JANUARY 2016

Clinical Updates in Reproductive Health

Please use and share widely:
www.ipas.org/clinicalupdates

Also available in Spanish:
www.ipas.org/actualizacionesclinicas

For more information, email
clinicalaffairs@ipas.org

Ipas
Health. Access. Rights.

Clinical Updates in Reproductive Health

January 2016

Clinical Updates in Reproductive Health are designed to provide Ipas staff, trainers, partners and other health-care providers with access to up-to-date, evidence-based recommendations. In general, the recommendations are the same as those in the World Health Organization's 2012 *Safe Abortion: Technical and Policy Guidance for Health Systems, Second Edition*. In rare cases, the recommendations have been modified due to the settings where Ipas works. In addition, if there is more current evidence to inform the recommendations, they will be updated here.

Ipas works around the world to increase women's ability to exercise their sexual and reproductive rights, especially the right to safe abortion. You can find more information at www.ipas.org.

Revisions: This document is updated once a year; please see the "last reviewed" date for each topic. The information for each *Clinical Update* topic is current through the listed "last reviewed" date, meaning all relevant published literature up to that date has been considered and included where appropriate.

Acknowledgements

Editor: Alice Mark

Thanks to the following people for giving their time and expertise to the development of this publication:

Dalia Brahmi
Laura Castleman
Jennifer Colletti
Alison Edelman
Mary Fjerstad
Emily Jackson
Rhina Machuca de Ortiz
Alice Mark
Karen Padilla
Bill Powell
Jessica Reinholz
Laura Schoedler
Lisette Silva

Thanks also to Ipas staff and consultants who contributed to the development of previous versions of the content in this publication:

Rebecca Allen
Lynn Borgatta
Anne Burke
Catherine Casino
Talemoh Dah
Gillian Dean
Bela Ganatra
Vinita Goyal
Bliss Kaneshiro
Radha Lewis
Patricia Lohr
Lisa Memmel
Regina Renner

CURH-E15 January 2016

Produced in the United States of America.

Suggested citation:
Ipas. (2016). *Clinical Updates in Reproductive Health.* A. Mark (Ed.). Chapel Hill, NC: Ipas.

Ipas works globally to increase women's ability to exercise their sexual and reproductive rights and to reduce abortion-related deaths and injuries. We seek to expand the availability, quality and sustainability of abortion and related reproductive health services, as well as to improve the enabling environment. Ipas believes that no woman should have to risk her life or her health because she lacks safe reproductive health choices.

Ipas is a registered 501(c)(3) nonprofit organization. All contributions to Ipas are tax deductible to the full extent allowed by law.

For more information or to donate to Ipas:
Ipas
P.O. Box 9990
Chapel Hill, NC 27515 USA
1-919-967-7052
info@ipas.org
www.ipas.org

TABLE OF CONTENTS

Click on any listing to go directly to that specific page.

Uterine evacuation: Replace sharp curettage with aspiration or medications

Recommendation:

Vacuum aspiration or medical abortion should replace sharp curettage (also known as dilatation and curettage or D&C) for the treatment of induced, incomplete, or missed abortion performed in the first or second trimester of pregnancy.

Strength of recommendation: High

Quality of evidence: Moderate

Last reviewed: June 30, 2015

The World Health Organization (WHO) and the International Federation of Gynecology and Obstetrics (FIGO) state that vacuum aspiration or misoprostol-based medication abortion regimens should replace sharp curettage (FIGO, 2011; WHO, 2012). In places where no uterine evacuation services exist, vacuum aspiration and medical abortion should be introduced.

A recent Cochrane review comparing vacuum aspiration and sharp curettage shows that vacuum aspiration is as effective as sharp curettage in ending a pregnancy and reduces procedure time and procedure-related blood loss and pain (Tuncalp, Gulmezoglu, & Souza, 2010). In a retrospective case series of 80,437 women, vacuum aspiration was associated with less than half the rate of major and minor complications compared to sharp curettage (Grimes, Schulz, Cates Jr., & Tyler, 1976). Multiple studies on induced and postabortion care have shown that because vacuum aspiration can be performed in an outpatient setting by physicians or midlevel providers without general anaesthesia, the costs to both the health system and women are significantly less (Benson, Okoh, KrennHrubec, Lazzarino, & Johnston, 2012; Choobun, Khanuengkitkong, & Pinjaroen, 2012; Farooq, Javed, Mumtaz, & Naveed, 2011; Johnston, Akhter, & Oliveras, 2012). In addition, women needing postabortion care for moderate or severe complications can be treated with vacuum aspiration in place of D&C (Benson et al., 2012; Johnston et al., 2012).

Although no trials exist comparing D&C to medical management of induced, incomplete, or missed abortion, the safety and tolerability of medical regimens for uterine evacuation are well documented and appear as effective as vacuum aspiration in the management of incomplete abortion (Kulier et al., 2011; Neilson, Gyte, Hickey, Vazquez, & Dou, 2013).

The use of sharp curettage to manage incomplete or missed abortion may be associated with Asherman's syndrome (intrauterine adhesions), a condition that causes infertility. A recent retrospective review of one tertiary care center's patient outcomes reported on 884 women who underwent sharp curettage, vacuum aspiration or misoprostol for early pregnancy failure (Gilman Barber, Rhone, & Fluker, 2014). In follow-up, six women who had been managed with sharp curettage were found to have Asherman's syndrome, while no cases were found in women managed by vacuum aspiration or misoprostol.

Young women
This recommendation is the same for young women.

References

Benson, J., Okoh, M., KrennHrubec, K., Lazzarino, M. A., & Johnston, H. B. (2012). Public hospital costs of treatment of abortion complications in Nigeria. *International Journal of Gynecology & Obstetrics., 118*(2), 60012-60015.

Choobun, T., Khanuengkitkong, S., & Pinjaroen, S. (2012). A comparative study of cost of care and duration of management for first-trimester abortion with manual vacuum aspiration (MVA) and sharp curettage. *Archives of Gynecology and Obstetetrics, 286*(5), 1161-1164.

Farooq, F., Javed, L., Mumtaz, A., & Naveed, N. (2011). Comparison of manual vacuum aspiration, and dilatation and curettage in the treatment of early pregnancy failure. *Journal of Ayub Medical College Abbottabad, 23*(3), 28-31.

FIGO. (2011). Consensus statement on uterine evacuation. Retrieved from http://www.figo.org/sites/default/files/FIGO%20DC%20Statement.pdf

Gilman Barber, A. R., Rhone, S. A., & Fluker, M. R. (2014). Curettage and Asherman's syndrome-lessons to (re-) learn? *Journal of Obstetrics and Gynaecology Canada, 36*(11), 997-1001.

Grimes, D. A., Schulz, K. F., Cates Jr, W., & Tyler, C. W., Jr. (1976). *The Joint Program for the Study of Abortion/CDC: A Preliminary Report.* Paper presented at the Abortion in the Seventies: Proceeding of the Western Regional Conference on Abortion, Denver, Colorado.

Johnston, H. B., Akhter, S., & Oliveras, E. (2012). Quality and efficiency of care for complications of unsafe abortion: a case study from Bangladesh. *International Journal of Gynecology & Obstetrics, 118*(2), 60013-60017.

Kulier, R., Kapp, N., Gulmezoglu, A. M., Hofmeyr, G. J., Cheng, L., & Campana, A. (2011). Medical methods for first trimester abortion. *Cochrane Database of Systematic Reviews, 9*(11).

Neilson, J. P., Gyte, G. M., Hickey, M., Vazquez, J. C., & Dou, L. (2013). Medical treatments for incomplete miscarriage. *Cochrane Database of Systematic Reviews, 28*(3).

Tuncalp, O., Gulmezoglu, A. M., & Souza, J. P. (2010). Surgical procedures for evacuating incomplete miscarriage. *Cochrane Database of Systemtatic Reviews, 8*(9).

World Health Organization. (2012). *Safe abortion: technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

First-trimester vacuum aspiration and medical abortion: Screening for ectopic pregnancy

Recommendation:

Ectopic pregnancy should be considered in women presenting for abortion who also have a concerning history or exam.

Strength of recommendation: Strong

Quality of evidence: Moderate

Last reviewed: October 28, 2015

Background

Although the rate of ectopic pregnancy in women seeking abortion is less than 1% (Edwards & Creinin, 1997), ectopic pregnancy is a leading cause of maternal mortality in the first trimester (CDC, 1995; Khan, Wojdyla, Say, Gulmezoglu, & Van Look, 2006; WHO, 1985).

Risk factors

A woman's medical history and physical exam may indicate an increased risk of ectopic pregnancy; however, half of all ectopic pregnancies occur in women with no risk factors and a benign clinical presentation (Stovall, Kellerman, Ling, & Buster, 1990). Risk factors with the highest associated risk of ectopic pregnancy in pregnant women are shown in this table:

Risk factor	Risk of ectopic in the current pregnancy
Previous ectopic pregnancy	10-15%(Yao & Tulandi, 1997)
History of tubal surgery, including sterilization	25-50% (Barnhart, 2009)
IUD in place	25-50% (Barnhart, 2009)

Other risk factors—such as a history of infertility and assisted reproductive technology, a history of genital or pelvic infections, multiple partners, early age at first intercourse, and smoking—confer lower risks (Barnhart, 2009).

Screening

Providers should screen women for risk factors for ectopic pregnancy during the history and physical exam. A screening checklist should include relevant history, such as a history of ectopic pregnancy, tubal ligation, tubal surgery or an intrauterine device (IUD) in place. The screening checklist should also include signs and symptoms, such as an adnexal mass or pain on examination, or pain and vaginal bleeding.

Treatment for high-risk women

A woman desiring abortion who has risk factors for ectopic pregnancy with a benign physical exam can be evaluated further with ultrasound or serial hCG testing, but access to testing may be limited in low-resource

settings (Obed, 2006). A provider may also offer a woman vacuum aspiration with tissue examination to confirm the diagnosis of intrauterine pregnancy rather than a medical abortion. A woman with suspicious signs and symptoms or a concerning physical exam should be diagnosed and treated as soon as possible or transferred immediately to a facility that can manage ectopic pregnancy. Early diagnosis and treatment of ectopic pregnancy can help preserve fertility and save women's lives.

Post-procedure screening

For women undergoing vacuum aspiration, the products of conception should be strained and examined to confirm products of conception in the aspirate. If products of conception are not seen, ectopic pregnancy should be suspected and followed closely.

Young women

This recommendation is the same for young women.

References

Barnhart, K. T. (2009). Clinical practice. Ectopic pregnancy. *New England Journal of Medicine*, *361*(4), 379-387.

Centers for Disease Control. (1995). Current trends ectopic pregnancy: United States 1990-1992. *Morbidity and Mortality Weekly Report*, *44*(03), 46-48.

Edwards, J., & Creinin, M. (1997). Surgical abortion for gestations less than 6 weeks. *Current Problems in Obstetrics Gynecology and Fertility*, *20*, 11-19.

Khan, K. S., Wojdyla, D., Say, L., Gulmezoglu, A. M., & Van Look, P. F. (2006). WHO analysis of causes of maternal death: a systematic review. *The Lancet*, *367*(9516), 1066-1074.

Obed, S. (2006). Diagnosis of Unruptured Ectopic Pregnancy is Still Uncommon in Ghana. *Ghana Medical Journal*, *40*(1), 3-7.

Stovall, T. G., Kellerman, A. L., Ling, F. W., & Buster, J. E. (1990). Emergency department diagnosis of ectopic pregnancy. *Annals of Emergency Medicine*, *19*(10), 1098-1103.

WHO. (1985). A multinational case-control study of ectopic pregnancy. The World Health Organization's Special Programme of Research, Development and Research Training in Human Reproduction: Task Force on Intrauterine Devices for Fertility Regulation. *Clinical Reproduction and Fertility*, *3*(2), 131-143.

Yao, M., & Tulandi, T. (1997). Current status of surgical and nonsurgical management of ectopic pregnancy. *Fertility and Sterility*, *67*(3), 421-433.

First-trimester vacuum aspiration: Success and complication rates

Key information:

Vacuum aspiration is effective and safe, with success rates over 98% and complication rates under 2%. Serious adverse events during first-trimester vacuum aspiration are very rare.

Quality of evidence: High

Last reviewed: October 28, 2015

Success

Vacuum aspiration success is defined as an abortion requiring no further intervention. In a large United States-based observational study of 11,487 first-trimester aspiration abortions done by physicians, nurse practitioners, certified nurse midwives and physicians assistants, the need for repeat aspiration due to incomplete abortion was 0.28% and ongoing pregnancy was 0.16% (Weitz et al., 2013).

Complication rates

A 2015 systematic review analyzed 57 studies reporting data for 337,460 first-trimester abortions performed in North America, Western Europe, Scandinavia and Australia/New Zealand (White, Carroll, & Grossman, 2015). Major complications requiring intervention (such as hemorrhage requiring transfusion or perforation necessitating repair) occurred in ≤ 0.1% of procedures; hospitalization was necessary in ≤ 0.5% of cases. Studies looking at different cadres of providers (physicians, nurses, nurse midwives, etc.) in other settings have had similar results (Hakim-Elahi, Tovell, & Burnhill, 1990; Jejeebhoy et al., 2011; Warriner et al., 2006). Complication rates are lower with more experienced providers (Child, Thomas, Rees, & MacKenzie, 2001).

A U.S. retrospective cohort study comparing first-trimester aspiration abortion complication rates looked at one group of 597 women with at least one medical comorbidity (diabetes, hypertension, obesity, HIV, epilepsy, asthma, thyroid disease and bleeding/clotting disorders) and another group of 1,363 women without comorbidities and found an overall complication rate of 2.9% with no difference between the two groups (Guiahi, Schiller, Sheeder, & Teal, 2015).

Mortality rates

In the United States, the mortality rate from legal induced abortion is 0.64 deaths per 100,000 reported abortions (Pazol, Creanga, Zane, Burley, & Jamieson, 2013). In comparison, in the United States in 2009 the mortality rate from live birth was 17.8 deaths per 100,000 live births (Centers for Disease Control and Prevention, 2013). In the 2015 systematic review referenced above, no deaths were reported (White, Carroll, & Grossman, 2015).

Young women

Young women and adolescents have similar success and lower complication rates for first-trimester vacuum aspiration (Cates, Schulz, & Grimes, 1983).

