- Indications for abdominal delivery: Caesarean section, hysterotomy
  - Intrauterine foetal death with severe uterine bleeding
  - Severe degree of placental abruption with a viable foetus
  - Haemorrhage severe enough that it jeopardizes life of mother
  - Any incidental complication of labour
- Postpartum: Continue oxytocin for about 2 hours.

Placenta Praevia

The management of placenta praevia depends on gestation, extent of bleeding, and clinical findings. Conservative management is done when: bleeding is minimal and a significant risk of prematurity exists. The decision follows evaluation based on complete examination of maternal and foetal status. Speculum examination is mandatory. The following must be done:

- Hospitalization mandatory in a place with caesarean section facilities.
- Restriction of physical activities.
- Weekly haemoglobin.
- Avoid unnecessary physical examinations.
- Ultrasound monitor if possible.

Patient may be discharged if placenta is normally situated and be re-admitted at 38 weeks (as below); then:

- If no bleeding recurs by 37 weeks prepare patient for theatre under a DOUBLE SET-UP for EUA and for caesarean section.
- If a minor degree of placenta praevia is found, then do artificial rupture of membranes (ARM), start oxytocin, and DELIVER.
- If a major degree of placenta praevia is found, prepare the patient for theatre immediately for caesarean section.
- Do caesarean section if: Bleeding is severe and a threat to life, in doubt about degree of placenta praevia, and any contraindication for normal delivery.

☛ **Level of care for antepartum haemorrhage is 4–6.**

58.4 Cardiac Disease in Pregnancy

In Kenya, this is often of rheumatic heart disease origin.

Clinical Features
There may be history of rheumatic fever in childhood, or known rheumatic heart disease, dyspnoea, palpitations, body oedema, cough, easy fatigability, evidence of heart enlargement, murmurs, thrills, left parasternal heave, prominent neck veins, and tachycardia. There may also be hepatomegaly, ascites, and basal crepitations.

Investigations
- Shielded chest x-ray in early pregnancy
- Electrocardiogram
- Routine antenatal profile (haemoglobin, VDRL, blood group, urinalysis)
- Urine C&S, blood culture, urea and electrolytes

Management
- This depends on functional classification of the New York Heart Association:
  - Class I Asymptomatic
  - Class II Symptomatic with heavy work
  - Class III Symptomatic with light work or exercise
  - Class IV Symptomatic at rest
- Class I and II are managed as outpatients until 34–36 weeks when they are admitted for bed rest and observation in hospital level 4–6.
- Class III and IV are admitted on first visit at any gestation for entire duration of pregnancy, level 5 and 6.

Management – Supportive
- Bed rest
- Haematinic supplementation: Ferrous sulphate 200mg TDS + folic acid 5mg OD combination.
- Treat intercurrent infections: Dependent on organisms identified and site of infection.
- Avoid undue physical and emotional stress.
- Regular urine analysis and culture.
- Ensure dental hygiene.
- Regular urea and electrolyte determination.

Management – Pharmacological
- Digitalization is indicated in imminent and overt cardiac failure, if not previously on digoxin. Consult cardiologist on medication regimes.
- Rapid digitalization by mouth, 1–1.5mg in divided doses over 24 hours, less urgent digitalization 250–500mcg daily (higher dose may be divided).
- Continue maintenance therapy with digoxin 0.25mg, frusemide 40–80mg.
- Continue prophylactic IM benzathine penicillin 2.4 mega units monthly.

Labour and Delivery

- Spontaneous labour and delivery are preferred.
- Prop up.
- Keep oxygen and emergency tray available.
- Start antibiotics PO amoxicillin 2g + IV gentamicin 160mg STAT then PO amoxicillin 1g 8 hourly and IV gentamicin 80mg 8 hourly for 2 weeks.
- Adequate analgesia with morphine 10mg IM STAT at 4–6cm cervical dilatation.
- Avoid lithotomy position.
- Assisted vacuum delivery in second stage.
- Massage uterus after delivery of placenta to achieve uterine contraction.
- Give oxytocin 10 IU IM if needed to achieve uterine contraction or to control postpartum haemorrhage.
- Give frusemide 80mg IV STAT after 3rd stage of labour
- Observe closely for evidence of cardiac failure
- Keep in hospital for 2 weeks. Continue antibiotics for entire period. Discharge through the cardiac clinic.

Patient Education

- Advise on family planning. Cardiac patients should have small families of 1 or 2 children or none. Suitable methods include minilaparotomy tubal ligation under local anaesthesia, vasectomy, barrier methods, progesterone-only agents pills or implants. Oestrogen containing methods are contraindicated such patients.
- Levels of care for cardiac disease in pregnancy:
  - Classes I and II: Levels 4–6
  - Classes III and IV: Levels 5–6

58.5 Diabetes in Pregnancy

Diabetes mellitus is a metabolic disorder characterized by elevated glucose levels in blood. Covered in Section 11.3 in Part I.

Clinical Features

- ***Overt diabetes:*** If not already diagnosed the symptoms include polydipsia, polyuria, weight loss, blurred vision, and lethargy. Glycosuria is common but not diagnostic.
- ***Gestational diabetes: This will occur in 1–5% of pregnancies.*** Historical risk factors include previous gestational diabetes, family history of diabetes, previous macrosomic infant or unexplained still birth, polyhydramnios, obesity, and advanced maternal age. Glycosuria may be present but is not diagnostic.
- ***Complications of diabetes:*** These include chronic hypertension and nephropathy, pregnancy-induced hypertension, foetal macrosomia, intrauterine growth retardation, polyhydramnios, foetus distress, and hypoglycaemia.

Investigations

- Postprandial blood glucose level
- Glucose tolerance test (GTT) to confirm diabetes

Management

- Diabetes in pregnancy should be managed in hospital (levels 4-6).
- Regular daily physical activity should be maintained.
- Diet should be 30–35 calories/kg/day, i.e., 1,800–2,400 calories per day; carbohydrate 200g/day and protein 90g/day.
- Non-insulin requiring gestational diabetes can be managed by diet alone and monitored with serial blood sugar:
- If not controlled by diet the patient should start on soluble insulin under the supervision of the diabetic team during admission. Start with 10 units of soluble insulin TDS subcutaneous to maintain the sugar under 7–10mmol/L. To change the dosage as required. Once controlled to convert to insulin 70/30 give 2/3 of the daily dose of soluble in the morning and 1/3 in the evening. To prevent PET, start aspirin 60–75mg OD; start at 16 week and stop at 36 week to avoid excess bleeding.
- Delivery:
  - Non-insulin requiring gestational diabetic should be delivered at term.
  - Well controlled insulin-requiring diabetic should progress to 38 weeks before delivery.
  - Insulin dependent diabetic with hypertension, renal, retinal, or cardiac disease, or pre-eclamptic intrauterine growth retardation must be delivered by 37 weeks When in labour give 1/2 of the daily dose as insulin soluble STAT subcutaneously and then put the other half of the daily dose as insulin soluble in an infusion of 1 litre 5% dextrose to be given over 8 hours.
  - Intrapartum blood glucose is monitored hourly and insulin doses adjusted accordingly in small doses (Discontinue usual insulin regime).
- Postpartum:
  - Insulin requirement can alter after delivery; serial glucose monitoring should be done allowing adjustment of insulin dose to achieve stable control.

Patient Education

This should involve the following:

- Pre-pregnancy counselling to facilitate achieving optimum glucose control before pregnancy to minimize foetal complications in diabetic pregnancy.
- Family planning: Advise on a small family.
- Recommended FP methods include VSC, barrier methods, implants, IUD, and progesterone-only pill.
- Oestrogen containing methods are contraindicated.

58.6 Drugs in Pregnancy

Drugs taken by the mother during pregnancy can be harmful to the developing foetus in a variety of ways. Drugs taken just before delivery can also affect the baby. Table 58.3 provides guidelines on drugs that are considered safe or relatively safe in pregnancy. Even these drugs should be used with caution, however, and only when necessary. ***Drugs that are contraindicated should be avoided***.

Table 58.3: Drug use in pregnancy

Types of medication	Degree of safety for use in pregnancy		
	Safe or relatively safe	Some risk – Use with caution	Contraindicated in pregnancy
Analgesics	Codeine, morphine, pacacetamol, pethidine	Indomethacin, salicylates	
Anti-convulsants	Ethosuximide, phenobarbitone, primidone	Clonazepam, phenytoin	
Anti-microbials	Ampicillin, amoxycillin, cephalosporins, clidamycin, dicloxacilin, erythromycin, gentamicin, isonizid, miconazole, oxacillin, penicillin	Chloramphenicol, metronidazole, nitrofuratoin, streptomycin, sulfonamides, trimethoprim, rifampicin, kanamycin	Tetracycline
Anticoagulants	Dipyridamole, heparin	Dicumarol, warfarin	
Antiemetics	Hydroxyzine, meclizine, prochlorperazine	Phenothiazines	
Antihypertensive	Hydralazine, methyldopa, propranolol	Diazoxide	Nitroprusside
Bronchodilators	Aminophylline, beclomethasone	Cromolyn sodium	
Cardiac drugs	Atropine, digoxin, lidocaine, procainamide, quinidine	Dispyramide, nifedipine	
Decongestants	Pseudoephedrine		
Diuretics	Frusemide, Hydrochlorothiazide		Acetazolamide
Gastrointestinal drugs	Antacids, cimetidine, ranitidine		
Hypoglycemics	Insulin		Chlorpropamide, tolbutamide
Sedative & psychiatrics	Barbiturates, flurazepam	Diazepam, chlordiazepoxide, haloperidol, lithium, phenothiazines, tricyclic antidepressants	
Thyroid preparations	L-thyroxine, propylthiouracil		Iodide
Vaccines	Polio, tetanus, rabies		Rubella, measles, smallpox
Other drugs	Ferrous sulphate, probenecid		Antineoplastic drugs, oestrogens, DES

58.7 Malaria in Pregnancy

Falciparum malaria is particularly dangerous in the pregnant women. The clinical features of malaria in pregnancy depend to a large extent on the immune status of the woman, which in turn is determined by her previous exposure to malaria. (More details are given in Part I, Section 11.5, malaria in pregnancy.)

Clinical Features

- Non-immune (women from endemic area): High risk of maternal perinatal mortality. Acute febrile illness; severe haemolytic anaemia; hypoglycaemia;

coma/convulsions; pulmonary oedema; abortion; intrauterine death; premature labour; intrauterine growth retardation.
- Semi-immune (women from endemic area): May be asymptomatic, despite placental infection. Causes severe anaemia and low birth weight. More common in primigravidae than multigravidae. One of the dangers of malaria in these settings is that it is not detected or suspected. Antimalarials should form part of the case management of all women with severe anaemia who are from endemic areas, irrespective of whether they have a fever or a positive blood slide (see Part I, Section 11.1, anaemia in pregnancy).

Investigations
- Haemogram
- Blood slide for peripheral blood film for identification of parasites. This may be negative in a woman from endemic areas, despite placental parasitization.

Management
This is consists of supportive and pharmacological portions of management.

Supportive:
- Correct dehydration.
- Evacuate if incomplete/inevitable abortion.
- Deliver if foetal death or established labour.

Management – Pharmacological
For clinical disease it is essential to use the most effective antimalaria drug available.

☛ **Immediate treatment is essential.**

For uncomplicated disease the following is recommended:
- PO Quinine hydrochloride 600mg 8 hourly for 7 days.
- Give PO paracetamol 1g 8 hourly or PO ibuprofen 400mg 8 hourly for 3 days.
- ***OR*** PO artemether 20mg – lumefantrine 120mg 4 tabs STAT, then after 8 hours, then 12 hourly for 2 more days (4 STAT at 0, 8 , 24 36, 48 and 60 hours). After a meal.

This treatment can be used in 2nd and 3rd trimester and even in the 1st trimester if quinine not available.

For severe or complicated disease the following is recommended:
☛ ***This is a medical emergency that puts both the life of the mother and foetus at high risk. Aggressive management is essential.***
- Quinine hydrochloride parenterally IV 900mg over 4 hours, then 600mg in 5% dextrose solution to run for 4 hours, then 10% dextrose 500ml for the next 4 hours, to continue with the cycle IV 8 hourly, until able to take oral then change to oral quinine 600mg TDS . Quinine given for 7 days. Or change to full course of AL once able to take orally. Dextrose use helps avoid quinine-induced maternal hypoglycaemia (encourage oral glucose).

- Give diclofenac 75mg BD for 1 day then change to PO paracetamol 1g 8 hourly or PO ibuprofen 400mg 8 hourly for 3 days.
- Other drugs that can be used for treatment in pregnancy are artemisinin derivatives in absence of quinine.

Prevention
- In endemic areas all women should receive 4 doses of SP: 1 in the 2nd trimester (between 16 and 27 weeks) and 1 in the 3rd trimester (between 28 and 36 weeks). Doses should be given at last 4 weeks apart.
- Non-immune pregnant women should be advised not to visit a malarious area. If travel is not avoidable they should take special precautions in order to prevent being bitten, such as using mosquito repellents and an insecticide treated bed net.
- In addition, they should take chemoprophylaxis of either daily sulphadoxine + pyrimethamine 3 tablets STAT in the 2nd or 3rd trimesters. Check with the malaria guidelines.
- Drugs that are contraindicated in pregnancy are: tetracycline preparations (oxytetracycline, minocycline, doxycycline), and primaquine.

☛ Health care providers should refer to the latest edition of National Guidelines for Treatment and Control of Malaria as protocols may change from time to time.

58.8 Multiple Pregnancy

In multiple pregnancy there is more than one foetus in utero. In most situations it is a twin pregnancy but pregnancy involving more foetuses like triplets may be encountered. Multiple pregnancy may be associated with the use of fertility drugs and generally with higher risk for adverse outcomes (antenatal, intrapartum, and postpartum) than for a singleton.

Clinical Features
The uterus is larger than dates; there are multiple foetal parts or more than two foetal poles. There may be a family history of twins and on examination foetal heart rates can be identified at two different areas with a difference of 15 beats per minute. There is increased risk for having PET, polyhydramnios, anaemia, APH, PPH, malpresentation, congenital foetal anomalies, and premature labour.

Investigations
- Definitive diagnosis is made by ultrasound, but where it is lacking a plain abdominal radiograph can be taken between 34 and 36 weeks.
- Other investigations as for routine antenatal care.

Management – Antenatal Care
- Preferably in a hospital “High Risk” clinic, levels 4–6.
- Monthly haemoglobin check.

- Administration of:
  - Ferrous sulphate 200mg TDS
  - Folic acid 5mg OD
- Monitor for associated obstetric complications, e.g., pre eclamptic toxaemia, antepartum haemorrhage, anaemia, malpresentation.
- Ultrasound at 34–36 weeks gestation (or radiography if not available) to determine:
  - Presentation of 1st twin.
  - Detect anomalies, e.g., conjoined twins.
- Mode of delivery
  - Admission may be necessary to observe and manage for premature labour.
  - Bed rest while at home.

Management – Intrapartum
- Mode of delivery determined by presentation of 1st twin:
  - If cephalic allow vaginal delivery.
  - Any other presentation or anomaly, then caesarean section.
- Vaginal delivery:
  - Monitor as per normal labour (refer to normal labour and delivery).
  - After delivery of 1st twin the lie and presentation of the 2nd foetus is determined. Foetal heart also evaluated.
  - If longitudinal, cephalic and foetal heart are satisfactory, then perform ARM and await spontaneous delivery.
  - If lie is not longitudinal, do external cephalic version (ECV). If ECV fails, then do internal podalic version and perform assisted breech delivery after bringing down a leg and stabilizing the head.
  - If longitudinal lie and cephalic presentation with ruptured membranes but with inadequate contractions and stable foetal heart rate, then oxytocin at 5 units per 500ml at 30 drops per minute and deliver normally.

Management – Retained 2nd Twin

Perform abdominal and vaginal examination and assess: membranes – if intact rupture; lie and presentation; whether cervix oedematous. Look for evidence of foetal and maternal distress and manage accordingly. If assessment is favourable, then oxytocin and delivery. Caesarean section if evaluation is poor.

Management – 3rd Stage
- Oxytocin 10 IU IM administered after delivery of 2nd twin.
- Look for and anticipate postpartum haemorrhage.

Patient Education
- Family planning
- Infant feeding
- Early antenatal visit at subsequent pregnancies.
- Level of care for multiple gestation is 4—6.

58.9 Pre-Eclampsia and Eclampsia

Pre-eclampsia (PET) and eclampsia are a continuum of the same syndrome. PET is defined as the onset of hypertension with either proteinuria, oedema, or both at a gestation of 20 weeks or more. Hypertension is here defined as a blood pressure of 140/90mmHg or higher on more than 2 occasions of about 6 hours apart. Eclampsia is the presence of convulsive fits in a patient with PET. Eclampsia carries a high foetal mortality and high maternal morbidity, and in cases of poor management a high maternal mortality as well. The aetiology of pre-eclampsia and eclampsia remains unknown, remaining as “a disease of theories”

The risk factors associated with pre-eclampsia and eclampsia are:
- Parity, mostly affecting primigravidae.
- Positive family history of PET.
- Associated with the following medical diseases:
  - Diabetes mellitus
  - Chronic hypertension
  - Renal disease; chronic pyelonephritis, acute glomerulonephritis, polycystic kidneys.
- Age extremes.
- Obstetric conditions:
  - Multiple pregnancy
  - Hydatidiform mole
  - Hydrops fetalis

Clinical Features
For management purposes the clinical features may be graded by the criteria given in Table 58.4.

Table 58.4: PET grading

Category	Diastolic BP	Proteinuria (dipstix)	Oedema (variable)
Mild	Up to 100mmHg	-	+
Severe	>100mmHg	++	++

Imminent eclampsia manifests as severe PE with these features:
- Headaches
- Nausea and vomiting
- Epigastric pain
- Visual disturbances, e.g., blurred vision, diplopia, blindness, ocular signs
- Restlessness
- Oliguria

Investigations
- Haemoglobin, PCV
- Urinalysis for protein (bedside):

  - Qualitative: Dipstix
  - Quantitative: Esbach's reagent
- Blood urea and electrolytes
- Liver function tests
- Coagulation tests (where available)
- Ultrasound may be done to evaluate foetal status

Management –- General
- Proper management of pre-eclamptic toxaemia is necessary to optimize the maternal and foetal outcome.
- The optimal time for delivery to be considered.
- Continuous assessment of maternal and foetal conditions.
- Bed rest.
- Drug therapy where appropriate.
- Delivery options must be evaluated.
- Admit level 4–6 for:
  - PET at term for delivery.
  - Severe PET at any gestation.
  - Imminent eclampsia for management and delivery.
  - Eclampsia for management and delivery.
  - Complicating obstetric condition, e.g., antepartum haemorrhage (abruptio), premature labour.
  - Foetal conditions:
    – Intrauterine foetal death.
    – Intrauterine growth retardation.
- Mild pre-eclamptic toxaemia can be managed at level 2–6 as outpatient with weekly:
  - Blood pressure record
  - Body weight
  - Urinalysis by dipstix
  - Foetal heart rate
  - Foetal/uterine size
- Advise on bed rest at home on sedation with phenobarbitone 30mg TDS and to report to hospital level 4–6 if:
  - Onset of features suggesting severity (see above).
  - Decrease/change in foetal movements.
- Admit level 4–6 at 38 weeks for delivery:
  - Surfactant test.
  - Bishop's score.

Management –- Severe Pre-Eclamptic

Admit and manage in hospital level 4–6 as follows
- General
  - Absolute bed rest
  - BP 4 hourly
  - Daily urinalysis by dipstix if more than ++, then do quantitative:
    – Daily foetal heart rates
    – Foetal kick count chart

- Weekly blood urea and electrolytes
- Weekly haemoglobin
- Input/output chart (if necessary)

◆ Pharmacological
- Tabs phenobarbitone 30mg TDS
- Tabs methyldopa 250mg TDS then build up to 500mg QDS (depending on response)

◆ If this regimen does not work, deliver immediately.

☛ ***The definitive treatment of severe pre eclamptic toxaemia is delivery.***

◆ Delivery
- Admit preferably in a quiet room with 24-hour nursing coverage (a pre-eclamptic toxaemia room)
- Put an indwelling Foley's catheter for monitoring output of urine.
- Keep an input/output chart.
- Prevent convulsion.
- Give magnesium sulphate 50% 5g IV over 5 min and then 50% 5g in each buttock deep IM. If MgSO4 not available:
  – Put an IV line and put in 40mg of IV diazepam. This to titrate against level of consciousness to keep them well sedated but arousable. The diazepam to be put in 500ml of 5% dextrose
- Control blood pressure:
  – Through another IV line mix 40mg hydralazine in 500ml of 5% dextrose and titrate against the blood pressure level to maintain a diastolic blood pressure of 90–100mmHg. (Where patient is allergic to hydralazine, use sublingual nifedipine 10mg BD.)
- Do a vaginal examination and decide on the mode of delivery, either:
  – Abdominal delivery (caesarean section, hysterotomy)
  – Vaginal delivery (artificial rupture of membrane and oxytocin drip IV); if vaginal delivery is not recommended then do abdominal delivery (caesarean section, hysterotomy)

◆ Intrapartum management:
- Maintain the above guidelines.
- If foetus is alive, monitor the foetal heart rate $^{1}/_{2}$ hourly to detect signs of foetal distress.
- Maintain partogram (see Section 58.13.1, on normal labour).
- Do vacuum extraction with episiotomy if required at 2nd stage.
- Continue MgSO4 or diazepam and hydralazine as above for 24–48 hours.