Complication rates by study

	Upadyay, 2015	Weitz, 2013	Jejeebhoy, 2011	Warriner, 2006	Hakim-Elahi, 1990
Number of women	34,744	11,487	897	2,789	170,000
Location	USA	USA	India	South Africa and Vietnam	USA
Provider type	Not specified	Physicians and newly trained nurse practitioners, certified nurse midwives and physician assistants	Newly trained physicians and nurses	Experienced physicians, midwives and doctor-assistants	Experienced physicians
Time period	2009-2010	2007- 2011	2009-2010	2003-2004	1971-1987
Total minor complication rate	1.1%	1.3%	1% (all reported as incomplete abortion)	1%	0.85%
Incomplete abortion	0.33%	0.3%	1%	0.9%	Not reported (0.35% re-aspiration rate)
Ongoing pregnancy	0.04%	0.16%	Not reported	Not reported	0%
Minor infection	0.27%	0.12%	Not reported	0.1%	0.5%
Uncomplicated perforation	0.01%	0.03%	0%	0%	0%
Total major complication rate	0.16%	0.05% (6 complications: 2 perforations, 3 infections and 1 hemorrhage)	0.12% (1 complication: 1 high fever)	0%	0.07% (hospitalizations for perforation, ectopic pregnancy, hemorrhage, sepsis or incomplete abortion)

References

Cates Jr, W., Schulz, K. F., & Grimes, D. A. (1983). The risks associated with teenage abortion. *New England Journal of Medicine*, *309*(11), 621-624.

Centers for Disease Control and Prevention. (2015). Pregnancy mortality surveillance system. Retrieved from http://www.cdc.gov/reproductivehealth/MaternalInfantHealth/PMSS.html

Guiahi, M., Schiller, G., Sheeder, J., & Teal, S. (2015). Safety of first-trimester uterine evacuation in the outpatient setting for women with common chronic conditions. *Contraception*, *92*(5), 453-7.

Hakim-Elahi, E., Tovell, H., & Burnhill, M. (1990). Complications of first-trimester abortion: a report of 170,000 cases. *Obstetrics & Gynecology*, *76*(1), 129-135.

Jejeebhoy, S. J., Kalyanwala, S., Zavier, A., Kumar, R., Mundle, S., Tank, J., Jha, N. (2011). Can nurses perform manual vacuum aspiration (MVA) as safely and effectively as physicians? Evidence from India. *Contraception*, *84*(6), 615-621.

Pazol, K., Creanga, A. A., Burley, K. B., Hayes, B., & Jamieson, D. J. (2013). Abortion Surveillance - United States, 2010. *Morbidity and Mortality Weekly Report*, *62*(8), 1-48.

Upadhyay, U. D., Desai, S., Zlidar, V., Weitz, T. A., Grossman, D., Anderson, P., & Taylor, D. (2015). Incidence of emergency department visits and complications after abortion. *Obstetrics & Gynecology, 125*(1), 175-83.

Warriner, I. K., Meirik, O., Hoffman, M., Morroni, C., Harries, J., My Huong, N., Seuc, A. H. (2006). Rates of complication in first-trimester manual vacuum aspiration abortion done by doctors and midlevel providers in South Africa and Vietnam: a randomised controlled equivalence trial. *The Lancet*, *368*(9551), 1965-1972.

Weitz, T. A., Taylor, D., Desai, S., Upadhyay, U. D., Waldman, J., Battistelli, M. F., & Drey, E. A. (2013). Safety of aspiration abortion performed by nurse practitioners, certified nurse midwives, and physician assistants under a California legal waiver. *American Journal of Public Health*, *103*(3), 454-461.

White, K., Carroll, E., & Grossman, D. (2015). Complications from first-trimester aspiration abortion: a systematic review of the literature. *Contraception*, *92*, 422-438.

First-trimester vacuum aspiration: Safety for adolescent and young women

Recommendation:

- Vacuum aspiration for adolescent and young women is very safe and should be offered as a method of safe abortion.
- Cervical preparation may be considered for young adolescents prior to vacuum aspiration due to their increased risk of cervical injury.
- Clinical services should promote timely access to safe abortion for young women.

Strength of recommendation: Strong

Quality of evidence: Moderate

Last reviewed: October 20, 2015

Background

The World Health Organization (WHO) defines adolescents as individuals 10-19 years of age, and young women as 20-24 years of age. Adolescents face barriers to accessing safe abortion care and present for abortions at later gestational ages than adult women (Pazol, Creanga, Zane, Burley, & Jamieson, 2012; Sowmini, 2013). Adolescents are at increased risk of complications of unsafe abortion due to delays seeking care, seeking care from unskilled providers and not accessing services when complications arise (Olukoya, Kaya, Ferguson, & AbouZahr, 2001). Increasing access to safe abortion is beneficial for young women.

Safety of vacuum aspiration

A large prospective United States multicenter cohort study of 164,000 women undergoing legal abortion, 50,000 of whom were adolescents, found that mortality and major morbidity were lower in adolescents (Cates Jr., Schulz, & Grimes, 1983). The mortality rate was 1.3 per 100,000 in women under 20 years old compared to 2.2 per 100,000 in women age 20 and older. Serious adverse events including major surgery, hemorrhage with transfusion, and uterine perforation were less common in women under age 20.

Cervical injury

In large prospective cohort studies, very young age (<17 years old) has been associated with cervical injury during vacuum aspiration even after controlling for nulliparity (Cates Jr. et al., 1983; Schulz, Grimes, & Cates, 1983). Cervical preparation may be considered for young women prior to first-trimester vacuum aspiration (Allen & Goldberg, 2007; WHO, 2012).

Subsequent perinatal outcomes

Three studies have examined perinatal outcomes in pregnancies in adolescent and young women who have had a previous abortion (van Veen, Haeri, & Baker, 2015; Lao & Ho, 1998; Reime, Schucking, & Wenzlaff, 2008). None of the studies—a US-based retrospective cohort study comparing 654 nulliparous adolescent deliveries to 102 adolescent deliveries with a prior abortion (van Veen, Haeri, & Baker, 2015), a German retrospective cohort including 7,845 nulliparous adolescent deliveries and 211 adolescent deliveries with one prior induced abortion (Reime, Schucking, & Wenzlaff, 2008) and a Hong Kong case-control study comparing

118 adolescent deliveries with one or more prior abortions to 118 age- and parity-matched controls (Lao & Ho, 1998) —found any differences in adverse perinatal outcomes between study groups. Method of abortion was not specified in any of these studies.

References

Allen, R., & Goldberg, A. (2007). Cervical dilation before first-trimester surgical abortion (< 14 weeks' gestation). SFP Guideline 20071. *Contraception*, *76*(2), 139-156.

Cates Jr, W., Schulz, K. F., & Grimes, D. A. (1983). The risks associated with teenage abortion. *New England Journal of Medicine*, *309*(11), 621-624.

Lao, T. T., & Ho, L. F. (1998). Induced abortion is not a cause of subsequent preterm delivery in teenage pregnancies. *Human Reproduction*, *13*(3), 758-761.

Olukoya, A., Kaya, A., Ferguson, B., & AbouZahr, C. (2001). Unsafe abortion in adolescents. *International Journal of Gynecology & Obstetrics*, *75*(2), 137-147.

Pazol, K., Creanga, A. A., Zane, S. B., Burley, K. B., & Jamieson, D. J. (2012). Abortion Surveillance - United States, 2009. *Morbidity and Mortality Weekly Report*, 61, 1-44.

Reime, B., Schucking, B. A., & Wenzlaff, P. (2008). Reproductive outcomes in adolescents who had a previous birth or an induced abortion compared to adolescents' first pregnancies. *BioMed Central Pregnancy and Childbirth, 8(*4).

Schulz, K., Grimes, D., & Cates, W. (1983). Measures to prevent cervical injury during suction curettage abortion. *The Lancet*, *321*(8335), 1182-1185.

Sowmini, S.V. (2013). Delay in termination of pregnancy among unmarried adolescents and young women attending a tertiary hospital abortion clinic in Trivandrum, Kerala, India. *Reproductive Health Matters*, *21*(41). 243-250.

van Veen, T. R., Haeri, S., & Baker, A. M. (2015). Teen pregnancy: are pregnancies following an elective termination associated with increased risk for adverse perinatal outcomes? *Journal of Pediatric and Adolescent Gynecology*, Epub ahead of print.

World Health Organization. (2012). *Safe abortion: technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

First-trimester vacuum aspiration: Midlevel providers

Recommendation:

Most cadres of trained midlevel providers can provide first-trimester vacuum aspiration abortion as safely and effectively as physicians (WHO, 2015).

Strength of recommendation: Strong

Quality of evidence: High

Last reviewed: October 26, 2015

Background

Access to safe abortion or postabortion care can be increased by expanding the provider base to include midlevel providers. Midlevel providers include cadres of health-care providers other than physicians such as nurses, nurse midwives, clinical officers and others.

Evidence

A 2015 systematic review compiled data from five studies comparing provision of surgical abortion by midlevel providers to that of doctors (Barnard, Kim, Park, & Ngo, 2015). Included studies were from the United States, India, Vietnam and South Africa. There was no difference in total complication rates, and a very slightly increased risk of incomplete abortion when done by midlevel providers. The similarity in safety and efficacy is true for both experienced and newly trained providers (Jejeebhoy et al., 2011; Warriner et al., 2006).

The World Health Organization (WHO) recommends that non-specialist doctors, associate and advanced associate clinicians, midwives and nurses can perform vacuum aspiration for induced abortion. In settings where there are established mechanisms to include auxiliary nurses and auxiliary nurse midwives in basic emergency obstetric care or postabortion care, these cadres can also perform vacuum aspiration. Where doctors of complementary medicine participate in other tasks related to maternal and reproductive health, they can also perform vacuum aspiration (WHO, 2015).

Young women

This recommendation is the same for young women.

References

Barnard, S., Kim, C., Park, M. H., & Ngo T. D. (2015). Doctors or mid-level providers for abortion? *Cochrane Database of Systematic Reviews*, 7:CD011242.

Jejeebhoy, S., Kalyanwala, S., Zavier, A., Kumar, R., Mundle, S., Tank, J., Jha, N. (2011). Can nurses perform manual vacuum aspiration (MVA) as safely and effectively as physicians? Evidence from India. *Contraception*, *84*(6), 615-621.

Warriner, I., Meirik, O., Hoffman, M., Morroni, C., Harries, J., My Huong, N., Seuc, A. (2006). Rates of complication in first-trimester manual vacuum aspiration abortion done by doctors and midlevel providers in South Africa and Vietnam: A randomised controlled equivalence trial. *The Lancet*, *368*(9551), 1965-1972.

World Health Organization. (2015). Health Worker Roles in Providing Safe Abortion Care and Post-abortion *Contraception*. Geneva: World Health Organization.

First-trimester vacuum aspiration: Cervical preparation

Recommendation:

Cervical preparation is recommended after 12-14 weeks. Before 12-14 weeks, cervical preparation may be offered but does not need to be routinely used (WHO, 2012).

Recommended methods for cervical preparation in the first trimester include:

- Misoprostol 400mcg sublingually 2-3 hours before the procedure
- Misoprostol 400mcg vaginally three hours before the procedure
- Mifepristone 200mg orally 24-48 hours before the procedure
- Osmotic dilators placed in the cervix 6-24 hours before the procedure

Strength of recommendation: Strong

Quality of evidence: Moderate

Last reviewed: October 20, 2015

Background

Cervical preparation is recommended before surgical abortion for all women over 12-14 weeks gestation to prevent complications (Fox & Hayes, 2007; Kapp, Lohr, Ngo, & Hayes, 2010; WHO, 2012). For women at higher risk of complications (young women, nulliparous women, women with cervical abnormalities, or women at later gestational ages) or inexperienced providers there may be a benefit from cervical preparation even before 12-14 weeks gestation (Allen & Goldberg, 2007; Grimes, Schulz, & Cates, 1984; Kaunitz, Rovira, Grimes, & Schulz, 1985).

Benefits of cervical preparation

A meta-analysis of 51 randomized controlled clinical trials of cervical preparation in the first trimester showed that procedure time was shorter with cervical preparation but there was no difference in serious outcomes like cervical laceration or uterine perforation in women who were given cervical preparation compared to placebo (Kapp et al., 2010). The largest multicenter randomized controlled trial of 4,972 women given misoprostol 400mcg vaginally or placebo three hours before a vacuum aspiration showed no difference in the rates of cervical laceration, perforation or infection between the two groups. In this study, the risk of incomplete abortion was lower in the misoprostol group (<1%) compared to the placebo group (2%), but side-effects were more frequent for women who took misoprostol (Meirik, Huong, Piaggio, Bergel, & von Hertzen, 2012).

Side-effects of cervical preparation

In randomized controlled trials, side-effects of cervical preparation are common (Kapp & vonHertzen, 2009; Meirik et al., 2012). In the largest randomized controlled trial of misoprostol, 55%of women who took misoprostol complained of abdominal pain and 37% had vaginal bleeding, compared to 22%and 7% in the placebo group (Meirik et al., 2012). In addition, cervical preparation adds cost, complexity and time to an abortion, as women must visit the clinic a day before the procedure to get osmotic dilators or mifepristone or wait in the clinic for 2-3 hours for misoprostol to work. Because first-trimester abortion is so safe, the gestational age at which the benefit of cervical preparation outweighs the side-effects is not known (Kapp et al.,

2010). Women's satisfaction with cervical preparation has not been studied in randomized controlled trials (Kapp et al., 2010) but is an important consideration for quality of care and service delivery.

Choice of methods

If cervical preparation is used, the choice of vaginal or sublingual misoprostol, oral mifepristone or osmotic dilators may be based on availability, expense, convenience and preference. Sublingual misoprostol has superior efficacy but more gastrointestinal side effects than vaginal misoprostol (Kapp et al., 2010). Mifepristone given 24 hours prior to the abortion is superior to misoprostol but adds time and expense to the abortion procedure (Ashok, Flett, & Templeton, 2000). Misoprostol and laminaria have similar efficacy but laminaria placement has increased pain, increased time to procedure and reduced satisfaction for women (Burnett, Corbett, & Gertenstein, 2005; MacIsaac, Grossman, Balistreri, & Darney, 1999).

Young women

Young women may benefit from cervical preparation due to their increased risk of cervical injury during abortion (Schulz, Grimes, & Cates, 1983), but there are no clinical trial data to support the use of cervical preparation in this patient population.

References

Allen, R. H., & Goldberg, A. B. (2007). Cervical dilation before first-trimester surgical abortion (<14 weeks' gestation). SFP Guideline 20071. *Contraception*, *76*(2), 139-156.

Ashok, P. W., Flett, G. M., & Templeton, A. (2000). Mifepristone versus vaginally administered misoprostol for cervical priming before first-trimester termination of pregnancy: a randomized, controlled study. *American Journal of Obstetrics & Gynecology, 183*(4), 998-1002.

Burnett, M. A., Corbett, C. A., & Gertenstein, R. J. (2005). A randomized trial of laminaria tents versus vaginal misoprostol for cervical ripening in first trimester surgical abortion. *Journal of Obstetrics and Gynaecology Canada*, *27*(1), 38-42.

Fox, M. C., & Hayes, J. L. (2007). Cervical preparation for second-trimester surgical abortion prior to 20 weeks of gestation. *Contraception*, *76*(6), 486-495.