Management – Eclampsia

◆ Admit in the acute/pre-eclampsia room.

◆ Management – General ("ABC" = airway, breathing, circulation)
- Assess the level of consciousness of the mother.
- Clear the airway: Suction excess secretions.
- Nurse on the lateral position.
- Introduce a mouth gag, plastic airway, or spatula.
- Administer oxygen through a nasal catheter.

  - Introduce an indwelling Foley's catheter to monitor urine output and check for proteinuria
- Management – Pharmacological
  - Control the convulsions:
    - Magnesium sulphate 50% 5g IV over 5 min and then 50% 5g in each buttock deep IM. Monitor its side effects through the knee reflex; absence signifies toxicity.
    - If MgSO4 is not available, use diazepam 20mg IV immediately.
    - Then put an IV line of 500ml 5% dextrose with 40mg diazepam to keep patient deeply sedated but arousable.
  - Control the blood pressure: If the diastolic blood pressure is 110mmHg or more then administer IV hydralazine 20mg STAT; then 40mg in 500ml of 5% dextrose, titrate according to BP.
  - Carry out emergency investigations:
    - Haemogram
    - Urea and electrolytes
    - Liver enzymes/and bilirubin levels
    - Urine analysis
- Ensure a urine output of 30ml/hr; if less, delay the delivery or refer for ICU. Determine the mode and expedite delivery immediately.
- NOTE: Imminent eclampsia is managed as eclampsia; prophylactic antibiotics ceftriaxone 1g BD ***OR*** IV flucloxacilin 500mg 6 hourly to be given. IV frusemide 40mg STAT to be administered if there is pulmonary oedema.
- Initiate obstetric physiotherapy.

58.10 Chronic Hypertension

Chronic hypertension is managed along the same lines as pre-eclamptic toxaemia. To note:
- Involve the physician.
- Provide contraception with caution.

58.11 Rhesus (Rh) Incompatibility

Rhesus isoimmunization occurs in pregnancy where a Rhesus-negative mother is pregnant with a Rhesus-positive foetus. Other ways of isoimmunization include transfusion with Rhesus incompatible blood, ectopic pregnancy, hydatidiform mole, and abortion.

Clinical Features
Usually none, but severe isoimmunization can lead to spontaneous abortion, intrauterine foetal death (hydrops foetalis), and neonatal death. Severely affected neonates who require exchange transfusion need to be referred to higher level for appropriate management to avoid hyperbilirubinaemia.

Investigations
- Blood groups and Rhesus factor in all pregnant women.

- Rhesus status of husbands of women who are Rh-negative. If he is Rh-negative, then the foetus should be Rh-negative and hence no risk of isoimmunization in the mother. Do remember, however, that extramarital pregnancies do occur.
- Rhesus antibody screening in those who are Rhesus-negative (i.e., indirect Coombs' test) as soon as possible and every month starting at 20 weeks.
- If Rhesus antibody titre is above 1:8 then do amniocentesis for bilirubin spectrophotometry. The results of this are read on the Liley's graph and the pregnancy managed accordingly.

Management – Level 4–6 with Obstetrician and Paediatrician
Pregnancies that are severely affected while the foetus is premature can benefit from intrauterine transfusion. Rhesus disease should be managed by an obstetrician.

Prevention
- A Rh-negative woman who delivers a Rh-positive baby must have anti D 500mcg IM within 72 hours of delivery if they are not already isoimmunized (i.e., Rh antibody negative or negative indirect Coombs test, or rhesus-negative baby)
- The same applies for un-isoimmunized Rh-negative mothers who have an abortion, ectopic pregnancy, hydatidiform mole, or obstetric amniocentesis.

58.12 Urinary Tract Infection (UTI) in Pregnancy

This is infection of the urethra, bladder, ureter, and kidney. It is more common in pregnancy because of the physiological changes that cause dilatation of the urinary system and relative stasis of urine. Glycosuria and amminoaciduria in pregnancy also encourage bacterial growth. UTI can lead to abortion, premature labour, low birth weight, and intrauterine growth retardation.

58.12.1 ASYMPTOMATIC BACTERIURIA

Clinical Features
This condition occurs when there are 100,000 or more bacteria per millilitre of urine without any symptoms. It occurs in 2–10% of all pregnant women. If left untreated, pyelonephritis will develop in 25–30%.

Investigations
- Urinalysis
- Urine C&S

Management
- Oral antibiotic therapy, oral amoxicillin/clavulanate 625mg 12 hourly ***OR*** PO nitrofurantoin 100mg 8 hourly OR ***OR*** erythromycin 500mg 8 hourly. All for 10 days.
- Can be managed at all levels of health care provided culture and sensitivity results are provided

58.12.2 URETHRITIS AND CYSTITIS

Clinical Features

There is dysuria, frequency, urgency, hesitancy, suprapubic pain, and false labour.

Investigations

Urine specimen for microscopy, culture and sensitivity

Management

- Advice on adequate hydration
- Oral antibiotic therapy as above
- Pain relief using hyoscine butylbromide 20mg TDS ***OR*** paracetamol 1g TDS for 5 days.

58.12.3 PYELONEPHRITIS

Clinical Features

There is fever, vomiting, renal angle tenderness, particularly on the right, and rarely premature labour.

Investigations

- Urine culture will usually grow E. coli or K. enterobacteria.

Management

- Admit immediately
- Hydration using intravenous fluids normal saline 500ml to run for 8 hours.
- Antibiotic therapy as above until the patient responds. Then continue orally for 10 days. If patient is vomiting, ampicillin 500mg IM QDS then change to oral therapy for 10 days.
- Recurrence cases are high and may indicate resistant organism, urologic abnormalities (e.g., polycystic kidneys), renal calculi, ureteric obstruction, or perinephric abscess. Ultrasound if available may be helpful. However, x-ray examinations may be done after the puerperium.

58.13 Intrapartum Care and Complications

58.13.1 NORMAL LABOUR AND DELIVERY

Normal labour and delivery can be managed at all levels of health care. It should be managed by a skilled provider linked to emergency obstetric care (EmOC) facilities by an effective referral system. Normal labour is characterized by onset of regular uterine contractions at term, accompanied by progressive cervical dilatation and expulsion of the foetus.

STAGES OF LABOUR

Labour is divided into 3 stages:

- 1st Stage: From onset to full dilatation of the cervix.
- 2nd Stage: From full dilatation to expulsion of the foetus.
- 3rd Stage: From delivery of the baby to delivery of placenta.

MANAGEMENT OF LABOUR

Proper management of labour reduces maternal and perinatal mortality and morbidity. It includes:

- Provision of rapid counselling and testing for HIV for those who missed during prenatal period.
- Making correct diagnosis of labour, with cervical effacement and dilatation 3–4cm and regular uterine contractions.
- Regular assessment consisting of maternal BP TPR 1 hourly, foetal heart rate half hourly, VE 4 hourly
- Use of partogram, which is a simple but essential tool in labour management. It is a graphic display of labour record to show progress of labour in terms of cervical dilatation, descent of the head, foetal condition, and maternal condition. An "alert line" and an "action line" should be noted. Parameters are charted against time. The partogram is especially useful where there is shortage of staff, and where majority of labours and deliveries are managed by midwives, clinical officers, or medical officers, or if patients have to be transferred to other facilities for operative deliveries (e.g., caesarean section).
- The expected rate of cervical dilatation is at least 1cm/hour: Avoid artificial rupture of membranes unless there is a clear indication.
- Vaginal examination is done at least 4 hourly to assess cervical dilatation, moulding, caput, position. Descent is assessed by abdominal palpation, noting the number of fifths of the head felt above the pelvic brim.
- Foetal condition is monitored by the foetal heart sounds and the colour of the liquor.
- Maternal condition is monitored by BP, temperature, pulse, and urinalysis. Most normal labours are completed by 12 hours. The few (approximately 20%) that go beyond 12 hours should be critically evaluated to rule out cephalopelvic disproportion (CPD), inadequate uterine contraction, malpresentation, or malposition.

Management – Supportive

Proper management of the 1st stage ensures the woman reaches 2nd stage strong enough for safe delivery. Patients in labour require:

- Psychological support.
- Appropriate analgesia if desired by patient, e.g., morphine 10mg IM STAT at 4–6cm cervical dilation.
- Hydration and nourishment.

Management – Pharmacological

- Oxytocin drip indicated for inadequate or incoordinate uterine action in absence of cephalopelvic disproportion or foetal distress:
  - Dose is 2.5–5 IU in 500ml of 5% dextrose starting at 10 drops per minute (DPM) increasing by 10 DPM every half hour to maximum of 60 DPM or when 3 contractions in 10 minutes, lasting over 20 seconds, are achieved.
  - Contraindicated in Para 5 and above and in patients with a previous scar, who should be referred to operative delivery.

- Dextrose drip (5% or 10%):
  - Indicated in mild foetal distress (light meconium staining of liquor with normal foetal heart rate) and maternal dehydration.
  - Flush with normal saline, then give at 30 drops per minutes or 20cc of 50% dextrose bolus.

NORMAL DELIVERY

Clinical Features

Second stage (full dilatation) is recognized to have been achieved when contractions become strong and frequent, patient grunts and bears down and develops the urge to push, the head further descends, the perineum bulges and the overlying skin becomes tense and glistening, and the anus may "gape".