Grimes, D. A., Schulz, K. F., & Cates, W. J., Jr. (1984). Prevention of uterine perforation during curettage abortion. *Journal of American Medical Association, 251*(16), 2108-2111.

Kapp, N., Lohr, P. A., Ngo, T. D., & Hayes, J. L. (2010). Cervical preparation for first trimester surgical abortion. *The Cochrane Database of Systematic Reviews* (2), CD007207.

Kapp, N., & vonHertzen, H. (2009). Medical methods to induce abortion in the second trimester. In M. Paul, E.S. Lichtenberg, L. Borgatta, D.A. Grimes, P.G. Stubblefields & M.D. Creinin (Eds.), *Management of Unintended and Abnormal Pregnancy* (pp. 178-192). Oxford: Wiley-Blackwell.

Kaunitz, A. M., Rovira, E. Z., Grimes, D. A., & Schulz, K. F. (1985). Abortions that fail. *Obstetrics and Gynecol*ogy, *66*(4), 533-537.

MacIsaac, L., Grossman, D., Balistreri, E., & Darney, P. (1999). A randomized controlled trial of laminaria, oral misoprostol, and vaginal misoprostol before abortion. *Obstetrics and Gynecology*, *93*(5 Pt 1), 766-770.

Meirik, O., Huong, N. T., Piaggio, G., Bergel, E., & von Hertzen, H. (2012). Complications of first-trimester abortion by vacuum aspiration after cervical preparation with and without misoprostol: a multicentre randomised trial. *The Lancet*, *379*(9828), 1817-1824.

Schulz, K. F., Grimes, D. A., & Cates, W., Jr. (1983). Measures to prevent cervical injury during suction curettage abortion. *The Lancet*, *1*(8335), 1182-1185.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

First-trimester vacuum aspiration: Paracervical anesthesia

Recommendation:

- Paracervical anesthesia is recommended as a component of pain management during first-trimester vacuum aspiration procedures.
- Midlevel providers may give paracervical anesthesia during first-trimester aspiration procedures.

Strength of recommendation: Strong

Quality of evidence: Moderate

Last reviewed: October 21, 2015

Evidence

Many providers use local anesthesia or paracervical block (PCB) for pain management during first-trimester vacuum aspiration (O'Connell et al., 2009). A 2013 systematic review evaluating PCB for gynecologic procedures requiring cervical dilation, including abortion, found that PCB reduced pain during cervical dilation and uterine interventions, although not postprocedure pain, when compared to placebo or no anesthesia (Tangsiriwatthana, Sangkomkamhang, Lumbiganon, & Laopaiboon, 2013). In a recent, high-quality randomized controlled trial of 120 women undergoing first-trimester aspiration abortion, women who received PCB had less pain during dilation and aspiration compared to women who received a sham injection. In this study, the overall rate of complications was low and there was no difference between the two groups (Renner, 2012).

Technique (Renner, 2012)

- Load a 20mL syringe with 18mL of lidocaine (1%) buffered with 2mL sodium bicarbonate (8.4%).
- Attach syringe to a 20-gauge spinal needle.
- Infiltrate 2mL into the cervix superficially at the tenaculum site (located at 12 o'clock).
- Grasp the cervix with the single-tooth tenaculum.
- Inject the remaining 18mL in equal amounts at the cervicovaginal junction at the locations of two, four, eight and 10 o'clock. The injection should be continuous from superficial to a depth of three centimeters.
- Pull back on the plunger before injecting anesthesia to prevent intravascular injection.
- Begin dilation three minutes after the PCB is complete.

Midlevel providers

In an international randomized multicenter study comparing 2,894 first-trimester procedures done by physicians and midlevel providers, midlevel providers had similar safety and efficacy rates as physicians when performing vacuum aspiration with paracervical block (Warriner et al., 2006). The midlevel providers did not have any complications related to use of paracervical anesthesia.

Young women

This recommendation is the same for young women.

References

O'Connell, K., Jones, H. E., Simon, M., Saporta, V., Paul, M., & Lichtenberg, E. S. (2009). First-trimester surgical abortion practices: A survey of National Abortion Federation members. *Contraception*, *79*: 385–392.

Renner, R. M., Nichols, M. D., Jensen, J. T., Li, H., & Edelman, A. B. (2012). Paracervical block for pain control in first-trimester surgical abortion: a randomized controlled trial. *Obstetrics & Gynecology,* 119(5), 1030-1037.

Tangsiriwatthana, T., Sangkomkamhang, U.S., Lumbiganon, P., Laopaiboon, M. (2013). Paracervical local anesthesia for cervical dilatation and uterine intervention*. Cochrane Database of Systematic Review*s, 9, CD005056.

Warriner, I. K., Meirik, O., Hoffman, M., Morroni, C., Harries, J., My Huong, N. T., Seuc, A. H. (2006). Rates of complication in first-trimester manual vacuum aspiration abortion done by doctors and midlevel providers in South Africa and Vietnam: a randomised controlled equivalence trial. *The Lancet, 368*(9551), 1965-1972.

First-trimester vacuum aspiration: Pain management

Recommendation:

- Women undergoing first-trimester vacuum aspiration should receive pain medications and non-pharmacologic approaches to treat pain (WHO, 2012).
- General anesthesia is not routinely recommended for first-trimester pain management.

Strength of recommendation: Strong

Quality of evidence: Moderate

Last reviewed: October 24, 2015

Background

Most women undergoing first-trimester vacuum aspiration will experience pain (Smith, Stubblefield, Chirchirillo, & McCarthy, 1979). Clinicians consistently underestimate the amount of pain women experience during abortion (Singh et al., 2008).

Methods of pain management

For first-trimester vacuum aspiration, a combination of pain medications, local anesthesia (in the form of a paracervical block), and non-pharmacologic measures typically provide pain relief for most women (WHO, 2012; Renner et al., 2010). Intravenous sedation may also be offered. General anesthesia increases the risks associated with abortion and is not recommended for routine procedures (Atrash, Cheek, & Hogue, 1988).

Pain medication

Premedication with non-steroidal anti-inflammatory drugs has been shown in clinical trials to decrease pain during and after the procedure (Roche, Li, James, Fechner & Tilak, 2012; Romero, Turok, & Gilliam, 2008; Suprapto & Reed, 1984; Wiebe & Rawling, 1995); both oral and intramuscular non-steroidal anti-inflammatory medications are effective (Braaten, Hurwitz, Fortin & Goldberg, 2013). Premedication with narcotic analgesics also provides pain relief but may be less effective than non-steroidal anti-inflammatory drugs (Khazin et al., 2011; Lowenstein et al., 2006; Romero, Turok & Gilliam, 2008). A randomized controlled trial of hydrocodone-acetaminophen compared to placebo showed that the addition of hydrocodone-acetaminophen to standard premedication with ibuprofen did not improve pain management and increased postoperative nausea (Micks et al., 2012). Anxiolytics such as lorazepam or midazolam may decrease anxiety related to the procedure and cause amnesia for some women, but do not affect pain (Bayer et al., 2015; Wiebe, Podhradsky, & Dijak, 2003). Paracetamol is not effective for pain relief during vacuum aspiration (Cade & Ashley, 1993).

Local anesthesia

A paracervical block with 20mL of lidocaine (1%) given three minutes before dilating the cervix has been shown to decrease pain with dilation and aspiration (Renner, Nichols, Jensen, Li, & Edelman, 2012). Paracervical block is a low risk procedure that can be performed by physicians and midlevel providers (Warriner et al., 2006).

Non-pharmacologic pain management

Medications should be supplemented with supportive techniques to decrease pain and anxiety. Some techniques that may be helpful include respectful staff; a clean, secure and private setting; counseling; verbal support; gentle surgical technique; and a heating pad or hot water bottle in the recovery room. One small trial randomizing 214 women to doula support or usual care during their abortion procedures found no differences in pain or satisfaction with procedure, although women who received doula support overwhelmingly recommended it (Chor et al., 2015). In small studies, listening to music has not been shown to improve pain relief, and may increase pain perception for some women (Guerrero et al., 2012; Wu et al., 2012).

Intravenous sedation

Intravenous sedation using a combination of narcotics and anxiolytics is an effective means of pain control and improves satisfaction with the abortion procedure (Allen, Kumar, Fitzmaurice, Lifford, & Goldberg, 2006; Wong, Ng, Ngai, & Ho, 2002). However, providing intravenous sedation increases the expense, complexity and potential risks of an abortion procedure. The increased monitoring necessary to deliver intravenous sedation safely requires facility investments in training and equipment.

Young women

Young and nulliparous women report increased pain during abortion procedures (Belanger, Melzack, & Lauzon, 1989; Smith et al., 1979). Being attentive to young women's needs for pain management increases the quality of abortion care.

References

Allen, R. H., Kumar, D., Fitzmaurice, G., Lifford, K. L., & Goldberg, A. B. (2006). Pain management of first-trimester surgical abortion: Effects of selection of local anesthesia with and without lorazepam or intravenous sedation. *Contraception*, *74*(5), 407-413.

Atrash, H. K., Cheek, T. G., & Hogue, C. J. (1988). Legal abortion mortality and general anesthesia. *American Journal of Obstetrics & Gynecology*, *158*(2), 420-424.

Bayer, L. L., Edelman, A. B., Fu, R., Lambert, W. E., Nichols, M. D., Bednarek, P. H., Miller, K., & Jensen, J. T. (2015). An evaluation of oral midazolam for anxiety and pain in first-trimester surgical abortion: A randomized controlled trial. *Obstetrics & Gynecology, 126*(1), 37-46.

Belanger, E., Melzack, R., & Lauzon, P. (1989). Pain of first-trimester abortion: a study of psychosocial and medical predictors. *Pain*, *36*(3), 339-350.

Braaten, K.P., Hurwitz, S., Fortin, J., Goldberg, A.B. (2014). Intramuscular ketorolac versus oral ibuprofen for pain relief in first-trimester surgical abortion: A randomized clinical trial. *Contraception*, *89*(2):116-121.

Cade, L., & Ashley, J. (1993). Prophylactic paracetamol for analgesia after vaginal termination of pregnancy. *Anaesthesia and Intensive care*, *21*(1), 93.

Chor, J., Hill, B., Martins, S., Mistretta, S., Patel, A., & Gilliam, M. (2015). Doula support during first-trimester surgical abortion: A randomized controlled trial. *American Journal of Obstetrics and Gynecology, 212*(1), 45.e1-6.

Khazin, V., Weitzman, S., Rozenzvit-Podles, E., Ezri, T., Debby, A., Golan, A., & Evron, S. (2011). Postoperative analgesia with tramadol and indomethacin for diagnostic curettage and early termination of pregnancy. *International Journal of Obstetric Anesthesia, 20*(3), 236-239.

Lowenstein, L., Granot, M., Tamir, A., Glik, A., Deutsch, M., Jakobi, P., & Zimmer, E. Z. (2006). Efficacy of suppository analgesia in postabortion pain reduction. *Contraception*, *74*(4), 345-348.

Micks, E., Renner, R., Jensen, J., Nichols, M., Bednarek, P., Beckley, E., & Edelman, A. (2012). An evaluation of hydrocodone/acetaminophen for pain control in first-trimester surgical abortion. *Contraception*, *86*(3), 295-295.

Renner, R. M., Nichols, M. D., Jensen, J. T., Li, H., & Edelman, A. B. (2012). Paracervical block for pain control in first-trimester surgical abortion: a randomized controlled trial. *Obstetrics & Gynecology*, *119*(5), 1030-1037.

Renner, R.M., Jensen, J.T., Nichols, M.D., Edelman, A.B. (2010). Pain control in first-trimester surgical abortion: A systematic review of randomized controlled trials. *Contraception*, *81*, 372-388.

Roche, N. E., Li, D., James, D., Fechner, A., & Tilak, V. (2012). The effect of perioperative ketorolac on pain control in pregnancy termination. *Contraception*, *85*(3), 299-303.

Romero, I., Turok, D., & Gilliam, M. (2008). A randomized trial of tramadol versus ibuprofen as an adjunct to pain control during vacuum aspiration abortion. *Contraception*, *77*(1), 56-59.

Singh, R. H., Ghanem, K. G., Burke, A. E., Nichols, M. D., Rogers, K., & Blumenthal, P. D. (2008). Predictors and perception of pain in women undergoing first trimester surgical abortion. *Contraception*, *78*(2), 155-161.

Smith, G. M., Stubblefield, P. G., Chirchirillo, L., & McCarthy, M. J. (1979). Pain of first-trimester abortion: its quantification and relations with other variables. *American Journal of Obstetrics & Gynecology*, *133*(5), 489-498.

Suprapto, K., & Reed, S. (1984). Naproxen sodium for pain relief in first-trimester abortion. American Journal of *Obstetrics & Gynecology*, *150*(8), 1000-1001.

Warriner, I. K., Meirik, O., Hoffman, M., Morroni, C., Harries, J., My Huong, N. T., Seuc, A. H. (2006). Rates of complication in first-trimester manual vacuum aspiration abortion done by doctors and midlevel providers in South Africa and Vietnam: a randomised controlled equivalence trial. *The Lancet*, *368*(9551), 1965-1972.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Wiebe, E., Podhradsky, L., & Dijak, V. (2003). The effect of lorazepam on pain and anxiety in abortion. *Contraception*, *67*(3), 219-221.

Wiebe, E. R., & Rawling, M. (1995). Pain control in abortion. *International Journal of Gynecology and Obstetrics*, *50*(1), 41-46.

Wong, C. Y., Ng, E. H., Ngai, S. W., & Ho, P. C. (2002). A randomized, double blind, placebo-controlled study to investigate the use of conscious sedation in conjunction with paracervical block for reducing pain in termination of first trimester pregnancy by suction evacuation. *Human Reproduction*, *17*(5), 1222-1225.

Wu, J., Chaplin, W., Amico, J., Butler, M., Ojie, M.J., Hennedy, D., & Clemow, L. (2012). Music for surgical abortion care study: a randomized controlled pilot study. *Contraception*, *85*(5), 496-502.

First-trimester vacuum aspiration: Prophylactic antibiotics

Recommendation:

Administer prophylactic antibiotics for all women prior to vacuum aspiration (WHO, 2012). Where antibiotics are unavailable, uterine aspiration may still be offered. Therapeutic antibiotics should be administered to all women who are suspected of or who have been diagnosed with an infection.

Strength of recommendation: Strong

Quality of evidence: High

Last reviewed: October 23, 2015

Background

A Cochrane meta-analysis of 19 randomized controlled clinical trials showed that administration of prophylactic antibiotics at the time of vacuum aspiration in the first trimester significantly reduces the risk of postabortal infection (Low, Mueller, Van Vliet, & Kapp, 2012). The World Health Organization (2012), Society of Family Planning (Achilles & Reeves, 2011), American Congress of Obstetricians and Gynecologists (2009) and Royal College of Obstetricians and Gynaecologists (2011) recommend prophylactic antibiotics for all women having a vacuum aspiration. Giving prophylactic antibiotics is more effective (Levallois & Rioux, 1988) and cheaper (Penney et al., 1998) than screening all women and treating only those with evidence of infection. The inability to provide antibiotics should not limit access to abortion (WHO, 2012), as the overall risk of infection with vacuum aspiration is very low.