Management

- Full dilatation should be confirmed by digital vaginal examination (VE).
- Mother should be encouraged to bear down with contractions and relax in between.
- At crowning, perineum should be supported with the fingers to prevent perineal tear.
- If necessary episiotomy should be done at this time under local anaesthesia.
- When head is born, it is allowed to rest, the cord round neck is checked and loosened if present.
- Anterior shoulder is delivered followed by the posterior.
- Oxytocin 10IU IM is given after delivery of shoulders (hypertension, cardiac disease, delivery of first twin).
- Cord is clamped and cut, leaving adequate length for administration of drugs if needed.
- Application of tetracycline 1% eye ointment is recommended as prophylaxis against ophthalmia neonatorum.
- APGAR (A= appearance, P = pulse, G= grimace, A= activity, R = respiration) scoring is done.
- Identification tag applied; baby is wrapped in warm towels and given to the mother to introduce breastfeeding.
- Baby is given a full physical examination when stable.
- Following delivery of the baby, the mother is observed for signs of placental separation indicated by uterus becoming harder and more globular, occurrence of sudden gush of blood PV, rising higher of the uterus in the abdomen, and lengthening of the cord outside the vagina.. When this happens:
  - The placenta should be delivered by controlled cord traction.
  - The uterus should be gently massaged.
  - The placenta and membranes should be examined for completeness, infarcts, retroplacental clot, and any other abnormalities.
  - The placenta should be weighed.
- The perineum, vagina, and cervix are then examined for tears. The episiotomy and any tears discovered are repaired immediately. Patients are then observed closely for 1–2 hours before being transferred to the postnatal ward. This period of observation after delivery of the placenta is called 4th Stage of Labour and involves monitoring of blood pressure (BP), temperature (T), and

pulse rate hourly, together with uterine palpation, vulva inspection, and estimation of degree of blood loss.

58.13.2 COMPLICATED LABOUR AND DELIVERY

Complications of labour may affect the mother, the baby, or both. Most complications are associated with obstructed labour. Cephalopelvic disproportion (CPD) is the major cause of obstructed labour and ruptured uterus.

Maternal complications of labour include:

- Genital tract infection
- Fistula formation
- Laceration of the genital tract
- Peripheral nerve palsies
- Foot drop

Foetal/infant complications of labour include:

- Foetal distress
- Meconium aspiration
- Hypoxia/Asphyxia
- Injuries
- Foetal death

CEPHALOPELVIC DISPROPORTION (CPD)

This occurs when the baby is too big for the pelvis or the pelvis is too small for the baby. CPD may be due to faults in the pelvis or faults in the foetus or a combination of both.

- The faults in pelvis may be:
  - Contracted pelvis
  - Deformed pelvis
- The faults in the foetus may be:
  - Too large baby
  - Hydrocephalus
  - Foetal monsters
  - Locked twins (rare)

CPD is the most important cause of obstructed labour. Other causes of obstructed labour are malpresentations or malpositions of the foetus, and soft tissue abnormalities of the genital tract. Obstructed labour is the commonest cause of ruptured uterus and a major cause of maternal mortality. Obstructed labour and ruptured uterus can be prevented by appropriately timed caesarean section.

OBSTRUCTED LABOUR

The requirements for a diagnosis of obstructed labour are:

- The cervix fails to dilate despite good uterine contractions.
- There is oedema of the cervix and vulva.
- The head fails to descend.
- The degree of moulding increases.

- Bandl's ring occurs.
- There is urinary retention, blood stained urine on catheterization.
- There is foetal distress.
- There is maternal distress, manifested by:
  - Dehydration
  - Fever
  - Tachycardia

Management

- Give supportive management.
  - Resuscitation:
    - Rehydration (IV fluids),
    - Parenteral antibiotics: Ceftriaxone 1g BD, metronidazole 500mg TDS, and gentamicin 80mg TDS.
    - Bladder care (empty bladder and continuous bladder drainage for at least 7–14 days).
  - Relief of obstruction:
    - Caesarean section or
    - Destructive operation if the foetus is dead.
- Do laparotomy: if there is rupture of the uterus:
  - Repair or
  - Subtotal hysterectomy.
- Initiate physiotherapy.

RUPTURED UTERUS

Ruptured uterus is an obstetric catastrophe and should be prevented. Major causes are:

- Obstructed labour
- Previous operations on uterus (C/S, myomectomy)
- Ecbolic herbs and improper use of oxytocin
- Grand multiparity
- Perforations during evacuation of uterus or D&C are a type of ruptured uterus

Clinical Features

- Clinical features may be insidious ("quiet") or obvious ("classical"). In classical cases the patient who was in labour complains of severe abdominal pains, has PV bleeding and goes into shock. Examination shows hypovolaemic shock with signs of intraperitoneal haemorrhage.
- Impending rupture of the uterus can be diagnosed by:
  - Observing rise in maternal pulse (more than 100 beats per minute).
  - Localized abdominal pains.
  - Foetal distress (irregular foetal heart, meconium stain).
  - PV bleeding.

Management

- Quick resuscitation with drip, blood.
- Cross-match adequate blood.

- Arrange for laparotomy as soon as possible or refer.
- Decision to repair the tear or remove uterus (hysterectomy) depends on extent and number of tears. Whichever is best to achieve haemostasis quickly is done.

CAESAREAN SECTION

- When properly applied, caesarean section is an important operation in reducing maternal and perinatal mortality and morbidity.
- The major indications for caesarean section are:
  - Cephalopelvic disproportions (CPD)
  - Foetal distress
  - Previous caesarean section: 2 or more caesarean sections or 1 caesarean section with CPD
  - Malpresentations: Breech, transverse lie
  - Cord prolapse or presentation
  - Antepartum haemorrhage
  - Placenta praevia (major types), placental abruptions (sometimes)
  - Hypertensive disease: Where induction is unlikely to succeed or is contraindicated
- Types of caesarean section operation:
  - Lower uterine segment transverse incision – Routinely done nowadays because of its low morbidity and safety during subsequent pregnancies.
  - Classical caesarean section – Vertical incision in upper uterine segment; done very rarely for:
    - Inaccessible lower segment because of tumours or adhesions
    - Avoiding dissemination in cancer of cervix
    - Impacted shoulder presentation
- Preparation for caesarean section and procedure:
  - Catheterization of the bladder inserted in the theatre.
  - Empty the stomach (if not fasted).
  - Premedicate with atropine IM 0.6mg half an hour before operation and start antibiotics at a high dose crystalline penicillin 5 mega units for a clean operation and ceftriaxone 1g STAT if infection is suspected.
  - Cross-match 1–2 units of blood, fix drip normal saline 500ml over 8 hours (15 drops per minute).
  - Anaesthesia may be general or regional; requires special skills to avoid foetal respiratory depression and maternal gastric acid aspiration.
  - Preparation of operation field done when mother is awake to shorten induction delivery interval to 10 minutes or less.
  - Incision through the abdomen and uterus done quickly (but carefully) to avoid foetal respiratory depression.
- Post operative care after caesarean section:
  - Patient requires:
    - IV fluids normal saline 500ml alternate with 5% dextrose 500ml every 6 hours for 24 hours,
    - Analgesia morphine IM 10mg every 4 hourly if required and give antibiotics if indicated ceftriatoxe 1g OD 3 days.

  - Close observation, vital signs, BP, temp, pulse, respiration half hourly for the first hour or until awake and then monitor every 4 hours.
- Early postoperative ambulation is encouraged.

- Chest and leg exercises are also given to prevent hypostatic pneumonia and deep venous thrombosis (DVT).
- Patient can be discharged from 4 to 7 days.
- Alternate stitches are removed on the 6th day and all stitches on the 7th day.

INDUCTION OF LABOUR

- This is artificial initiation of the process of labour; the indications are:
  - Intrauterine foetal death from any cause
  - Prolonged gestation (postdates, 41 weeks and above)
  - Diabetes mellitus
  - Pre-eclampsia and eclampsia
  - Rhesus isoimmunization
- Technique for induction of labour:
  - Generally induction is achieved by ARM and oxytocin drip as described above in active management of labour according to Bishops score:
  - If 7 and above, warm bath and then ARM and oxytocin 5IU in 500ml of 5% dextrose (10 drops per minute for 30 minutes and increase by 10 drops every half hour to a maximum of 60 drops per minute or 3 contractions per 10 minutes, whichever is earlier).
  - If less than 7, cervical ripening is indicated. The following option is available:
    - Foley's catheter (can only be used when the membranes are intact) inflated maximally and left for 8–12 hours will normally achieve ripening.
    - Misoprostol 25mcg tablet inserted per vaginum.

OPERATIVE VAGINAL DELIVERY

Level 3 with specially trained, competent and experienced provider may perform vacuum delivery (ventouse). Indications and case selection must be appropriate to avoid maternal and/or foetal injuries. These include:

- Poor maternal effort.
- Delayed second stage (within 30 minutes from full dilatation) in the absence of CPD.
- Cord prolapse in 2nd stage.

Requirements for vacuum delivery are:

- Cephalic presentation
- Full cervical dilation
- Low head (good descent)
- Empty bladder
- Episiotomy

Contraindications for vacuum delivery are:

- CPD
- Previous caesarean or myomectomy scar
- Malpresentation (breech, transverse lie, oblique, etc.)
- Malpositions (brow and face malpositions)

58.14 Postpartum Care and Complications

Postnatal care can be given at all levels by a skilled provider appropriately supported. Postnatal care is the care of the woman in the immediate postpartum period and within 6 weeks of delivery. This is the time the woman is returning to her normal pre-pregnant status. Targeted postnatal care has a minimum of 3 check ups. The emphasis is starting early in the postpartum period, with the 1st review 24 to 48 hours after delivery, the 2nd review within 2 weeks after delivery, and the 3rd review between 4 and 6 weeks after delivery.

The aim of postnatal care is to protect and promote maternal and infant health, support breastfeeding, and provide family planning counselling and services.

58.14.1 IMMEDIATE POSTPARTUM CARE

This includes the following:

- Repairing the episiotomy as soon as possible.
- Observing and monitoring maternal BP, pulse and temperature closely for 1–2 hours.
- Ensuring that the uterus is well contracted, lochia loss is normal, and urine has been passed.
- Encouraging the mother to establish bonding and initiate breastfeeding.
- Giving paracetamol 2 tabs TDS for after pains and episiotomy pain and providing rapid counselling and testing for HIV for those whose status is unknown and also giving the prophylactic ARVs to the baby (within 72 hours) if mother is positive.
- Transferring the mother to postnatal ward.
- Continuing the above observations at least twice daily.
- Encouraging rooming-in (or “bedding-in”) of mother and baby.
- Continuing to give paracetamol 2 tabs TDS.
- Advising on nutritious diet, and generous fluid intake for successful lactation.
- Giving the baby first immunizations (BCG and first polio).
- Documenting and notifying the birth to the civil registrar.
- If no problem, discharging after 24–48 hrs to avoid ward congestion. Women who deliver at home should come for check up with their babies within 24–48 hours.