Regimen

Many antibiotic regimens for abortion prophylaxis have been studied, but the ideal antibiotic, dose and timing has not yet been established (Achilles & Reeves, 2011; Low, Mueller, Van Vliet, & Kapp, 2012). Tetracyclines (doxycycline) and nitroimidazoles (metronidazole and tinidizole) are commonly used because of their clinical efficacy, oral availability, low cost and low risk of allergic reactions (Achilles & Reeves, 2011). Although studies of abortion are limited, (Caruso et al., 2008) evidence from the obstetrical (Costantine et al., 2008), gynecologic (Mittendorf et al., 1993) and general surgery (Classen et al., 1992) literature supports the practice of giving antibiotics before the procedure to decrease the risk of infection. Antibiotic regimens do not need to be extended beyond the immediate postabortion period (Achilles & Reeves, 2011; Levallois & Rioux, 1988; Caruso, et al., 2008; Lichtenberg & Shott, 2003).

The following table lists regimens recommended by professional organizations. These regimens are based on clinical evidence and expert opinion. Providers should choose a regimen based on the expense and availability of the antibiotics as well as practices around testing and treating women for sexually transmitted infections.

Common Regimens	Recommender
Doxycycline 100mg orally 1 hour before the procedure and 200mg after the procedure *or* Metronidazole 500mg orally twice daily for 5 days	American College of Obstetricians and Gynecologists (2009)
Doxycycline 200mg orally before the procedure *or* Azithromycin 500mg orally before the procedure *or* Metronidazole 500mg orally before the procedure	Planned Parenthood Federation of America (PPFA Manual of Medical Standards and Guidelines, 2014)

Therapeutic antibiotics

If possible, women at high risk should be screened and treated for sexually transmitted infections in addition to receiving prophylactic antibiotics. Women who have signs and symptoms of active infection should be provided with abortion services without delay and treated appropriately once the procedure is completed.

Young women

This recommendation is the same for young women.

References

Achilles, S. L., & Reeves, M. F. (2011). Prevention of infection after induced abortion: release date October 2010: SFP guideline 20102. *Contraception*, *83*(4), 295-309.

American Congress of Obstetricians and Gynecologists. (2009). Antibiotic prophylaxis for gynecologic procedures. Practice Bulletin No. 104. *Obstetrics & Gynecology*, *113*, 1180-1189.

Caruso, S., Di Mari, L., Cacciatore, A., Mammana, G., Agnello, C., & Cianci, A. (2008). [Antibiotic prophylaxis with prulifloxacin in women undergoing induced abortion: a randomized controlled trial]. *Minerva Ginecologica*, *60*(1), 1-5.

Classen, D. C., Evans, R. S., Pestotnik, S. L., Horn, S. D., Menlove, R. L., & Burke, J. P. (1992). The timing of prophylactic administration of antibiotics and the risk of surgical-wound infection. *The New England Journal of Medicine*, *326*(5), 281-286.

Costantine, M. M., Rahman, M., Ghulmiyah, L., Byers, B. D., Longo, M., Wen, T., Saade, G. R. (2008). Timing of perioperative antibiotics for cesarean delivery: a metaanalysis. *American Journal of Obstetrics & Gynecology*, *199*(3), 301-306.

Levallois, P., & Rioux, J. E. (1988). Prophylactic antibiotics for suction curettage abortion: results of a clinical controlled trial. *American Journal of Obstetrics & Gynecology*, *158*(1), 100-105.

Low, N., Mueller, M., Van Vliet, H., & Kapp, N. (2012). Perioperative antibiotics to prevent infection after first-trimester abortion. *The Cochrane Database of Systematic Reviews*, Issue 3, CD005217.

Lichtenberg, E. S., & Shott, S. (2003). A randomized clinical trial of prophylaxis for vacuum abortion: 3 versus 7 days of doxycycline. *Obstetrics & Gynecology*, *101*(4), 726-731.

Mittendorf, R., Aronson, M. P., Berry, R. E., Williams, M. A., Kupelnick, B., Klickstein, A., Chalmers, T. C. (1993). Avoiding serious infections associated with abdominal hysterectomy: a meta-analysis of antibiotic prophylaxis. *American Journal of Obstetrics & Gynecology*, *169*(5), 1119-1124.

Penney, G. C., Thomson, M., Norman, J., McKenzie, H., Vale, L., Smith, R., & Imrie, M. (1998). A randomised comparison of strategies for reducing infective complications of induced abortion. *B JOG: An International Journal of Obstetrics and Gynaecology*, *105*(6), 599-604.

Royal College of Obstetricians and Gynaecologists (2011). *The care of women requesting induced abortion* (3rd ed.). London, UK: Royal College of Obstetricians and Gynaecologists Press.

Sawaya, G. F., Grady, D., Kerlikowske, K., & Grimes, D. A. (1996). Antibiotics at the time of induced abortion: the case for universal prophylaxis based on a meta-analysis. *Obstetrics & Gynecology*, *87*(5 Pt 2), 884-890.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

First-trimester vacuum aspiration: Postabortion contraception

Recommendation:

- Immediate initiation of hormonal and non-hormonal contraception and sterilization following first-trimester aspiration abortion is encouraged and considered safe.
- Intrauterine device (IUD) placement or female sterilization can be performed immediately following a successful, uncomplicated abortion.
- Long-acting contraceptive methods have higher continuation rates and lower repeat pregnancy rates compared to short-acting methods.

Strength of recommendation: Strong

Quality of evidence:

- IUDs and combined oral contraceptives: High
- Other methods: Low to Moderate

Last reviewed: October 27, 2015

Fertility return

A woman may ovulate within 10 days of an abortion (Boyd et al., 1972) and can become pregnant if she resumes sexual intercourse without using a modern contraceptive method.

Safety and acceptability of postabortion contraception

The World Health Organization's (WHO) 2015 *Medical Eligibility Criteria for Contraceptive Use* classifies all contraceptive methods as category one, or safe for immediate use, following first-trimester uncomplicated aspiration abortion. Sterilization is classified as acceptable after an uncomplicated abortion. Male sterilization may be performed at any time. Fertility awareness-based methods may be initiated once a woman has had at least one postabortion menses.

In comparison to short-acting methods such as oral contraceptive pills, long-acting methods of birth control such as implants and IUDs have higher continuation rates and lower repeat pregnancy and abortion rates than other methods (Rose, Garrett, & Stanley, 2015; Pohjoranta, Mentual, Gissler, Suhonen, & Heikinheimo, 2015; Blumenthal, Wilson, Remsburg, Cullins & Huggins, 1994; Cameron et al., 2012; Langston, Joslin-Rohr, & Westhoff, 2014; Peipert, Madden, Allsworth, & Secura, 2012; Roberts, Silva, & Xu, 2010).

Evidence related to specific contraceptive methods

Progestin-only subdermal implants: Cohorts of women using the etonogestrel contraceptive implant immediately after abortion show high continuation rates, similar to those of women with interval placement (Madden et al., 2012; Mark, Borgatta, & Sonalkar, 2013).

Intrauterine devices (IUDs): A 2010 Cochrane review of eleven randomized trials with 7,405 women concluded that IUD insertion immediately after abortion is safe and practical (Grimes, Lopez, Schulz, & Stanwood, 2010).

This review found no differences in serious adverse events, such as infection or perforation, between immediate and delayed placement. Expulsion rates were slightly higher with immediate insertion but so were long-term continuation rates. In a recent randomized controlled trial that assigned 575 women to either immediate or delayed insertion, those with delayed insertion were less likely to obtain the device and more likely to have a repeat pregnancy (Bednarek et al., 2011). Requiring a follow-up visit for IUD insertion is a significant barrier to obtaining the IUD (Stanek, Bednarek, Nichols, Jensen, & Edelman, 2009).

Progestin-only injection: A study of 132 women using depot medroxyprogesterone acetate immediately after abortion reported no serious adverse events but low method continuation rates (22%) at one year and high repeat pregnancy rates (Goldberg, Cardenas, Hubbard, & Darney, 2002).

Combined oral contraceptives (COCs): A recent review of seven studies including 1,739 women demonstrated no serious adverse events using COCs immediately after abortion (Gaffield, Kapp, & Ravi, 2009). Additionally, women who used COCs immediately demonstrate similar bleeding patterns to women using no contraception, and less bleeding than copper IUD users.

Combined vaginal ring: A cohort study of 81 women who placed a vaginal ring one week after abortion showed no serious adverse events or infections (Fine, Tryggestad, Meyers, & Sangi-Haghpeykar, 2007).

Combined contraceptive patch: A trial of 298 women randomized to either immediate postabortion start or delayed start the Sunday after an abortion showed no difference in continuation rates at two and six months. In the 53% of women who were able to be contacted at six months, half had stopped using the contraceptive patch (Steinauer, Sokoloff, Roberts, Drey, Dehlendorf, & Prager, 2014).

Young women

The IUD for women under the age of 20 is classified by WHO as category two, in which the benefits generally outweigh the risks. While risk is slightly increased due to higher rates of sexually transmitted infections and expulsion in this patient population, IUDs are still a safe, effective and recommended method for women under the age of 20. Depot medroxyprogesterone acetate injection is also classified by WHO as a category two for women under 18 years of age, due to theoretical concerns about bone mineral density. Sterilization may be performed, but a young woman will need special precautions due to the increased risk of regret (WHO, 2015).

References

Bednarek, P. H., Creinin, M. D., Reeves, M. F., Cwiak, C., Espey, E., & Jensen, J. T. (2011). Immediate versus delayed IUD insertion after uterine aspiration. *New England Journal of Medicine*, *364*(23), 2208-2217.

Blumenthal, P. D., Wilson, L. E., Remsburg, R. E., Cullins, V. E., & Huggins, G. R. (1994). Contraceptive outcomes among post-partum and post-abortal adolescents. *Contraception*, *50*(5), 451-460.

Boyd Jr, E. F., & Holmstrom, E. G. (1972). Ovulation following therapeutic abortion. *American Journal of Obstetrics & Gynecology*, *113*(4), 469.

Cameron, S., Glasier, A., Chen, Z., Johnstone, A., Dunlop, C., & Heller, R. (2012). Effect of contraception provided at termination of pregnancy and incidence of subsequent termination of pregnancy. *BJOG: An International Journal of Obstetrics and Gynaecology*, *119*(9), 1074-1080.

Fine, P. M., Tryggestad, J., Meyers, N. J., & Sangi-Haghpeykar, H. (2007). Safety and acceptability with the use of a contraceptive vaginal ring after surgical or medical abortion. *Contraception*, *75*(5), 367-371.

Gaffield, M. E., Kapp, N., & Ravi, A. (2009). Use of combined oral contraceptives post abortion. *Contraception*, *80*(4), 355-362.

Goldberg, A. B., Cardenas, L. H., Hubbard, A. E., & Darney, P. D. (2002). Post-abortion depot medroxyprogesterone acetate continuation rates: a randomized trial of cyclic estradiol. *Contraception*, *66*(4), 215-220.

Grimes, D. A., Lopez, L. M., Schulz, K. F., & Stanwood, N. L. (2010). Immediate postabortal insertion of intrauterine devices. *The Cochrane Database of Systematic Reviews*, Issue 6, CD001777.

Langston, A.M., Joslin-Rohr, S.L., & Westhoff, C.L. (2014). Immediate postabortion access to IUDs, implants and DMPA reduces repeat pregnancy within 1 year in a New York City practice. *Contraception*, 89(2), 103-8.

Madden, T., Eisenberg, D. L., Zhao, Q., Buckel, C., Secura, G. M., & Peipert, J. F. (2012). Continuation of the etonogestrel implant in women undergoing immediate postabortion placement. *Obstetrics & Gynecology*, *120*(5), 1053-1059.

Mark, A., Sonalkar, S., & Borgatta, L. (2013). One-year continuation of the etonogestrel contraceptive implant in women with postabortion or interval placement. *Contraception*, *88*(5), 619-23.

Peipert, J. F., Madden, T., Allsworth, J. E., & Secura, G. M. (2012). Preventing unintended pregnancies by providing no-cost contraception. *Obstetrics & Gynecology*, *120*(6), 1291-1297.

Pohjoranta, E., Mentula, M., Gissler, M., Suhonen, S., & Heikinheimo, O. (2015). Provision of intrauterine contraception in association with first trimester induced abortion reduces the need of repeat abortion: first-year results of a randomized controlled trial. Human Reproduction, 30(11), 2539-46.

Roberts, H., Silva, M., & Xu, S. (2010). Post abortion contraception and its effect on repeat abortions in Auckland, New Zealand. *Contraception*, *82*(3), 260-265.

Rose, S. B., Garrett, S. M., & Stanley, J. (2015). Immediate postabortion initiation of levonorgestrel implants reduces the incidence of births and abortions at 2 years and beyond. *Contraception, 92*(1), 17-25.

Stanek, A. M., Bednarek, P. H., Nichols, M. D., Jensen, J. T., & Edelman, A. B. (2009). Barriers associated with the failure to return for intrauterine device insertion following first-trimester abortion. *Contraception*, *79*(3), 216-220.

Steinauer, J. E., Sokoloff, A., Roberts, E., Drey, E. A., Dehlendorf, C. E., & Prager, S. W. (2014). Immediate versus delayed initiation of the contraceptive patch after abortion: a randomized trial. *Contraception*, *89*(1), 42-7.

World Health Organization. (2015). *Medical eligibility criteria for contraceptive use* (5th ed.). Geneva: Department of Reproductive Health and Research, World Health Organization.

First-trimester vacuum aspiration: Postabortion IUD use

Recommendation:

- Intrauterine contraceptive device (IUD) placement can be performed immediately following a successful, uncomplicated abortion.
- Long-acting contraceptive methods have higher continuation rates and lower repeat pregnancy rates compared to short-acting methods.

Strength of recommendation: Strong

Quality of evidence: High

Last reviewed: October 27, 2015

Fertility return

A woman may ovulate within 10 days of an abortion (Boyd et al., 1972) and can become pregnant if she resumes sexual intercourse without using a modern contraceptive method.

Safety and acceptability of postabortion contraception

The World Health Organization's (WHO) 2015 *Medical Eligibility Criteria for Contraceptive Use* classifies intrauterine contraceptive devices (IUDs) as category one, or safe for immediate use, following first-trimester uncomplicated aspiration abortion.