58.14.2 FOLLOW UP VISITS AND REVIEW

A follow up is carried out at 1–2 weeks to check and treat for secondary PPH, sub-involution of the uterus, puerperal infection, and whether baby is well and breastfeeding. For those not breastfeeding, the visit and review should be at 1 month for family planning.

Otherwise 3rd visit is at 4–6 weeks to check:

- For any problems in mother or baby
- Whether periods and/or intercourse has resumed and to provide counselling on family planning, baby care, breastfeeding and immunizations

At 6 weeks provide family planning service if required. Suitable methods for lactating mothers include:
- Progesterone-only pill (e.g., microlut)
- Intrauterine device ("coil")
- Depo-provera or noristerat ("injection")
- Voluntary surgical contraception (VSC): Tubal ligation
- Norplant/jadelle

58.14.3 COMPLICATIONS OF PUERPERIUM

The puerperium is defined as the time period 6 weeks following parturition. This is a time when complex adaptations of physiology and behaviour occur in women. Although usually a low risk period, life threatening emergencies or serious complications may occur that must be recognized and managed efficiently. For the majority, however, a minimum of interference is warranted. Those caring for women postpartum should be sensitive to the initiation of family bonding, a special process not to be disturbed unless maternal or neonatal complications arise.

Some of the maternal complications include postpartum haemorrhage, puerperal sepsis, deep vein thrombosis, psychosis, breast engorgement, mastitis, or breast abscess.

POSTPARTUM HAEMORRHAGE (PPH)

Postpartum haemorrhage is a condition that can sometimes be preventable by proper management of all stages of labour. An understanding of the factors that predispose to postpartum haemorrhage will lead to the practice of precautionary measures that minimize its occurrence. All levels managing labour and delivery (1–6) should be able to diagnose this condition. The skilled health provider should be supported by an effective referral system. Level 1–3 should refer to 4–6 after first aid and should send donors.

Postpartum haemorrhage is defined as bleeding from the genital tract after delivery. It is further defined as primary or secondary postpartum haemorrhage.
- In primary postpartum haemorrhage: Bleeding of more than 500ml within the first 24 hours postpartum.
- In secondary postpartum haemorrhage: Abnormal bleeding occurring after 24 hours and up to 6 weeks postpartum.

Clinical experience and empiric estimates of blood loss are important for diagnosis of postpartum haemorrhage to be made.

Patients at high risk of developing postpartum haemorrhage include the following:
- Prolonged or obstructed labour
- Grand multiparity
- Past history of PPH
- Past history of retained placenta
- Multiple pregnancy

- Polyhydramnios
- Antepartum haemorrhage either placental abruptio or placenta praevia.

The commonest causes of PPH are:
- Uterine atony
- Failure of adequate contraction and retraction of uterus after delivery associated with:
- Prolonged labour
- Precipitate labour
- Over-distension of the uterus by, e.g., multiple pregnancy and/or polyhydramnios
- Grand multiparity
- Fibroids
- Halothane use in general anaesthesia
- Concealed haemorrhage in placenta abruptios leading to intramyometrial haemorrhage and manifested as Couvelaire uterus
- Uterine sub-involution.
- Retained placental fragments or membranes. This is a common complication in which there is delay in completion of the 3rd stage of labour due to adherent placenta. Adherent placenta manifests usually as actual placental invasion of the myometrial wall in the following forms:
  - Placenta accreta: Which is superficial myometrial invasion.
  - Placenta increta: Which is deep myometrial invasion.
  - Placenta percreta: Which is uterine perforation by placenta.
- Lacerations or tears of the birth canal: This can be cervical, vaginal, or vulvoperineal.
- Other causes include disseminated intravascular coagulation (DIC), which is usually secondary to other causes like intrauterine foetal death, amniotic fluid embolism, abruptio placentae, and pre-eclampsia/eclampsia.
- Rupture of the uterus where there is previous scar, oxytocin hyper-stimulation, obstructed labour in multigravidae, and use of ecbolic herbs.
- Uterine inversion and when there is excessive cord traction, adherent placentae, manual removal of placenta, and poor technique of placental delivery.

Investigations
- Hb or PCV, most important
- Bleeding time
- Clotting time
- Coagulation factors

Management
- General measures include:
  - Put up an IV line
  - Take blood for group and cross-match
  - Put in a self-retaining catheter, Foley
  - Determine cause

- Specific measures
  - These depend on the cause

UTERINE ATONY

- Do a bimanual uterine massage and express any clots; this may also provoke contractions.
- Put up an oxytocin drip 20 units in 500ml dextrose or normal saline to run at 20 drops per minute for about 2 hours.
- Give prostaglandins when and where available, as these are also useful:
  - Misoprostrol 600mcg orally or per rectum.
- Surgery:
  - Subtotal hysterectomy if above measures do not achieve haemostasis.

RETAINED AND ADHERENT PLACENTA

Retained placenta also causes uterine atony. The following is recommended:

- Apply general measures as above.
- For manual removal of the placenta in lithotomy position on the delivery couch, administer:
  - Morphine 10mg IM STAT
  - 10mg diazepam IV, then
  - Try manual removal of placenta using the ulnar surface of the right hand with the left hand supporting the uterus. If this is not possible, see below.

ADHERENT PLACENTA

- This will require management in the major theatre in some cases of placenta accreta for manual removal and limited instrument use, e.g., ovum forceps, blunt curette under general anaesthesia .
- Other types will require surgery, i.e., subtotal hysterectomy.

LACERATIONS/TEARS OF GENITAL TRACT

Cervical Tear

The following is important for cervical tear:

- Review in lithotomy position and in good light.
- Secure a good exposure of cervix by two Sims' speculums.
- Carry out a careful evaluation of the extent of the tear.
- Repair cervix with No. 1 chromic catgut under local anaesthesia (lignocaine HCL 1%) and achieve haemostasis. Then give antibiotics (PO amoxicillin/ clavulanate 625mg BD for 5 days) and PO paracetamol 1g 8 hourly for 3 days.
- NB: General anaesthesia may be required if upper limit of tear is not defined or laparotomy is further required.

Vaginal Tear

The following are important for vaginal tear:

- Examine in lithotomy position.
- Carry ligation of bleeders and repair of tears and laceration with No. 1 chromic catgut under local anaesthesia (lignocaine HCL 1%).

- Carry out evacuation of haematomata. Then give antibiotics (PO amoxicillin/clavulanate 625mg BD for 5 days) and PO paracetamol 1g 8 hourly for 3 days.

Vulvoperineal Tear

Proper management of episiotomy:

- Define upper end.
- Stitch vaginal epithelium with continuous Chromic catgut No. 1 suture under local anaesthesia (lignocaine HCL 1%):
  - Stitch muscle layer with the same interrupted stitch.
  - Stitch skin with interrupted catgut.
- Repair all other tears.
- Then give antibiotics (PO amoxicillin/clavulanate 625mg BD for 5 days) and PO paracetamol 1g 8 hourly for 3 days.

☛ **If disseminated intravascular coagulopathy (DIC) develops:**

- Administer fresh blood.
- Administer fresh frozen plasma.
- Carry out surgery as appropriate.

RUPTURED UTERUS

- Carry out laparotomy and then:
  - Repair of the tear, or
  - Hysterectomy.
- Give broad spectrum antibiotics ceftriaxone 1g OD for 3 days and analgesics morphine 10mg IM 4 hourly for 24 hours.

UTERINE INVERSION

Perform manual replacement:

- If inversion recognized before corpus is trapped,
  - Carry out manual compression and insertion
  - Initiate oxytocin drip 20 IU in 500ml 5% dextrose 30 drops per minute until the uterus is well contracted and haemorrhage well controlled.
  - The inserting fist should remain until uterine cavity is well contracted.
- If above is not possible then:
  - Give general anaesthesia using halothane to relax uterus.
  - Replace and compress uterus.
  - Use oxytocin as above.
  - Leave fist during the G/A till uterus is well contracted.
- If replacement is not successful with the above measures, then hysterectomy and appropriate treatment are recommended.

58.15 Puerperal Infections

These are any postpartum infections of the genital tract complicating labour or delivery. An important contributor is wound sepsis after caesarean section. Extragenital causes of puerperal fever must be considered and looked for. These

include upper and lower urinary tract infections, deep vein thrombosis, respiratory tract infections, and mastitis with associated breast engorgement.

Clinical Features
There is fever of greater than 38°C during the first 6 weeks after delivery. Other features include lethargy, general malaise, toxicity, dehydration, lower abdominal tenderness, foul-smelling lochia, parametrial pain and thickening and retained membranes.

58.15.1 PUERPERAL SEPSIS

This is usually a polymicrobic infection presenting as a combination of endometritis, endomyometritis, and endoparametritis. Associated risk factors are: prolonged labour, prolonged rupture of membranes, low socio-economic status, caesarean section, and underlying chronic debilitating disease. Anaerobic organisms are encountered in most infections associated with puerperal sepsis.

Investigations
- Haemoglobin, PCV
- Total white cell count (TBC) and differential
- Culture of lochia cervical specimen
- Blood cultures
- Urinalysis and culture
- Sputum: Gram-stain, culture
- Chest x-ray

Management – General
General measures/non-pharmacological therapy on admission:
- Rehydration: Start an IV line of 500ml normal saline to run over 8 hours.
- At the same time:
  - Take blood for urgent group and cross-match, haemoglobin, white cell count, blood cultures.
  - Give blood transfusion if necessary.
- Keep patient warm.
- Arrange for infant care in nursery or by relatives.
- Evacuate uterus for any remaining placental tissue or membranes.

Management – Pharmacological
- Oral therapy:
  - Amoxicillin capsules 500mg TDS for 5 days + metronidazole tablets 200mg TDS for 5 days + paracetamol tablets 2 TDS for 5 days.
- Parenteral therapy:
  - Ceftriaxone injection 1g IV or IM BD + gentamicin 80mg IV or IM TDS + metronidazole 500mg IV TDS, all for 3 days then oral treatment.

Management – Surgical
- Laparotomy to be done if any complicating sequalae occur, the most common one being pelvic abscess. Others are abdominal abscess and diffuse peritonitis.

- Wound sepsis following caesarean section may require surgical wound debridement to remove haematomata, necrotic material.
- Admit if
  - Patient toxic
  - Patient febrile >39°C
  - Patient dehydrated
  - Patient not able to take oral drugs
  - Pelvic abscess suspected

58.15.2 SEPTIC PELVIC THROMBOPHLEBITIS

This condition occurs with development of ovarian vein thrombophlebitis in a patient with preceding pelvic soft tissue infection. Presenting as a definite mass extending caudally, this is a rare condition that is diagnosed mainly by exclusion and has poor response to therapy.