In comparison to short-acting methods of birth control such as oral contraceptive pills, long-acting methods such as implants and IUDs have higher continuation rates and lower repeat pregnancy and abortion rates (Pohjoranta, Mentula, Gissler, Suhonen, & Heikinheimo, 2015; Blumenthal, Wilson, Remsburg, Cullins, & Huggins, 1994; Cameron et al., 2012; Langston, Joslin-Rohr, & Westhoff, 2014; Peipert, Madden, Allsworth, & Secura, 2012; Roberts, Silva, & Xu, 2010). Although rates of IUD expulsion are slightly higher following immediate postabortion insertion (5% compared to 2.7% after delayed insertion), continuation rates at six months are significantly higher than for patients who await interval insertion (Bednarek et al., 2011; Grimes, Lopez, Shulz, & Stanwood, 2010). Requiring a follow-up visit for IUD insertion is a significant barrier to obtaining an IUD (Stanek, Bednarek, Nichols, Jensen, & Edelman, 2009). A 2015 randomized controlled trial comparing the Cu-IUD to the LNG-IUS inserted immediately following first-trimester vacuum aspiration found no differences in expulsion rates (approximately 12%) or continuation rates at six months (approximately 75%) between the two IUD types (Bilgehan, Dilbaz, Karadag, & Deveci, 2015).

Young women

The IUD for women under the age of 20 is classified by WHO as category two, in which the benefits generally outweigh the risks. While risk may be slightly increased due to higher rates of sexually transmitted infections and expulsion in this patient population, IUDs are still a safe, effective and recommended method for women under the age of 20.

References

Bednarek, P. H., Creinin, M. D., Reeves, M. F., Cwiak, C., Espey, E., & Jensen, J. T. (2011). Immediate versus delayed IUD insertion after uterine aspiration. *New England Journal of Medicine,* 364(23), 2208-2217.

Bilgehan, F., Dilbaz, B., Karadag, B., & Deveci, C. D. (2015). Comparison of copper intrauterine device with levonorgestrel-bearing intrauterine system for post-abortion contraception. *The Journal of Obstetrics and Gynecology Research*, 41(9), 1426-32.

Blumenthal, P. D., Wilson, L. E., Remsburg, R. E., Cullins, V. E., & Huggins, G. R. (1994). Contraceptive outcomes among post-partum and post-abortal adolescents. *Contraception, 50*(5), 451-460.

Boyd Jr, E. F., & Holmstrom, E. G. (1972). Ovulation following therapeutic abortion. *American Journal of Obstetrics & Gynecology*, *113*(4), 469.

Cameron, S., Glasier, A., Chen, Z., Johnstone, A., Dunlop, C., & Heller, R. (2012). Effect of contraception provided at termination of pregnancy and incidence of subsequent termination of pregnancy. *BJOG: An International Journal of Obstetrics and Gynaecology, 119*(9), 1074-1080

Grimes, D. A., Lopez, L. M., Schulz, K. F., & Stanwood, N. L. (2010). Immediate postabortal insertion of intrauterine devices. *The Cochrane Database of Systematic Reviews*, Issue 6, CD001777.

Peipert, J. F., Madden, T., Allsworth, J. E., & Secura, G. M. (2012). Preventing unintended pregnancies by providing no-cost contraception. *Obstetrics & Gynecology*, *120*(6), 1291-1297.

Pohjoranta, E., Mentula, M., Gissler, M., Suhonen, S., & Heikinheimo, O. (2015). Provision of intrauterine contraception in association with first trimester induced abortion reduces the need of repeat abortion: first-year results of a randomized controlled trial. *Human Reproduction, 30*(11), 2539-46.

Roberts, H., Silva, M., & Xu, S. (2010). Post abortion contraception and its effect on repeat abortions in Auckland, New Zealand. *Contraception, 82*(3), 260-265.

Stanek, A. M., Bednarek, P. H., Nichols, M. D., Jensen, J. T., & Edelman, A. B. (2009). Barriers associated with the failure to return for intrauterine device insertion following first-trimester abortion. *Contraception, 79*(3), 216-220.

World Health Organization. (2015). *Medical eligibility criteria for contraceptive use* (5th ed.). Geneva: Department of Reproductive Health and Research, World Health Organization.

First-trimester medical abortion: Safety and efficacy for adolescent and young women

Recommendation:

- Medical abortion for adolescent and young women is safe, effective and acceptable and should be offered as a method of safe abortion to this population.
- Clinical services should promote timely access to safe abortion for young women.

Strength of recommendation: Strong

Quality of evidence: Moderate

Last reviewed: October 20, 2015

Background

The World Health Organization defines adolescents as individuals 10-19 years of age, and young women as 20-24 years of age. Adolescents face barriers to accessing safe abortion care and present for abortions at later gestational ages than adult women (Pazol, Creanga, Zane, Burley, & Jamieson, 2012; Sowmini, 2013). Adolescents are at increased risk of complications of unsafe abortion due to delays seeking care, seeking care from unskilled providers and not accessing services when complications arise (Olukoya, Kaya, Ferguson, & AbouZahr, 2001). Increasing access to safe abortion, including medical abortion, is beneficial for young women.

Efficacy of medical abortion

Clinical trials and cohort studies have shown young women have the same (Haimov-Kochman et al., 2007; Heikinheimo, Leminen, & Suhonen, 2007) or increased (Niinimäki et al., 2011; Shannon et al., 2006) success rates when using mifepristone and misoprostol for medical abortion compared to older women. A large Finnish population-based retrospective cohort study that compared 3,024 adolescents to 24,006 adult women up to 20 weeks gestational age showed that the risk of needing surgical evacuation following medical abortion was significantly lower in adolescents (Niinimäki et al., 2011). In a prospective cohort that included young women, the efficacy of misoprostol-only medical abortion was the same for young women and older women (Bugalho et al., 1996).

Safety of medical abortion

Despite higher rates of chlamydia infection in adolescents, a large population-based retrospective cohort study of women up to 20 weeks gestational age found complication rates were similar or lower among adolescents than among adult women, even when controlling for nulliparity. In this study, adolescents had a significantly lower incidence of hemorrhage, incomplete abortion, and need for surgical evacuation. Postabortion infection occurred at similar rates in adolescents and older women (Niinimäki, et al., 2011).

Acceptability of medical abortion

In one small, non-comparative study of 28 adolescents age 14-17 using mifepristone and misoprostol medical abortion, 96% of adolescents found medical abortion acceptable and 79% reported satisfaction with the procedure by four weeks of follow-up (Phelps, Schaff, & Fielding, 2001).

References

Bugalho, A., Faundes, A., Jamisse, L., Usfa, M., Maria, E., & Bique, C. (1996). Evaluation of the effectiveness of vaginal misoprostol to induce first trimester abortion. *Contraception, 53*(4), 243-246.

Haimov-Kochman, R., Arbel, R., Sciaky-Tamir, Y., Brzezinski, A., Laufer, N., & Yagel, S. (2007). Risk factors for unsuccessful medical abortion with mifepristone and misoprostol. *Acta obstetricia et gynecologica Scandinavica*, *86*(4), 462-466.

Heikinheimo, O., Leminen, R., & Suhonen, S. (2007). Termination of early pregnancy using flexible, low-dose mifepristone–misoprostol regimens. *Contraception, 76*(6), 456-460.

Niinimäki, M., Suhonen, S., Mentula, M., Hemminki, E., Heikinheimo, O., & Gissler, M. (2011). Comparison of rates of adverse events in adolescent and adult women undergoing medical abortion: population register based study. *British Medical Journal*, *342*, d2111.

Olukoya, A., Kaya, A., Ferguson, B., & AbouZahr, C. (2001). Unsafe abortion in adolescents. *International Journal of Gynecology & Obstetrics*, *75*(2), 137-147.

Pazol, K., Creanga, A. A., Zane, S. B., Burley, K. B., & Jamieson, D. J. (2012). Abortion Surveillance - United States, 2009. *Morbidity and Mortality Weekly Report*, 61, 1-44.

Phelps, R. H., Schaff, E. A., & Fielding, S. L. (2001). Mifepristone abortion in minors. *Contraception*, *64*(6), 339-343.

Shannon, C., Wiebe, E., Jacot, F., Guilbert, E., Dunn, S., Sheldon, W., & Winikoff, B. (2006). Regimens of misoprostol with mifepristone for early medical abortion: a randomised trial. *BJOG: An International Journal of Obstetrics & Gynaecology*, *113*(6), 621-628.

Sowmini, S.V. (2013). Delay in termination of pregnancy among unmarried adolescents and young women attending a tertiary hospital abortion clinic in Trivandrum, Kerala, India. *Reproductive Health Matters*, *21*(41), 243-50.

First-trimester medical abortion with mifepristone and misoprostol or misoprostol only: Midlevel providers

Recommendation:

Most cadres of trained midlevel providers can provide first-trimester medical abortion as safely and effectively as physicians (WHO, 2015).

Strength of recommendation: Strong

Quality of evidence: High

Last reviewed: October 26, 2015

Background

Access to safe abortion or postabortion care can be increased by expanding the provider base to include non-physician providers. Midlevel providers include cadres of health-care providers other than physicians such as nurses, nurse midwives, clinical officers and others.

Evidence

A 2015 Cochrane systematic review comparing medical abortion provision by midlevel providers and doctors (Barnard, Kim, Park, & Ngo, 2015) included three studies from Nepal, India and Sweden. Midlevel providers in the included studies were nurses, auxiliary nurse midwives, ayurvedic (traditional) physicians and midwives. The review found no difference in failure or incomplete abortion rates or complication rates when medical abortion was provided by midlevel providers or doctors. An additional randomized non-inferiority trial published since the review compared provision of medical abortion by nurses and doctors in Mexico and found no differences in safety or efficacy (Olavarrieta et al., 2015).

The World Health Organization (WHO) recommends that, in addition to specialist and non-specialist doctors, associate and advanced associate clinicians, midwives, nurses, auxiliary nurses and auxiliary nurse midwives can provide medical abortion. Where doctors of complementary medicine participate in other tasks related to maternal and reproductive health, they can also provide medical abortion. The WHO makes no recommendation regarding provision of medical abortion by pharmacists or lay health workers, based on lack of evidence (2015).

Young women

This recommendation is the same for young women.

References

Barnard, S., Kim, C., Park, M. H., & Ngo T. D. (2015). Doctors or midlevel providers for abortion? Cochrane Database of Systematic Reviews, 7:CD011242.

Olavarrieta, C. D., Ganatra, B., Sorhaindo, A., Karver, T. S., Seuc, A., Villalobos, A., Garcia, S. G., Perez, M., Bousiequez, M., & Sanhueza, P. (2015). Nurse versus physician-provision of early medical abortion in Mexico: a randomized controlled non-inferiority trial. *Bulletin of the World Health Organization*, *93*(4), 249-58.

World Health Organization. (2015). *Health Worker Roles in Providing Safe Abortion Care and Post-abortion Contraception*. Geneva: World Health Organization.

First-trimester medical abortion with mifepristone and misoprostol or misoprostol only: Estimating gestational age

Recommendation:

Gestational age can be calculated using a woman's report of her last menstrual period (LMP) combined with a clinician's bimanual exam. Use of routine ultrasound for gestational age determination is not necessary (WHO, 2012).

Strength of recommendation: Strong

Quality of evidence: Moderate

Last reviewed: October 24, 2015

Background

Providers should determine gestational age to assess a woman's eligibility for medical abortion. Women and providers can accurately assess gestational age without routine ultrasound (Kaneshiro, Edelman, Sneeringer, & Ponce de Leon, 2011). If gestational age is misestimated, the result is usually not clinically significant because any reduction in effectiveness of medical abortion regimens as gestational age advances is gradual, not sudden (Hamoda, Ashok, Flett, & Templeton, 2005).

Last menstrual period

Most women can recall their last menstrual period (LMP) reasonably well regardless of their education and whether they usually record their LMP dates (Harper, Ellertson & Winikoff, 2002; Wegienka & Baird, 2005). A 2014 systematic review assessing accuracy of LMP alone for gestational dating before medical abortion included five studies reporting data for more than 7,500 women (Schonberg et al., 2014). Overall, 3-12% of women eligible for medical abortion based on LMP were ineligible based on ultrasound. In two multi-site international cohort studies of 1,221 women having medical abortion in China, Cuba, India and the United States, women were able to estimate their eligibility accurately over 90% percent of the time (Ellertson et al., 2000; Ellertson, Elul, & Winikoff, 1997).

Bimanual examination

According to cohort studies of medical abortion, adding a bimanual exam to a woman's report of her LMP can help a clinician accurately determine gestational age (Blanchard et al., 2007; Bracken et al., 2011; Clark et al., 2010; Clark, Gold, Grossman, & Winikoff, 2007; Fielding, Schaff, & Nam, 2002). A cross-sectional multi-site study of 673 women in South Africa found that providers' estimates of gestational age were, on average, two days lower than ultrasound estimate and women's LMP estimates of gestational age were one day lower. The authors concluded that a combination of assessment of menstrual history and physical examination was sufficiently accurate to determine eligibility for medical abortion in most cases when compared to ultrasound (Blanchard et al., 2007). In a prospective study of 1,016 women at 15 sites in the United States, clinicians correctly estimated eligibility in 87% of women. In only 1% of cases did clinicians underestimate gestational age, a potentially important error in medical abortion if underestimation is clinically significant (Fielding et al., 2002). Finally, a prospective trial of 4,484 women in 10 clinics in the United States showed that if women had gestational age estimated by LMP and a clinician exam, only 1.6% of them would have been inappropriately

given medical abortion above the gestational age limit compared to when ultrasound was used (Bracken et al., 2011).

Ultrasound

Ultrasound does not yield exact gestational age measurements due to variability in the sonographer, machines and software (Callen, 2000). In addition, an ultrasound has an inherent margin of error of 3-5 days before 12 weeks gestation, and the margin of error increases as the pregnancy advances (Hadlock, Shah, Kanon, & Lindsey, 1992). For these reasons, if the LMP and ultrasound differ within five days in the first trimester, the LMP is usually used for dating. In cohort studies of medical abortion in low-resource settings such as India, Nepal, Vietnam and Tunisia, lack of ultrasound has not had an impact on the success of medical abortion (Coyaji et al., 2001; Elul et al., 2001; Warriner et al., 2011).

If a provider is unable to assess gestational age through the combination of LMP, history and bimanual examination, a more experienced clinician should perform a bimanual examination or the woman should be referred for an ultrasound. Any woman with a suspected ectopic pregnancy needs further evaluation.

Young women

This recommendation is the same for young women.

References

Blanchard, K., Cooper, D., Dickson, K., Cullingworth, L., Mavimbela, N., Von Mollendorf, C., Winikoff, B. (2007). A comparison of women's, providers' and ultrasound assessments of pregnancy duration among termination of pregnancy clients in South Africa. *BJOG: An International Journal of Obstetrics and Gynaecology*, *114*(5), 569-575.

Bracken, H., Clark, W., Lichtenberg, E., Schweikert, S., Tanenhaus, J., Barajas, A., Winikoff, B. (2011). Alternatives to routine ultrasound for eligibility assessment prior to early termination of pregnancy with mifepristone–misoprostol. *BJOG: An International Journal of Obstetrics and Gynaecology*, *118*(1), 17-23.