Treatment

- Give ceftriaxone injection 1g IV 12 hourly + gentamicin 80mg IV 8 hourly + metronidazole 500mg IV 8 hourly and IM diclofenac 75mg 12 hourly, all for 3–5 days, then oral treatment for 5–7 days as above including heparin 10,000 units 6 hourly subcutaneously until symptoms (pain, swelling and warmth of the involved limb) abate. Then taper heparin dosage within a week (heparin 10,000 units for 2 days then heparin 5,000 IU for 2 days and then finally heparin 2,500 IU for 3 days, then stop the heparin).
- Start warfarin 2mg OD for 2 days with the heparin at 5,000 IU, then warfarin 4mg OD for 3 days with heparin 2,500 IU) and then stop the heparin and change to oral warfarin 5mg OD a day for 3 months. Monitor heparin with KCCT (kaolin cephalin clotting time) and warfarin with Prothrombin Time Index (PTI).
- Ensure availability of antidotes (protamine sulphate for heparin overdosage with IV heparin: Give protamine sulphate IV; 1mg neutralizes 80–100 units of heparin when given within 15 minutes of heparin. If longer than 15 minutes less protamine is required, since heparin is rapidly excreted. Max of 50mg of protamine sulphate) and (Vitamin K dosage to be added for warfarin).
- Note that surgery may be indicated.

58.16 Extra-Genital Differential Diagnoses

These include urinary tract infections, deep vein thrombosis, and respiratory tract infections. Respiratory complications are an infrequent cause of puerperal morbidity. Lobar pneumonia is the most serious infection and may be complicated by atelectasis. Patients who have delivered through caesarean section are the most susceptible to developing this condition.

58.16.1 BREAST CONDITIONS

These involve the following conditions:

- Breast engorgement: This is accompanied by inflammation of breast and fever. Adequate breastfeeding and paracetamol 1g TDS for 5 days are usually sufficient.

- Mastitis: This is infection of the parenchyma of the mammary glands. It may occur any time postpartum but usually 2–3 weeks after. Predisposing factors include:
  - Breastfeeding per se.
  - Fissures in nipple.
  - Recent weaning.

Diagnosis of mastitis is usually made on basis of the pain on the same side, localized cellulitis, and axillary lymph nodes that may be palpable and tender. The most common causative organism is Staphylococcus aureus.

Management
- Expressing milk on affected side
- Applying ice packs
- Supporting affected breast.
- Using antibiotics: PO flucloxacillin 500mg 6 hourly for 7 days.
- For pain and inflammation, adding PO ibuprofen 400mg 8 hourly for 3 days.

☛ ***Breast abscess may be a sequelae of mastitis.*** In addition to the measures above, incision and drainage will be necessary, as well as stoppage of breastfeeding when there is a purulent discharge. If abscess does not respond to this, refer to a specialist on lactation management.

58.16.2 DEEP VEIN THROMBOSIS (DVT)

- Antibiotics: PO amoxicillin/clavulanate 625mg 12 hourly ***OR*** PO flucloxacillin 500mg 6 hourly for 7 days.
- PO ibuprofen 400mg Diclofenac 50mg 8 hourly for 3 days.

Clinical features, investigations, and general management are described under Section 3.1 in Part I.

Management
- Give heparin 10,000 units 6 hourly subcutaneously until symptoms (pain, swelling, warmth of the involved limb) abate, then taper heparin dosage within a week (heparin 10,000 units for 2 days, then heparin 5,000 IU for 2 days, and finally heparin 2,500 IU for 3 days, then stop the heparin).
- Start warfarin 2mg OD for 2 days with the heparin at 5,000 IU. then warfarin 4mg OD for 3 days with heparin 2,500 IU, and then stop the heparin and change to oral warfarin 5mg OD a days for 3 months.
- Monitor heparin with KCCT and warfarin with PTI. Ensure availability of antidotes. Use protamine sulphate for overdosage with IV heparin: Give protamine sulphate IV; 1mg neutralizes 80–100 units of heparin when given within 15 minutes of heparin. If longer than 15 minutes less protamine is required since heparin is rapidly excreted. Max of 50mg of protamin sulphate) and vitamin K (major bleeding – stop warfarin, give vitamin K 5–10mg by slow IV if INR>8.0; no bleeding or minor bleeding – stop warfarin and give vitamin K 500μg by slow I : INR 6.0–8.0; no bleeding or minor bleeding stop warfarin restart when INR<5.0). Monitor as above for INR to be in the range of 2.0–2.5 times the normal.

Patient Education
- Avoid oestrogen containing contraceptives.
- Non hormonal progesterone only contraceptives are appropriate.
- Avoid prolonged bed rest. Exercise legs even during bed rest.

58.16.3 PUERPERAL PSYCHOSIS

The following are risk factors of puerperal psychosis:
- Family history of major psychological illness of close relative, e.g., mother.
- Major emotional complications during and after a previous pregnancy.
- "Reaction" of current pregnancy.
- "Fear" of labour from a previous experience.
- Traumatic childhood.
- Deprivation of emotional support during adult life, e.g., single mother.
- Severe prolonged or multiple somatic symptoms with no apparent organic cause during current/or prior pregnancy.
- Major sustained mood changes or repeated rapid mood swings or abnormal sleep patterns.
- Refer to Mental Illness chapter for clinical features and management.

59. Family Planning

Family planning (FP) means that "everyone should plan their family so that all children are born when wanted, expected, and welcome". The health benefits of family planning play a major role in protecting the lives of infants, children, women, and the family as a whole. (See also Family Planning Guidelines for Service Providers, MOH/DRH 2005).

59.1 Family Planning Methods

There are many available types of family planning methods, and many categories of people can be involved in the provision of FP advice, information, and services, as long as they have received the necessary training and instruction. Similarly, FP can be provided in varied settings (from levels 1 to 6) and within facilities operated by various providers (public, mission, private), provided they conform to the basic requirement for the provision of the particular FP method. (FP Guidelines for Service Providers MOH/DRH 2005).

Refer to Table 59.1 for a summary of the different types of methods and their suitability for different types of clients. Table 59.2 provides a guide to the various methods in terms of their effectiveness, ease of use, compatibility with breastfeeding, return to fertility after stopping, and other pertinent issues.

59.2 Hormonal Contraceptives

Methods in this category work by affecting the body's hormonal system in various ways. They are contraceptives only, and do not provide protection against STIs and HIV.

Table 59.1: Family planning methods and their suitability for various types of users

Method recommended for the group	Not recommended for the group
Combined pill	
Women under 40 years, of any parity Women who want highly effective contraception Breastfeeding mothers after 6 months postpartum Younger women/adolescents who are sexually active and have been adequately counselled	With suspected pregnancy Who are over 35 years and smoke With history of blood clotting disorders or heart disease With lump in either breast, liver disease With unexplained abnormal vaginal bleeding With BP over 140/90mm/Hg confirmed on revisit
Progestin-only pill	
Women of reproductive age, of any parity Breastfeeding mothers after 4–6 weeks postpartum	With suspected pregnancy With history of blood clotting disorders or heart disease With lump in either breast, liver disease With unexplained abnormal vaginal bleeding
Injectable methods	
Women of proven fertility Breastfeeding mothers after 6 weeks postpartum Women who want long-term contraception Women who want at least 2 years between pregnancies	With suspected pregnancy With history of blood clotting disorders or heart disease With lump in either breast, liver disease With unexplained abnormal vaginal bleeding
Implants	
Women needing long-term protection Breastfeeding mothers after 6 weeks postpartum (Long term highly effective contraception) Women who have their desired family size but do not want permanent surgical contraception	With suspected pregnancy With history of blood clotting disorders or heart disease With lump in either breast, liver disease With unexplained abnormal vaginal bleeding
Intrauterine devices	
Women who have delivered 1 or more times Breastfeeding mothers Women who want long-term contraception Women in a stable monogamous sexual relationship Women after 6 weeks postpartum; before 6 weeks if provider has specialized IUD insertion training	With suspected pregnancy, history of PID or ectopic pregnancy With anaemia or heavy menstrual bleeding Having no menses after 6 weeks postpartum With history of heart disease With abnormalities or cancer of pelvic organs Having unexplained vaginal bleeding or severe menstrual pains At risk of exposure to STDs
Male and female condom	
Men who desire to take contraceptive initiative Couples needing an immediately effective method Couples waiting to rule out a suspected pregnancy Couples at risk of exposure to HIV, STDs	Who desire or require highly effective protection against pregnancy Who are allergic to latex

Continued

Table 59.1, *continued*

Method recommended for the group	Not recommended for the group
Natural family planning	
Couples willing to learn about the woman's cycle and to practise abstinence 1–2 weeks each cycle Couples who, for religious or any other reasons, desire to practise periodic abstinence	Who need/want more effective contraception With irregular menstrual cycle Who are breastfeeding Who must not become pregnant for health or any other reasons Who are unwilling to abstain during fertile period
Tubal ligation or vasectomy	
Couples or individuals who have been fully counselled, understand and have voluntarily signed consent form Couples with desired family size Women for whom age or health problems might cause an unsafe pregnancy Couples who are certain they want no more children regardless of accidental death of a child or children	Who do not fully understand VSC or are unwilling to agree to items on the consent form Note: Men or women whose spouses oppose VSC should be considered on a case by case basis for the procedure.

Table 59.2: Guide to family planning methods

Method	Pregnancy rate?	Used at inter-course?	Effect on STD risk?	Compatible with breast-feeding?	Return to fertility after stopping?
Male sterilization	0.15 (0.1)	No	None	Yes	Permanent method
Female sterilization	0.4 (0.2)	No	None	Yes	Permanent method
Implants	0.2 (0.04)	No	Probably none	Yes, but not preferred method. Wait 6 weeks postpartum	Immediate on removal
Combined oral contra-ceptives	1–8 (0.1–3)	No	May protect against some forms of PID, but increase risk of infection with some STDs	After 6 months postpartum, but not preferred method if breastfeeding	Immediate to short delay (average 2–3 months)
Progestin-only minipill	3–10 (0.5–3)	No	None	Yes, but not preferred method. Wait 6 weeks postpartum	Immediate to short delay
Injectables	0.3–0.4	No	Unknown	Yes, but not preferred method. Wait 6 weeks postpartum	Delayed 4–12 months

Continued

Table 59.2, *continued*

Method	Pregnancy rate?	Used at inter-course?	Effect on STD risk?	Compatible with breast-feeding?	Return to fertility after stopping?
Intrauterine devices (IUCD)	3 (0.3–2)	No	Increase risk of PID in women at risk of STDs	Yes	Immediate after removal by trained provider
Condoms	12 (2)	Yes	Protective (70% against AIDS)	Yes	Immediate
Natural family planning	20 (1–9)	No	None	No, method not reliable	Immediate

59.2.1 COMBINED ORAL CONTRACEPTIVE PILL

This pill contains a combination of progestogen and oestrogen in proportion and quantity that vary across the various preparations. The pill acts by inhibiting ovulation and thickening cervical mucus, thus providing a physical barrier to spermatozoa and making the endometrium too thin for implantation.