Callen, P. W. (2000). The obstetric ultrasound examination. In *Ultrasonography in Obstetrics and Gynecology*, 4th ed. Philadelphia, PA: WB Saunders Co.

Clark, W., Bracken, H., Tanenhaus, J., Schweikert, S., Lichtenberg, E. S., & Winikoff, B. (2010). Alternatives to a routine follow-up visit for early medical abortion. *Obstetrics and Gynecology*, *115*(2, Part 1), 264.

Clark, W. H., Gold, M., Grossman, D., & Winikoff, B. (2007). Can mifepristone medical abortion be simplified? A review of the evidence and questions for future research. *Contraception*, 75(4), 245-250.

Coyaji, K., Elul, B., Krishna, U., Otiv, S., Ambardekar, S., Bopardikar, A., Winikoff, B. (2001). Mifepristone abortion outside the urban research hospital setting in India. *The Lancet*, *357*(9250), 120-122.

Ellertson, C., Elul, B., Ambardekar, S., Wood, L., Carroll, J., & Coyaji, K. (2000). Accuracy of assessment of pregnancy duration by women seeking early abortions. *The Lancet*, *355*(9207), 877-881.

Ellertson, C., Elul, B., & Winikoff, B. (1997). Can women use medical abortion without medical supervision? *Reproductive Health Matters*, *5*(9), 149-161.

Elul, B., Hajri, S., Ellertson, C., Slama, C. B., Pearlman, E., & Winikoff, B. (2001). Can women in less-developed countries use a simplified medical abortion regimen? *The Lancet*, *357*(9266), 1402-1405.

Fielding, S. L., Schaff, E. A., & Nam, N. (2002). Clinicians' perception of sonogram indication for mifepristone abortion up to 63 days. *Contraception*, *66*(1), 27-31.

Hadlock, F., Shah, Y., Kanon, D., & Lindsey, J. (1992). Fetal crown-rump length: reevaluation of relation to menstrual age (5-18 weeks) with high-resolution real-time US. *Radiology*, *182*(2), 501-505.

Hamoda, H., Ashok, P. W., Flett, G. M. M., & Templeton, A. (2005). Medical abortion at 9-13 weeks' gestation: a review of 1076 consecutive cases. *Contraception*, *71*(5), 327-332.

Harper, C., Ellertson, C., & Winikoff, B. (2002). Could American women use mifepristone-misoprostol pills safely with less medical supervision? *Contraception*, *65*(2), 133-142.

Kaneshiro, B., Edelman, A., Sneeringer, R. K., & Ponce de Leon, R. G. (2011). Expanding medical abortion: can medical abortion be effectively provided without the routine use of ultrasound? *Contraception*, *83*(3), 194-201.

Schonberg, D., Wang, L.F., Bennett, A.H., Gold, M., Jackson, E. (2014). The accuracy of using last menstrual period to determine gestational age for first trimester medication abortion: a systematic review. *Contraception*, *90*(5), 480-487.

Warriner, I., Wang, D., Huong, N., Thapa, K., Tamang, A., Shah, I., Meirik, O. (2011). Can midlevel health-care providers administer early medical abortion as safely and effectively as doctors? A randomised controlled equivalence trial in Nepal. *The Lancet*, *377*(9772), 1155-1161.

Wegienka, G., & Baird, D. D. (2005). A comparison of recalled date of last menstrual period with prospectively recorded dates. *Journal of Women's Health*, *14*(3), 248-252.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

First-trimester medical abortion with mifepristone and misoprostol or misoprostol only: Pain management

Recommendation:

- All women undergoing medical abortion in the first trimester should be offered pain management (WHO, 2012).
- Non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen or diclofenac are more effective than paracetamol or acetaminophen.
- Narcotic analgesics and non-pharmacologic measures may also be used.

Strength of recommendation: Strong

Quality of evidence: Low

Last reviewed: October 24, 2015

Medications for pain management

In a study of 6,755 women using medical abortion in the first trimester, 78.4% reported moderate or severe pain and cramping when using the regimen (Goldstone, Michelson, & Williamson, 2012). Different pain medications for medical abortion have been studied with varying degrees of effectiveness (Jackson & Kapp, 2011). A randomized controlled trial of 120 women showed that ibuprofen is more effective than acetaminophen for pain during first-trimester medical abortion with mifepristone and misoprostol (Livshits et al., 2009). Pre-treatment with ibuprofen is no better for pain management than treatment once cramping starts (Raymond et al., 2013). Narcotic analgesics are another option for pain control, although the optimal drug, dose and timing is not known. One potential strategy is to provide women with nonsteroidal anti-inflammatory drugs (NSAIDs) and narcotic analgesics and advise them to first take NSAIDs once cramping starts and alternate the two medications if they continue to experience pain.

Non-pharmacologic pain management

In addition to medications, other methods that may help women manage pain during a medical abortion are thorough counseling, a supportive environment and applying a heating pad or hot water bottle to the lower abdomen. These methods are complementary but not adequate substitutes for pain management with medications.

Quality of evidence

There is limited trial data to establish the best regimen for pain control (Jackson & Kapp, 2011). Neither pain nor its treatment are systematically reported in clinical trials of medical abortion; where these data are reported, multiple regimens and treatment protocols are difficult to compare (Fiala et al., 2014).

Young women

Young women and nulliparous women have been shown to have higher analgesic requirements during medical abortion (Westhoff, Dasmahapatra, Winikoff, & Clarke, 2000; Westhoff, Dasmahapatra, & Schaff, 2000).

Discussing pain control with young women and giving them the appropriate medications and instructions may be particularly important.

References

Fiala, C., Cameron, S., Bombas, T., Parachini, M., Saya, L., & Gemzell-Danielsson, K. (2014). Pain during medical abortion, the impact of the regimen: A neglected issue? A review. *European Journal of Contraception and Reproductive Health Care, 19*(6), 404-19.

Goldstone, P., Michelson, J., & Williamson, E. (2012). Early medical abortion using low-dose mifepristone followed by buccal misoprostol: a large Australian observational study. *Medical Journal of Australia, 197*(5), 282.

Jackson, E., & Kapp, N. (2011). Pain control in first-trimester and second-trimester medical termination of pregnancy: a systematic review. *Contraception*, *83*(2), 116-126.

Livshits, A., Machtinger, R., David, L. B., Spira, M., Moshe-Zahav, A., & Seidman, D. S. (2009). Ibuprofen and paracetamol for pain relief during medical abortion: a double-blind randomized controlled study. *Fertility and Sterility*, *91*(5), 1877-1880.

Raymond, E.G., Weaver, M.A., Louie, K.S., Dean, G., Porsch, L., Lichtenberg, E.S., Rose, A., & Arnesen, M. (2013). Prophylactic compared with therapeutic ibuprofen analgesia in first-trimester medical abortion. *Obstetrics & Gynecology*, *122*(3), 558-64.

Westhoff, C., Dasmahapatra, R., Winikoff, B., & Clarke, S. (2000). Predictors of analgesia use during supervised medical abortion. The Mifepristone Clinical Trials Group. *Contraception*, *61*(3), 225-229.

Westhoff, C., Dasmahapatra, R., & Schaff, E. (2000). Analgesia during at-home use of misoprostol as part of a medical abortion regimen. *Contraception, 62*(6), 311-314.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

First-trimester medical abortion with mifepristone and misoprostol or misoprostol only: Prophylactic antibiotics

Recommendation:

Routine use of antibiotics is not recommended for women undergoing medical abortion. Women who have signs or symptoms of sexually transmitted infection at the time of medical abortion should be treated appropriately and medical abortion can be provided without delay.

Strength of recommendation: Weak

Quality of evidence: Very low

Last reviewed: October 23, 2015

Risk of infection

The overall risk of infection found in prospective studies of medical abortion using mifepristone and a prostaglandin in the first trimester is approximately 0.01-0.5% (Chen & Creinin, 2015; Upadhyay et. al, 2015; Achilles & Reeves, 2011). Serious infections requiring hospitalization are very uncommon, with rates in large U.S. retrospective studies ranging from 0.03% to 0.09% (Fjerstad et al., 2009; Henderson, Hwang, Harper, & Stewart, 2005).

Infectious mortality

Nine cases of fatal Clostridium sepsis occurred in North America following mifepristone and misoprostol medical abortion (Cohen et al., 2007; Fischer et al., 2005; Meites, Zane, & Gould, 2010; Sinave, Le Templier, Blouin, Leveille, & Deland, 2002). One death from group A streptococcus has been reported in Australia and one death from Clostrium sordelli has been reported in Portugal (Reis et al., 2011) in women who used mifepristone and misoprostol. Although the deaths are concerning, the overall infections mortality rate related to medical abortion remains very low at 0.58 per 100,000 procedures (Meites et al., 2010). This rate is similar to the mortality rate after spontaneous abortion (Creinin, Blumenthal, & Shulman, 2006).

Prophylactic antibiotics

There have been no randomized controlled trials examining the effect of antibiotic prophylaxis on medical abortion outcomes (Low, Mueller, Van Vliet, & Kapp, 2012). A retrospective cohort study with historical controls from Planned Parenthood Federation of America showed that changing the route of administration of misoprostol from vaginal to buccal reduced the rate of serious infection from 0.093% to 0.025%, and routinely giving doxycycline twice a day for seven days starting on the day of mifepristone further reduced the rate to 0.006% (Fjerstad et al., 2009). However, because the baseline rate of infection was so low, the number of women who had to take doxycycline to prevent a single serious infection was 5,000. Given the large number of women who would need to take antibiotics to prevent a single infection coupled with the expense and side effects of antibiotics, the American College of Obstetricians and Gynecologists (2009) the Society of Family Planning (Achilles & Reeves, 2011) and the World Health Organization (2012) do not recommend routine antibiotic use. In contrast, the Royal College of Obstetricians and Gynaecologists recommends routine antibiotic use with medical abortion procedures (2011).

Young women

This recommendation is the same for young women.

References

Achilles, S. L., & Reeves, M. F. (2011). Prevention of infection after induced abortion: release date October 2010: SFP guideline 20102. *Contraception*, *83*(4), 295-309.

American College of Obstetrics and Gynecology (2009). Antibiotic prophylaxis for gynecologic procedures. Practice Bulletin No. 104.*Obstetrics & Gynecology*, *113*, 1180-1189.

Chen, M. J., & Creinin, M. D. (2015). Mifepristone with buccal misoprostol for medical abortion: a systematic review. Obstetrics & Gynecology, *126*(1), 12-21.

Cohen, A. L., Bhatnagar, J., Reagan, S., Zane, S. B., D'Angeli, M. A., Fischer, M., … McDonald, L. C. (2007). Toxic shock associated with *Clostridium sordellii* and *Clostridium perfringens* after medical and spontaneous abortion. *Obstetrics & Gynecology*, *110*(5), 1027-1033.

Creinin, M., Blumenthal, P., & Shulman, L. (2006). Mortality associated with mifepristone-misoprostol medical abortion. *Medscape General Medicine*, 8(2), 26.

Fischer, M., Bhatnagar, J., Guarner, J., Reagan, S., Hacker, J. K., Van Meter, S. H., Zaki, S. R. (2005). Fatal toxic shock syndrome associated with Clostridium sordellii after medical abortion. *New England Journal of Medicine*, *353*(22), 2352-2360.

Fjerstad M., Trussell J., Sivin I., Lichtenberg E.S., Cullins V. (2009). Rates of serious infection after changes in regimens for medical abortion. *New England Journal of Medicine*, 361(2):145-51.

Henderson, J. T., Hwang, A. C., Harper, C. C., & Stewart, F. H. (2005). Safety of mifepristone abortions in clinical use. *Contraception*, *72*(3), 175-178.

Low, N., Mueller, M., Van Vliet, H., & Kapp, N. (2012). Perioperative antibiotics to prevent infection after first-trimester abortion. *The Cochrane Database of Systematic Reviews*, Issue 3, CD005217.

Meites, E., Zane, S., & Gould, C. (2010). Fatal *Clostridium sordellii* infections after medical abortions. *New England Journal of Medicine*, *363*(14), 1382-1383.

Royal College of Obstetrics and Gynaecology. (2011). *The Care of the Woman Requesting Induced Abortion* (3 ed.). London: Royal College of Obstetrics and Gynaecology Press.

Reis, T., Chaves, C., Soares, A., Moreira, M., Boaventura, L., & Ribiero, G. (2011). A *Clostridium sordellii* fatal toxic shock syndrome post-medical-abortion in Portugal. Paper presented at the 21st European Congress of Clinical Microbiology and Infectious Diseases (ECCMID).

Sinave, C., Le Templier, G., Blouin, D., Leveille, F., & Deland, E. (2002). Toxic shock syndrome due to Clostridium sordellii: a dramatic postpartum and postabortion disease. *Clinical Infectious Diseases*, *35*(11), 1441-1443.

Upadhyay, U. D., Desai, S., Zlidar, V., Weitz, T. A., Grossman, D., Anderson, P., & Taylor, D. (2015). Incidence of emergency department visits and complications after abortion. Obstetrics & Gynecology, *125*(1), 175-83.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

First-trimester medical abortion with mifepristone and misoprostol or misoprostol only: Postabortion contraception

Recommendation:

- Hormonal methods including pills, patches, rings, injectables or implants may be started on the day of the first pill of medical abortion (WHO, 2012).
- IUD insertion and sterilization can be performed when it is reasonably certain that a woman is no longer pregnant.

Strength of recommendation: Strong

Quality of evidence: Very low

Last reviewed: October 27, 2015

Fertility return

On average, a woman will ovulate within 20 days of a medical abortion with mifepristone and misoprostol, but can ovulate in as little as eight days (Schreiber, Sober, Ratcliffe, & Creinin, 2011). Therefore, all women who wish to delay conception should leave the facility with an effective method of contraception. If a woman desires an intrauterine device (IUD) or sterilization, she should be counseled that these can be given at the same time as vacuum aspiration if she would prefer to leave the facility with her chosen method. If she still desires medical abortion, an interim method can be given and a follow-up visit made to provide IUD or sterilization when it is reasonably certain she is no longer pregnant.

Contraceptive start

Most forms of contraception (including pills, injectables and implants) may be started with the first pill of a medical abortion as long as there are no medical contraindications (WHO, 2015). IUDs may be inserted and sterilization performed as soon as it is reasonably certain that a woman is no longer pregnant (WHO, 2012).

Contraceptive implants

A prospective cohort study compared 57 women who had their implant placed on the day of mifepristone to 62 women who had interval placement (Barros Pereira, Carvalho, & Graca, 2015). There was no difference in medical abortion efficacy between the two groups; continuation at six months was 74% in the same-day placement group, however only 16% in the delayed placement group returned and received their implant as planned.