Client Education

This should contain the following information with regard to the pill:

- It is highly protective against pregnancy.
- Pregnancy rate increases if the pill is not taken regularly.
- It may be associated with minor complaints, such as nausea, headache, weight gain, and gastrointestinal upsets.
- It is unsuitable for breastfeeding mothers because of its suppressive effect on milk output.
- If you forgets to take a pill, take it as soon as you remember. Take the next pill at the regular time even if this means taking 2 pills on the same day.
- Return to the clinic in case of the following:
  - Suspected pregnancy
  - Swelling or pain in legs
  - Yellowing of skin or eyes
  - Pain in abdomen, chest, or arms or shortness of breath
  - Severe headaches, depression, or vision difficulties
- Side effects: Although many side effects of oral contraceptives use have been eliminated with low dose pills, some women still experience irregular menstrual bleeding, nausea, weight gain, headaches, skin colour changes, and other side effects. These may go away after several months or continue as long as oral contraceptives are taken.
- Complications:
  - There is increased risk of cardiovascular disease in women over 35 years of age who smoke.
  - There is increased risk of hypertension.
  - Users exposed to STIs may be at risk of serious diseases, including PID and possibly cervical cancer.

- Non-contraceptive benefits:
  - Reduces menstrual flow (lighter, shorter periods).
  - Decreases dysmenorrhoea.
  - Protects against ovarian and endometrial cancer.
  - Decreases benign breast disease.
  - Gives some protection against ectopic pregnancy.

59.2.2 PROGESTOGEN-ONLY PILL

This is a pill that is taken daily and contains only a progestogen. It acts by altering cervical mucus, making it thicker/denser, thus preventing sperm transport. It also suppresses ovulation and inhibits implantation of fertilized ovum.

Client Education

This should include the following:

- Used in breastfeeding mothers because it does not interfere with lactation.
- Has a high level of pregnancy protection.
- There is need for compliance on a daily regimen.
- Unrelated to sexual intercourse.
- May cause menstrual irregularities.
- If client forgets to take 1 pill, take it as soon as they remember (see combined pills)
- Client should return to the clinic immediately for a pregnancy check if 45 days have passed since the last menstrual period.
- Side effects: Users may experience irregular bleeding patterns.
- Complications: Studies to date have shown no long-term complications.
- Non-contraceptive benefits:
  - Does not affect lactation.
  - Lighter shorter periods.
  - Decreased breast tenderness.
  - Does not increase blood clotting.
  - Decreases dysmenorrhoea.
  - Protects against endometrial cancer.

59.2.3 EMERGENCY CONTRACEPTIVES

Emergency contraceptives reduce the occurrence of pregnancy in unprotected intercourse from 8% to 2% (75% protection). Indications are the following:

- Unprotected intercourse
- Rape
- Condom leakage
- Condom breakage/slippage.

COMBINED ORAL EMERGENCY CONTRACEPTIVES

- Ethynyl oestradiol 50mcg + levonorgestrel 150μg 2 tabs orally STAT and 2 tabs 12 hours later.
- Ethynyl oestradiol 30mcg + levonorgestrel 150μg 4 tablets STAT followed by 4 tabs after 12 hours.

PROGESTERONE ONLY EMERGENCY CONTRACEPTIVE

Levonorgestrel 750μg 1 tab STAT and 1 tab after 12 hours.

59.2.4 INJECTABLE CONTRACEPTIVES

These are either progesterone only or combined progesterone plus oestrogen. They comprise long-acting progestogen usually administered as deep intramuscular injections. They act by suppressing ovulation, inducing a thin atrophic endometrium, and producing a thick cervical mucus that is difficult for sperm to penetrate. They are available in these forms:

- Depot Medroxyprogesterone Acetate (Dmpa): 150mg per vial and given as a deep (depot) intramuscular injection every 3 months
- Norethisterone Enanthate (Net En): 200mg vials given at 2-month intervals

Client Education

- They may be associated with heavy menses, amenorrhoea, or spotting.
- Regular administration is required.
- It is necessary to return to the clinic as scheduled to continue using this method.
- Return to the clinic if one suspects pregnancy, or experiences dizziness or heavy bleeding.
- Side effects: Users may experience menstrual irregularity (amenorrhoea, spotting, and, rarely, heavy bleeding).
- Complications: Studies to date have shown no long-term complications.
- Advantages: They contain natural oestrogens and hence have a protective effect on CVS and CNS and give better cycle control

59.2.5 SUB-DERMAL IMPLANTS

Implants consist of 2 rods of levonogestrel 75mg that are inserted under the skin of the arm, and slowly release progestogen for up to 5 years. They act by thickening cervical mucus, suppressing ovulation, and causing atrophic changes in the endometrium that make it unsuitable for zygote implantation. Etonogestrel 68mg is a single rod of progesterone-only contraceptive implant that gives protection for years

Client Education

The following is important:

- May be associated with prolonged menses, spotting, or amenorrhoea.
- Requires a minor surgical procedure for insertion and removal.
- If possible, return to the same clinic if you desire implant or removal.
- Return for removal any time you desire, but it can be kept in place for 5 years.
- Return to the clinic if you:
  - Suspect pregnancy
  - Experience pain, swelling or pus at the implant site
  - Experience dizziness or headache.
  - Experience heavy bleeding
- Benefits include the following:
  - Highly effective

  - Immediate return to fertility
  - Continuous, long-term protection
  - Reduced menstrual flow
  - Protection against endometrial cancer and ectopic pregnancy
  - Does not affect lactation
- Side effects: Users may experience infection at the insertion site, irregular menstrual bleeding (longer bleeding episodes, amenorrhoea, or spotting).
- Complications: Studies to date have shown no serious long-term complications.

59.3 Intrauterine Contraceptive Devices (IUCD)

This forms a highly effective, long-term family planning method that is in widespread use around the world. The modern IUCD is a plastic device usually bound with copper wire that is placed in the uterus through the cervix. Lippes's loop has no copper. The IUCDs act by preventing implantation of fertilized ovum, inhibiting sperm mobility, and inhibiting fertilization. Copper T 380 A is effective for 12 years.

Client Education

The following is important:

- It is important to check regularly to ensure IUCD is in place
- May cause dysmenorrhoea and menorrhagia.
- Return to the clinic if you have:
  - Signs of pregnancy, heavy bleeding or spotting.
  - Abnormal sexual pain or vaginal discharge.
  - Chills or fever.
  - Dysmenorrhoea and menorrhagia.
  - Desire for removal.
- Benefits include the following:
  - Highly and immediately effective.
  - Long-term protection with immediate return to fertility upon removal.
  - Does not interfere with intercourse.
  - Can be used by women who are breastfeeding.
- Side effects: Users may experience pain on insertion and increased menstrual bleeding and abdominal cramps for the first 1–2 periods.
- Complications: Increased risk of anaemia if heavy bleeding occurs, perforation (rare) and increased risk of PID and associated infertility, especially within 4 months of insertion and in women at risk of STDs.
- Displaced IUCDs: When threads are not visible at cervix and pregnancy is ruled out, then
  - Attempt removal with an alligator or simple artery forceps.
  - If this fails, then localization by ultrasound, plain x-ray with tracer IUCD and removal.
- If one conceives with an IUCD remove it if possible; otherwise leave alone until delivery (ultrasound if possible) and counsel client accordingly.

59.4 Barrier Methods

59.4.1 THE MALE CONDOM

Condoms present a physical barrier to sperm deposition into the vagina. Condoms also offer some protection against STIs, including HIV/AIDS, HBV, and carcinoma of the cervix.

Client Education

The following is important:

- Before every intercourse, place condom on erect penis, leaving tip empty to collect semen.
- Withdraw the penis from the vagina after each ejaculation while the penis is still erect.
- Remove condom after use.
- Do not re-use condoms.
- Discard used condom immediately in toilet or pit latrine.
- Using spermicides with condoms increases the effectiveness.
- Complications may include local irritation if allergic to latex/lubricants.
- May interfere with sexual pleasure for some people.
- Benefits:
  - Fairly effective if used properly.
  - Immediately effective.
  - Highly effective protection against STIs/HIV.
  - May prevent premature ejaculation
- Side effects: Some users experience sensitivity to rubber or lubricants.

59.4.2 THE FEMALE CONDOM

The female condom is a thin (0.05mm) polyurethane sheath, 7.8cm in diameter and 17cm long. It is soft, loose fitting, and has 2 flexible rings. One ring is inserted into the vagina and acts as an internal anchor. The other ring forms the open edge of the device and remains outside the vagina after insertion.

The female condom provides protection for one act of intercourse. It can be inserted (up to 8 hours) before intercourse but must be removed immediately after. There are no complications associated with it. Unlike the male condom, it can be washed and reused.

59.5 Surgical Contraception

Many factors have contributed to improved safety of voluntary surgical contraceptive in the last 30 years. These include improved anaesthetic methods, better surgical techniques, asepsis, improved training of personnel, and better selection and monitoring of clients.

59.5.1 TUBAL LIGATION

This is a voluntary irreversible procedure for fallopian tubal occlusion that can be done under general or local anaesthesia by minilaparotomy or laparoscopy.

Client Education

- The procedure is more or less irreversible (permanent).
- Failure is very rare when done by trained professional.
- Counselling is absolutely necessary.
- There is no loss of libido or vigour or health.
- It is necessary to return to the clinic if the client experiences:
  - Postoperative fever, pus, or pain at the surgical site.
  - Weakness or rapid pulse.
  - Vomiting or persistent abdominal pain.
- Benefits:
  - Permanent; highly and immediately effective.
  - No change in sexual function.
  - Good for client if pregnancy would be a serious health risk.
  - Does not affect lactation.
- Side effects: Some users experience minor pain, bleeding, and wound infection following procedure.
- Complications: Injury to other organs (e.g., gut, bladder) and – rarely – death. Risk of complications is increased if general anaesthesia is used.

59.5.2 VASECTOMY

This is a voluntary surgical procedure, done under local anaesthesia, to cut and ligate the vas deferens so that spermatozoa cannot be ejaculated. It is gradually becoming accepted in Kenya.