Intrauterine device

IUDs inserted within 5-10 days of a successful medical abortion have low rates of expulsion and high continuation (Betstadt, Turok, Kapp, Feng, & Borgatta, 2011; Sääv, Stephansson, & Gemzell-Danielsson, 2012). IUD insertion one week after medical abortion has higher uptake and lower pregnancy rates than delayed insertion without an increased risk of expulsion (Shimoni, Davis, Ramos, Rosario, & Westhoff, 2011; Saav et al., 2012).

Sterilization
Sterilization may be performed as soon as it is reasonably certain that a woman is no longer pregnant and that a woman is not unduly influenced by the circumstances surrounding her abortion (WHO, 2012).

Progestin-only injection
One pilot study, which enrolled 20 women, administered depot medroxyprogesterone acetate within 15 minutes of mifepristone administration (Sonalkar, McClusky, Hou & Borgatta, 2015. Completed abortion rate was 17/20 (85%), one participant had an ongoing pregnancy and two participants had incomplete abortions with continuing heavy bleeding 7 days after mifepristone. Ten participants discontinued the method after the first injection.

Combined oral contraceptives
Two randomized controlled trials of combined oral contraceptive pills started immediately after medical abortion compared to placebo showed that pills do not have a significant effect on the efficacy of medical abortion or the quantity or duration of blood loss (Tang, Gao, Cheng, Lee, & Ho, 1999; Tang, Xu, Cheng, Lee, & Ho, 2002).

Barrier methods
Barrier methods are safe to use at any time after a first-trimester medical abortion and can be used as a bridge to long-term methods or sterilization.

Natural family planning
Natural family planning, or the fertility-awareness method, should only be used after a woman has had at least one postabortion menses and only if she had regular menstrual cycles prior to the abortion (World Health Organization [WHO], 2015).

Quality of the evidence
There is limited clinical data to support the recommendation of starting hormonal methods on the same day as the first pill of medical abortion. This recommendation is based on expert opinion and pilot data (Sonalkar, Hou, & Borgatta, 2013; WHO, 2012). A woman's immediate need for reliable contraception after medical abortion, coupled with the risk that delayed contraceptive provision reduces uptake, strongly supports the recommendation to start these methods immediately.

Young women
The IUD for women under the age of 20 is classified by the WHO as category two, in which the benefits generally outweigh the risks. While risk is slightly increased due to higher rates of sexually transmitted infections and expulsion in this patient population, IUDs are still a safe, effective and recommended method for women under the age of 20. The WHO also classifies depot medroxyprogesterone acetate injection as a category two for women under 18 years of age, due to theoretical concerns about bone mineral density. Sterilization may be performed, but a young woman will need special precautions due to the increased risk of regret (WHO, 2015).

References

Barros Pereira, I., Carvalho, R. M., & Graca, L. M. (2015). Intra-abortion contraception with etonogestrel subdermal implant. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, *185*, 33-5.

Betstadt, S. J., Turok, D. K., Kapp, N., Feng, K. T., & Borgatta, L. (2011). Intrauterine device insertion after medical abortion. *Contraception*, *83*(6), 517-521.

Sääv, I., Stephansson, O., & Gemzell-Danielsson, K. (2012). Early versus Delayed Insertion of Intrauterine Contraception after Medical Abortion—A Randomized Controlled Trial. *Public Library of Science ONE*, *7*(11), e48948.

Schreiber, C. A., Sober, S., Ratcliffe, S., & Creinin, M. D. (2011). Ovulation resumption after medical abortion with mifepristone and misoprostol. *Contraception*, *84*(3), 230-233.

Shimoni, N., Davis, A., Ramos, M. E., Rosario, L., & Westhoff, C. (2011). Timing of copper intrauterine device insertion after medical abortion: a randomized controlled trial. *Obstetrics & Gynecology*, *118*(3), 623-628.

Sonalkar, S., McClusky, J., Hou, M. Y., & Borgatta, L. (2015). Administration of depot medroxyprogesterone acetate on the day of mifepristone for medical abortion: a pilot study. *Contraception*, *91*(2), 174-177.

Tang, O. S., Gao, P. P., Cheng, L., Lee, S. W., & Ho, P. C. (1999). A randomized double-blind placebo-controlled study to assess the effect of oral contraceptive pills on the outcome of medical abortion with mifepristone and misoprostol. *Human Reproduction*, *14*(3), 722-725.

Tang, O. S., Xu, J., Cheng, L., Lee, S. W., & Ho, P. C. (2002). The effect of contraceptive pills on the measured blood loss in medical termination of pregnancy by mifepristone and misoprostol: a randomized placebo controlled trial. *Human Reproduction*, *17*(1), 99-102.

World Health Organization. (2015). *Medical Eligibility Criteria for Contraceptive Use* (5th ed.). Geneva: World Health Organization.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

First-trimester medical abortion with mifepristone and misoprostol or misoprostol only: Postabortion IUD use

Recommendation:

An IUD can be placed within one week of medical abortion when it is reasonably certain that a woman is no longer pregnant.

Strength of recommendation: Strong

Quality of evidence: Very Low

Last reviewed: October 27, 2015

Fertility return

On average, a woman will ovulate within 20 days of a medical abortion with mifepristone and misoprostol, but can ovulate in as little as eight days (Schreiber, Sober, Ratcliffe, & Creinin, 2011). If a woman wants an intrauterine device (IUD) after medical abortion, she can use an interim method starting at the first visit and return to have the IUD placed when it is reasonably certain she is no longer pregnant. If she prefers to leave the facility with an IUD, she may be counseled about vacuum aspiration with immediate insertion as an alternative to medical abortion.

Post-medical abortion IUD use

IUDs may be placed as soon as it is reasonably certain that a woman is no longer pregnant following a medical abortion as long as there are no medical contraindications (World Health Organization [WHO], 2012). IUDs placed within 5-10 days of a successful medical abortion have low rates of expulsion and high continuation (Betstadt, Turok, Kapp, Feng, & Borgatta, 2011; Sääv, Stephansson, & Gemzell-Danielsson, 2012).
IUD insertion one week after medical abortion has higher uptake and lower pregnancy rates than delayed insertion without an increased risk of expulsion (Shimoni, Davis, Ramos, Rosario, & Westhoff, 2011; Saav et al., 2012).

Young women

The IUD for women under age 20 is classified by WHO as category two, in which the benefits generally outweigh the risks. While the risk may be slightly increased due to higher rates of sexually transmitted infections and expulsion in this patient population, IUDs are still a safe, effective and recommended method for women under age 20.

References

Betstadt, S. J., Turok, D. K., Kapp, N., Feng, K. T., & Borgatta, L. (2011). Intrauterine device insertion after medical abortion. *Contraception*, *83*(6), 517-521.

Sääv, I., Stephansson, O., & Gemzell-Danielsson, K. (2012). Early versus Delayed Insertion of Intrauterine Contraception after Medical Abortion—A Randomized Controlled Trial. *Public Library of Science One*, *7*(11), e48948.

Schreiber, C. A., Sober, S., Ratcliffe, S., & Creinin, M. D. (2011). Ovulation resumption after medical abortion with mifepristone and misoprostol. *Contraception*, *84*(3), 230-233.

Shimoni, N., Davis, A., Ramos, M. E., Rosario, L., & Westhoff, C. (2011). Timing of copper intrauterine device insertion after medical abortion: a randomized controlled trial. *Obstetrics & Gynecology*, *118*(3), 623-628.

World Health Organization. (2015). *Medical Eligibility Criteria for Contraceptive Use (4th ed.)*. Geneva: World Health Organization.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems (2nd ed.)*. Geneva: World Health Organization.

First-trimester medical abortion with mifepristone and misoprostol: Home use of medications

Recommendation:

- Women may take mifepristone in a facility or at home when it is convenient for them to start the abortion regimen.
- Home use of misoprostol sublingually, vaginally or buccally in a combined regimen of mifepristone and misoprostol is a safe option for women with pregnancies below nine weeks (63 days) gestation (WHO, 2012). Home use of buccal misoprostol may be offered through 10 weeks (70 days) gestation in a combined mifepristone-misoprostol regimen (Winikoff, 2012).

Strength of recommendation: Strong

Quality of evidence:

Up to 63 days: High
64-70 days: Moderate

Last reviewed: October 21, 2015

Background

Traditionally, providers have given mifepristone to women to take in a facility to start the abortion regimen. Then 24-48 hours later, women may take misoprostol in a medical facility, their own home or another safe location. Because of women's individual preferences for privacy, support, and timing, they should have options about the location of mifepristone and misoprostol use.

Home use of mifepristone

Two prospective, nonrandomized multicenter cohort studies conducted in the US, which together included 701 women, showed that between a third and a half of women offered home or facility use of mifepristone chose home use (Swica et al., 2012; Chong et al., 2015). Women who used mifepristone at home had similar success rates and need for telephone or emergency room support as women who took mifepristone in the clinic, and they were highly satisfied. In similar studies conducted in Azerbaijan (Louie et al., 2014) and Nepal (Conkling et al., 2015), 74% and 72% of women, respectively, chose home use, citing presence of their partner and a more private experience as the most common reasons. Abortion success rates were the same in the home use and clinic use groups. If women choose home use of mifepristone when they are using a combined medical abortion regimen, they should schedule the medications within one week of their clinic visit as long as it is under the gestational age limit.

Home use of misoprostol up to 63 days

A systematic review of nine prospective comparative cohort studies with 4,522 women up to 56 days gestation showed that complete abortion rates and adverse event rates were the same for home- or facility-based misoprostol use (Ngo, Park, Shakur, & Free, 2011) as part of a mifepristone-misoprostol regimen. Women in the included studies found home use as acceptable as clinic use. Large observational studies up to 59 days (Fjerstad et al., 2009) and 63 days (Goldstone, Michelson, & Williamson, 2012; Lokeland et al., 2014; Louie et al., 2014;

Raghavan et al., 2013; Gatter, Cleland, & Nucatola, 2015) also confirm the safety and efficacy of home use of misoprostol. The World Health Organization (2012), American College of Obstetricians and Gynecologists (2005) and Royal College of Obstetricians and Gynaecologists (2011) recommend home use of misoprostol up to 63 days.

Home use of misoprostol from 64-70 days

A multicenter study of 729 women in the United States comparing a single dose of buccal misoprostol 800mcg at home from 57-63 days and from 64-70 days as part of a mifepristone-misoprostol regimen showed no difference in success rates, ongoing pregnancy or adverse events (Winikoff et al., 2012). Offering women up to 10 weeks gestation a single dose of buccal misoprostol at home rather than repeat doses of misoprostol in a facility may be appropriate in some settings (Boersma, Meyboom-de Jong, & Kleiverda, 2011; Winikoff et al., 2012). This study used ultrasound to determine gestational age for eligibility. Programs using this approach in different conditions should monitor their results to ensure success in their settings.

A prospective, open-label trial conducted in Ukraine, Georgia, India and Tunisia compared outcomes of 703 women who received mifepristone followed by 400mcg of at-home sublingual misoprostol for pregnancies of 57-63 days or 64-70 days gestation (Bracken et al., 2014). Success rates and ongoing pregnancy rates did not differ between groups, although women in the later gestational age group were more likely to receive an additional dose of misoprostol or require intervention for bleeding.

Young women

This recommendation is the same for young women.

References

American College of Obstetrics and Gynecology. (2014). Medical management of first-trimester abortion. ACOG Practice Bulletin No. 143. *Obstetrics & Gynecology*, *123*, 676-692.

Boersma, A. A., Meyboom-de Jong, B., & Kleiverda, G. (2011). Mifepristone followed by home administration of buccal misoprostol for medical abortion up to 70 days of amenorrhoea in a general practice in Curacao. *The European Journal of Contraception and Reproductive Health Care, 16*(2), 61-66.

Bracken, H., Dabash, R., Tsertsvadze, G., Posohova, S., Shah, M., Hajri, S., Mundle, S., Chelli, H., Zeramdini, D., Tsereteli, T., Platais, I., Winikoff, B. (2014). A two-pill sublingual misoprostol outpatient regimen following mifepristone for medical abortion through 70 days' LMP: a prospective comparative open-label trial. *Contraception*, *89*(3), 181-186.

Chong, E., Frye, L. J., Castle, J., Dean, G., Kuehl, L., & Winikoff, B. (2015). A prospective, non-randomized study of home use of mifepristone for medical abortion in the US. *Contraception, 92*(3), 215-9.

Cleland, K., Creinin, M. D., Nucatola, D., Nshom, M., & Trussell, J. (2013). Significant Adverse Events and Outcomes After Medical Abortion. *Obstetrics & Gynecology*, *121*(1), 166-171.

Gatter, M., Cleland, K., & Nucatola, D. L. (2015). Efficacy and safety of medical abortion using mifepristone and buccal misoprostol through 63 days. *Contraception, 91*(4), 269-73.

Goldstone, P., Michelson, J., & Williamson, E. (2012). Early medical abortion using low-dose mifepristone followed by buccal misoprostol: a large Australian observational study. *Medical Journal of Australia*, *197*(5), 282.

Lokeland, M., Iversen, O.E., Engeland, A., Okland, I., Bjorge, L. (2014). Medical abortion with mifepristone and home administration of misoprostol up to 63 days gestation. *Acta Obstetricia et Gynecologica Scandinavica*, *93*(7), 647-653.

Louie, K.S., Tsereteli, T., Chong, E., Aliyeva, F., Rzayeva, G., Winikoff, B. (2014). Acceptability and feasibility of mifepristone medical abortion in the early first trimester in Azerbaijan. *The European Journal of Contraception and Reproductive Health Care*, *19*(6), 457-464.

Ngo, T. D., Park, M. H., Shakur, H., & Free, C. (2011). Comparative effectiveness, safety and acceptability of medical abortion at home and in a clinic: a systematic review. *Bulletin of the World Health Organization*, *89*(5), 360-370.

Royal College of Obstetricians and Gynaecologists. (2011). *The Care of Women Requesting Induced Abortion* (3rd ed.). London: Royal College of Obstetrician and Gynaecologists.

Swica, Y., Chong, E., Middleton, T., Prine, L., Gold, M., Schreiber, C. A., & Winikoff, B. (2012). Acceptability of home use of mifepristone for medical abortion. *Contraception*, *88*(1), 122-127.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Winikoff, B., Dzuba, I. G., Chong, E., Goldberg, A. B., Lichtenberg, E. S., Ball, C., Swica, Y. (2012). Extending outpatient medical abortion services through 70 days of gestational age. *Obstetrics & Gynecology*, *120*, 1070-1076.

First-trimester medical abortion with mifepristone and misoprostol or misoprostol only: Ultrasound findings at follow-up

Recommendation:

Ultrasound is not necessary for medical abortion follow-up and may lead to unnecessary intervention. If clinicians choose to use ultrasound, the only ultrasound finding that requires intervention is an ongoing viable pregnancy.