Client Education

Counselling is necessary, as this procedure is permanent and irreversible.

- It is necessary to use condoms for at least 15 ejaculations or 3 months to ensure azoospermia.
- Return to the clinic in case of:
  - Postoperative fever.
  - Excessive swelling, pus, or pain at the surgical site.
- Side effects: Some users experience minor swelling, pain, infection, and bruising following procedure. For pain give ibuprofen 400mg TDS for 5 days and for infection flucloxacillin 500mg QDS for 7 days.
- Complications: Risk of serious complications or death is extremely low.

59.6 Periodic Abstinence (Natural Family Planning)

In this method, the couple avoids sexual intercourse during ovulation and for a safety margin before and after ovulation. Various techniques may be used to determine the fertile period: cervical mucus, basal body temperature, rhythm. The benefits include:

- No physical side effects and it is cheap.
- No need for prescriptions by medical personnel.
- Improved knowledge of reproductive system and possible closer relationship between couples.

Client Education

- Requires high motivation
- Has a high failure rate
- Assumes a regular, perfect menstrual cycle
- Requires proper record-keeping
- Has no health risks, except for pregnancy
- Side effects: None.
- Complications: None.

PART V
Referral Systems

IN THIS SECTION:

60. The Referral Framework

The Government of Kenya is actively promoting the concept of comprehensive care for all people at the community level. The elements of comprehensive care include clinical, nursing, psychological, and social support. Maintaining the continuum of care is essential, and requires a strong linkage between the community and the health system. This occurs through an effective and efficient referral system

A referral system is a network of service providers and facilities that link together to provide a continuum of care for acute and chronic illnesses. It includes individuals and organizations working to provide care and support to those who need it. There are typically 4 levels to a referral network in the health system: the community, primary, secondary, and tertiary levels.

As defined by the Kenya Essential Package for Health (KEPH), these 4 levels of the referral network incorporate the community level (level 1), with its households, community health workers (CHWs), traditional birth attendants (TBAs), traditional herbalists, and community health extension workers (CHEWs). At the primary care level, dispensaries and health centres (KEPH levels 2 and 3) are the first point of linkage between the community and the formal health system. They are strengthened by the CHEWs and health management committees. The district hospitals (level 4), the provincial hospitals (level 5), and the national referral hospital (level 6) provide levels of increasing specialization of care to support the community level. Providers at all of these levels should be able to recognize complications, gauge their severity, provide prompt treatment based on their capacity as defined by the norms and standards for each level of care, and refer any clients they are unable to treat to a facility where they know adequate treatment is available.

The objective of a referral system is to improve clients' access to services, reduce the time it takes for them to receive required care, and avoid unnecessary delays. Meeting the needs of clients entails a collective effort of many providers, both formal and informal. In order to strengthen access to existing services and enhance linkages between and among the providers, formal referral arrangements, proper communication, and standard tools must be in place.

The service provider initiating referral at any level of the referral system has the responsibility to document the referral activity and follow up with clients to ensure they received the necessary care. An effective system ensures continuity and high quality of care to patients, enhancing the utilization of available resources and encouraging clients to participate actively in making decisions that directly affect their lives.

Coordinated service delivery and strong communication among health care providers is necessary to ensure that access to required services is as quick as possible, referrals can be easily traced and followed up, referral outcomes can be

documented, feedback from clients on the services they received can be noted, gaps in the system can be identified, and steps taken to improve service provision. For this, effective communication and transport arrangements are crucial.

The following elements are essential:

- ***Availability, accessibility, and affordability:*** Services must be based on prevailing local health problems, and provided in a way that local needs can be addressed.
- ***Coordination, coordination, coordination:*** Referral activities within and between different service providers with different resources and different mandates demand focused attention. This is best facilitated by having a team or specific individuals designated to coordinate these referral activities.
- ***Relationships:*** Higher level health facility providers should take the lead in establishing and maintaining referrals by supporting lower level providers, with both the clients and the providers working as partners.
- ***Effective communication and transport arrangements:*** Identification of the most cost-effective means of transport should be done. One way is to choose a member of the community with a vehicle to assist other community members with transport during referrals in such a manner that the costs incurred can be covered and taken care of within such an arrangement.
- ***Feedback:*** Mechanisms should be established to help with the tracking of referrals from the point of initiation to the point of delivery. This will provide evidence that the client completed the referral process.
- ***Monitoring and quality control:*** Monitoring and evaluation mechanisms for the continuous assessment and improvement of the referral process and outcomes are crucial and need to be initiated and maintained.

61. General Guidelines

An efficient and effective pyramidal referral system is essential for effective management of surgical patients and is especially important in the emergency situation so as to provide rapid and effective treatment to the patients. A referral system can function either upwards or downwards with respect to the levels of health care. Upward referral seeks specific medical care from specialists and subspecialist found at the higher levels of health care or even outside the country. Downward referral engages the local facility nearest a patient's home environment because they no longer need the more specialized health care at the higher level. Instead, they require ongoing medical care that is best able to cope with the patient's needs and this often happens to be at locations nearest to the patient's home.

An efficient referral system ensures an appropriate mix of patients with different types of needs, admitted in different health facilities countrywide. This means that all referrals must be directed at the correct facility while maintaining the

normal pyramidal referral system of flow within the health system as much as possible.

Besides referrals between facilities, there are also referrals within institutions. Such referrals are necessary and important for patient's wellbeing. Hospitals should only manage cases they are able to handle, and in situations where they cannot adequately take care of them they must refer them to the next appropriate facility. All referrals must be carefully evaluated and the risks and benefits assessed critically before the decision to refer is made. The basic guidelines for upward referral are shown below and will vary a little depending on the level in question.

61.1 Procedure for Upward Referral

The upward referral consists of the following components:

1. Critical evaluation and decision to refer is made by:
   a) Individual doctor or health care provider.
   b) Management Team taking care of the patient.
   c) Ministry or other administrative body in charge of the welfare of the patient.

2. Documentation is prepared that includes the following:
   a) Admission details.
   b) Diagnostic details and investigations carried out.
   c) Medications and treatments given to the patient.
   d) The reason for the transfer of the patient.

☛ **This documentation MUST accompany the patient being referred.**

3. Appropriate communication with respect to the referral is made:
   a) With the receiving unit or health facility.
   b) With the relatives

4. Preparation of appropriate transportation is made:
   a) Efficient and reliable means of transport to effect the referral is secured.
   b) The means of transport secured is exclusively allocated for transportation of the referred patient.

5. An appropriately qualified escort is appointed.

6. A systematic check to ensure that the resuscitation equipment to accompany the patient is available and functioning well.

61.2 Procedure for Downward Referral

On completion of treatment at the higher centre there will be a need to refer the patient back to the initial facility for purposes of feedback to the facility and for ongoing rehabilitation or palliative care of the patient.

The downward referral is a mirror of the upward referral, except that in this situation the patient has already received specialized care and is now being sent to the lower health facilities for continuing care or for feedback or for rehabilitation or palliative care.

The downward referral consequently consists of the following components:
1. Decision to refer the patient downwards.

2. Documentation detailing the following aspects with respect to the patient being referred:
   a) Admission/identification details.
   b) The final diagnosis for the patient.
   c) Procedures carried out during hospitalization in the referring facility or unit.
   d) Medications provided while the patient was hospitalized in the referring health facility.
   e) Follow-up details and any rehabilitation requirements.
   f) In case of terminal disease the hospice needs to be involved in the referral process and the follow up of the patient.

☛ **There must be 3 legible copies of the referral note or letter: one for the patient, another for the unit receiving the patient, and a third for the file.**

3. Communication is made with receiving unit or facility as appropriate and feedback obtained as appropriate. Such communication enhances the efficiency of the referral system.

4. Communication is made with the relatives with regard to the planned downward referral and the need for the a referral for this patient.

5. Preparation is made for the appropriate transportation for the intended referral.

6. An appropriately qualified escort is appointed, although in many situations the relatives would be sufficient to provide such an escort.

7. Booking is made for the patient to be reviewed in the Surgical Outpatient Clinic (SOPC) in the referring facility, unless arrangements are made for the patient to be reviewed in the receiving unit or health facility.

61.3 Guidelines for an Institutional Referral System

Just as important to patient care is the institutional referral systems that need to be clear and functional. Each facility needs to have a system for both the upward and downward flow of patients to mirror that at the national level.

A simple institutional referral system should have the following features:
1. Casualty department review:

a) Make a correct diagnosis.
b) Call appropriate unit.
c) Ensure patient is reviewed.
d) Ensure patient is handed over to the unit on-call doctor.
e) Ensure documentation is accurate.

2. Making unit referrals and admission decisions:
   a) Decision on whether treatment should be provided to the patient on an outpatient basis or after admission as an inpatient.
   b) If patient is admitted, ensure the patient is handed over to the admitting ward doctor.
   c) If the decision is made to provide care to the patient on an outpatient basis, then correct referral should be made.
   d) In the event of incorrect clinic referral, the doctor rather than the patient should be responsible for correcting this error .

3. If the patient referred is not admitted, they should be referred to specialized clinics at the facility. Referrals should be made to the National Referral Centre.

62. Dangers and Barriers to a Coordinated Referral System

All team members at all levels need to be conscious of the dangers that face a coordinated referral system. Efforts need to be made to avoid these dangers to the referral system. These dangers and barriers involve the following:

- Lack of confidence in the facility by the community and the tendency by the community to bypass the facility to go to the next nearest facility they consider more suitable for them. Such a situation could be due to:
  - Poor community relationships.
  - Poor manpower utilization.

- An infrastructure that is nonfunctional:
  - Broken down, understaffed and under supplied middle level facilities.
  - Inadequate or inappropriate communication infrastructure at the various levels of care. This is exacerbated by poor management practices at the health facilities and failure to involve the community in the process.
  - Treating patients with specified conditions at inappropriate levels.
  - Inadequate funding and supplies for higher levels of health care, so that they are unable to provide expected services.

- Lack of or poor utilization of human resources, due to the following:
  - Brain drain because of perceived low wages, inadequate infrastructure, and non conducive working environments in the public health services, to NGOs or private health facilities with better remuneration, or even out of the country.

  - Poor distribution of staff.
  - Frustration in the workplace.
  - Poor working relationships.

- Lack of drugs and other equipment, which is to an extent related to issues of poor planning and inadequate financing.

- Inaccurate diagnosis and treatment plans for facilities because of inadequate training for personnel at the facilities.

- Lack of working quality control and M&E measures.

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