Strength of recommendation: Strong

Quality of evidence: Moderate

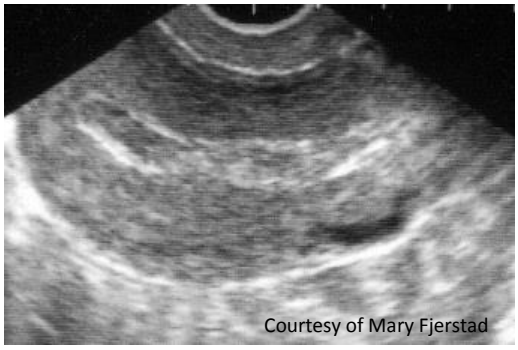
Last reviewed: October 24, 2015

Background

Ultrasound is not necessary to provide abortion care (WHO, 2012) but may be common in some settings. Ultrasound for follow-up after medical abortion has diagnostic limitations. Except for the rare case of an ongoing viable pregnancy, intervention after a medical abortion should be based on clinical symptoms and not ultrasound findings.

Findings

Endometrial thickening: After a successful medical abortion, the endometrium can have varying thickness and have a complex or heterogeneous appearance.

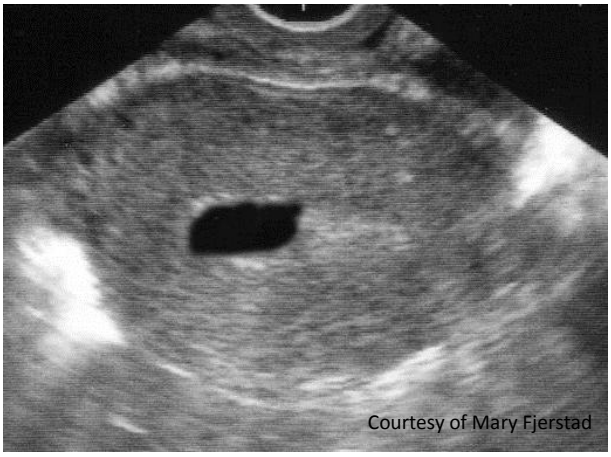


Endometrial thickening

Multiple retrospective and prospective cohort studies have shown that endometrial thickness has a wide range in women after medical abortion, with significant overlap between women with successful and failed medical abortion (Cowett, Cohen, Lichtenberg, & Stika, 2004; Markovitch, Tepper, Klein, Fishman, & Aviram, 2006; Parashar, Iversen, Midbøe, Myking, & Bjørge, 2007; Rørbye, Nørgaard, & Nilas, 2004; Tzeng, Hwang, Au, & Chien, 2013). In a pooled analysis of 2,208 women one week after medical abortion, once women with a persistent gestational sac were excluded, the average endometrial thickness was 10.9mm in women who did

not require more intervention and 14.5mm in 30 women who did require intervention (Reeves, Fox, Lohr, & Creinin, 2009). Although the average endometrial thickness in women who require intervention tends to be higher, because of the range and overlap between successful and unsuccessful abortion, no study has found that there is a thickness above which a diagnosis of unsuccessful medical abortion can be made. The decision of whether to intervene should be made on clinical signs and symptoms, such as ongoing or heavy bleeding, rather than ultrasound findings.

Persistent gestational sac: A persistent gestational sac, in which the sac is present but there is no viable embryonic tissue, occurs in less than 1% of medical abortions with the recommended mifepristone and misoprostol regimen (Creinin et al., 2004; Creinin et al., 2007; Winikoff et al., 2008). A persistent gestational sac is not a viable pregnancy and may be managed with aspiration, a second dose of misoprostol or expectant management according to a woman's preference. In a study of women with a persistent gestational sac within 11 days of medical abortion, a second dose of misoprostol was found to lead to expulsion of a nonviable sac in 69% of women (Reeves, Kudva, & Creinin, 2008).



Persistent gestational sac

Ongoing viable pregnancy: An ongoing pregnancy, in which the sac and an embryo with cardiac activity are present, occurs in less than 1% of medical abortions with the recommended mifepristone and misoprostol regimen (Von Hertzen et al., 2009; Winikoff et al., 2008). Some women will be able to identify this outcome without ultrasound due to lack of bleeding or continued pregnancy symptoms. A woman with an ongoing pregnancy should be offered uterine evacuation as soon as possible. She may have vacuum aspiration or a second dose of misoprostol may be considered. The success rate of misoprostol after failed medical abortion is 36% (Reeves, Kudva, & Creinin, 2008; WHO, 2012). If a woman chooses a second dose of misoprostol, she must be followed to see if it is successful.

Young women

This recommendation is the same for young women.

References

Cowett, A. A., Cohen, L. S., Lichtenberg, E. S., & Stika, C. S. (2004). Ultrasound evaluation of the endometrium after medical termination of pregnancy. *Obstetrics & Gynecology, 103*(5, Part 1), 871-875.

Creinin, M. D., Fox, M. C., Teal, S., Chen, A., Schaff, E. A., & Meyn, L. A. (2004). A randomized comparison of misoprostol 6 to 8 hours versus 24 hours after mifepristone for abortion. *Obstetrics & Gynecology*, *103*(5, Part 1), 851-859.

Creinin, M. D., Schreiber, C. A., Bednarek, P., Lintu, H., Wagner, M. S., & Meyn, L. A. (2007). Mifepristone and misoprostol administered simultaneously versus 24 hours apart for abortion: a randomized controlled trial. *Obstetrics & Gynecology, 109*(4), 885-894.

Markovitch, O., Tepper, R., Klein, Z., Fishman, A., & Aviram, R. (2006). Sonographic appearance of the uterine cavity following administration of mifepristone and misoprostol for termination of pregnancy. *Journal of Clinical Ultrasound*, *34*(6), 278-282.

Parashar, P., Iversen, O. E., Midbøe, G., Myking, O., & Bjørge, L. (2007). Medical abortion in the first trimester: The use of serum hCG and endometrial thickness as markers of completeness. *European Journal of Contraception and Reproductive Health Care*, *12*(4), 366-371.

Reeves, M., Fox, M., Lohr, P., & Creinin, M. (2009). Endometrial thickness following medical abortion is not predictive of subsequent surgical intervention. *Ultrasound in Obstetrics & Gynecology*, *34*(1), 104-109.

Reeves, M. F., Kudva, A., & Creinin, M. D. (2008). Medical abortion outcomes after a second dose of misoprostol for persistent gestational sac. *Contraception*, *78*(4), 332-335.

Rørbye, C., Nørgaard, M., & Nilas, L. (2004). Prediction of late failure after medical abortion from serial β-hCG measurements and ultrasonography. *Human Reproduction*, *19*(1), 85-89.

Tzeng, C.R., Hwang, J.L., Au, H.K., & Chien, L.W. (2013). Sonographic patterns of the endometrium in assessment of medical abortion outcomes. *Contraception*, *88*(1), 153-9.

Von Hertzen, H., Piaggio, G., Wojdyla, D., Marions, L., My Huong, N., Tang, O., Mittal, S. (2009). Two mifepristone doses and two intervals of misoprostol administration for termination of early pregnancy: a randomised factorial controlled equivalence trial. *BJOG: An International Journal of Obstetrics and Gynaecology*, *116*(3), 381-389.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems (2nd ed.)*. Geneva: World Health Organization.

Winikoff, B., Dzuba, I. G., Creinin, M. D., Crowden, W. A., Goldberg, A. B., Gonzales, J., . . . Shannon, C. S. (2008). Two distinct oral routes of misoprostol in mifepristone medical abortion: a randomized controlled trial. *Obstetrics & Gynecology*, *112*(6), 1303-1310.

First-trimester medical abortion with mifepristone and misoprostol or misoprostol only: Risk of fetal malformations

Recommendation:

Exposure to mifepristone alone has not been shown to cause fetal malformations. Exposure to misoprostol, whether in a combined or misoprostol-only regimen, carries a small increased risk of malformations if the woman has an ongoing pregnancy and decides not to terminate. Women with an ongoing pregnancy after using misoprostol should be counseled about the risk if they choose to carry the pregnancy to term.

Strength of recommendation: Strong

Quality of evidence:

Mifepristone: Very low
Misoprostol: Moderate

Last reviewed: October 24, 2015

Background

The expected rate of fetal malformations in the general population is approximately 3% (Dolk, Loane, & Garne, 2010). Exposure to certain medications, infections, radiation or drugs of abuse during embryonic or fetal development may result in an increased risk of malformations if the pregnancy continues.

Mifepristone

Mifepristone exposure may occur if a woman changes her mind and does not take misoprostol after taking mifepristone. Data on continuing pregnancy after mifepristone exposure without misoprostol are limited. The largest prospective study of 46 women continuing a pregnancy after mifepristone only resulted in eight miscarriages and two major malformations in the pregnancies that continued (5.3%). Both malformations were not thought to be related to mifepristone exposure but may have been a result of other medical conditions (Bernard et al., 2013).

Misoprostol

The association between misoprostol and congenital anomalies is better established. Case reports, cohort studies (da Silva Dal Pizzol, Tierling, Schüler-Faccin, Sanseverino, & Mengue, 2005; Vauzelle, Beghin, Cournot, & Elefant, 2013) and case-control studies (da Silva Dal Pizzol, Knop, & Mengue, 2006) show that the incidence of malformations peaks if misoprostol is used between 5-8 weeks after a woman's last menstrual period (LMP) and is not associated with anomalies after 13 weeks LMP (Philip, Shannon, & Winikoff, 2002). The most typical malformations associated with misoprostol use are Möbius sequence, a rare disorder of cranial nerve palsies associated with limb anomalies and craniofacial defects, and terminal transverse limb defects (da Silva Dal Pizzol et al., 2006). Although not clearly established, the proposed mechanism is vascular disruption from uterine contractions leading to disordered fetal development (Gonzalez et al., 2005; Shepard, 1995).

A systematic review of four case-control studies with 4,899 cases of congenital anomalies and 5,742 controls showed an increased rate of misoprostol exposure in cases with anomalies (da Silva Dal Pizzol et al., 2006). Misoprostol exposure was 25 times more likely in cases with Möbius sequence and 12 times more likely with terminal transverse limb defects. A prospective follow-up study comparing women who used misoprostol before 12 weeks of pregnancy to women who used antihistamines showed that the rate of fetal malformations was higher in the 236 pregnancies exposed to misoprostol (4%) than in 255 controls (1.8%) although the finding was not statistically significant (Vauzelle et al., 2013). Three malformations (2%) in the misoprostol group were consistent with misoprostol-related anomalies.

Although the rate of misoprostol exposure is higher in children born with characteristic defects such as Möbius sequence, the anomalies are so rare that the overall risk is low that a woman who takes misoprostol in the first trimester and carries a pregnancy to term will have a child born with a malformation related to misoprostol exposure. A woman's risk of a malformation related to misoprostol exposure is less than 10 per 1,000 exposures (Philip et al., 2002).

Young women

This recommendation is the same for young women.

References

Bernard, N., Elefant, E., Carlier, P., Tebacher, M., Barjhoux, C., Bos-Thompson, M., Vial, T. (2013). Continuation of pregnancy after first-trimester exposure to mifepristone: an observational prospective study. *BJOG: An International Journal of Obstetrics & Gynaecology*.

da Silva Dal Pizzol, T., Knop, F. P., & Mengue, S. S. (2006). Prenatal exposure to misoprostol and congenital anomalies: systematic review and meta-analysis. *Reproductive Toxicology*, *22*(4), 666-671.

da Silva Dal Pizzol, T., Tierling, V. L., Schüler-Faccin, L., Sanseverino, M. T. V., & Mengue, S. S. (2005). Reproductive results associated with misoprostol and other substances utilized for interruption of pregnancy. *European Journal of Clinical Pharmacology*, *61*(1), 71-72.

Dolk, H., Loane, M., & Garne, E. (2010). The prevalence of congenital anomalies in Europe. *Rare Diseases Epidemiology*, 349-364.

Gonzalez, C. H., Vargas, F. R., Perez, A. B. A., Kim, C., Brunoni, D., Marques-Dias, M. J., de Almeida, J. C. C. (2005). Limb deficiency with or without Möbius sequence in seven Brazilian children associated with misoprostol use in the first trimester of pregnancy. *American Journal of Medical Genetics*, *47*(1), 59-64.

Philip, N. M., Shannon, C., & Winikoff, B. (2002). *Misoprostol and teratogenicity: reviewing the evidence.* New York: Population Council.

Shepard, T. H. (1995). Möbius syndrome after misoprostol: a possible teratogenic mechanism. *The Lancet*, *346*(8977), 780.

Vauzelle, C., Beghin, D., Cournot, M.-P., & Elefant, E. (2013). Birth defects after exposure to misoprostol in the first trimester of pregnancy: prospective follow-up study. *Reproductive Toxicology*, *36*, 98-103.

Misoprostol product quality

Recommendation:

Because different misoprostol products have varying quality and can degrade over time, providers should track medical abortion success rates to ensure that they are using an effective product. Providers should store misoprostol in a cool dry place.

Strength of recommendation: Strong

Quality of evidence: Low

Last reviewed: October 21, 2015

Background

With the increasing use of misoprostol for reproductive health indications, there are concerns about the quality of misoprostol products. If misoprostol degrades, it may lead to decreased success rates with medical abortion and unsuccessful treatment of incomplete abortion and postpartum hemorrhage. A technical memo distributed by Pathfinder International reported that Misotac, a brand of misoprostol manufactured by Sigma, was recalled because batches of the medicine had degraded and no longer contained a sufficient amount of the active ingredient (Pathfinder, 2011).

Differences in quality related to manufacturing

There are at least 30-40 manufacturers of misoprostol worldwide and some manufacturers subcontract, which makes it difficult to enforce Good Manufacturing Practice and ensure quality across all brands (Hall, 2011). Although misoprostol is thought to be stable at normal room temperature, the active pharmaceutical ingredient (misoprostol oil) used in manufacturing must be stored below -20°C. Thus, exposure to heat and humidity during manufacturing, packaging and storage may compromise the quality of misoprostol (Cayman Chemical, 2012).

A 2011 study analyzed 76 misoprostol samples from countries all over the world (Hall, 2011). Two types of misoprostol contained the drug diclofenac and were excluded from analysis. When the remaining 74 samples were tested for content and purity, eight of the 200mcg tablets contained less than 40mcg of active ingredient. The analysis found that three factors influenced misoprostol integrity: 1) impact of moisture at all stages 2) manufacture and quality of the active pharmaceutical ingredient and 3) packaging. Misoprostol that was packaged in double-aluminum blister packs (aluminum on top and bottom) was found to retain the most active ingredient.

Misoprostol brands that have been approved by the European Union or the United States Food and Drug Administration are known to conform to Good Manufacturing Practice and are high quality. The United Nations Population Fund (UNFPA) has added misoprostol to its list of commodities which are available through long-term agreement. UNFPA is committed to procuring products which meet specified requirements and standards, according to internationally recognized quality standards.

Clinic use and storage

Even misoprostol manufactured in high-quality conditions and packaged well can become inactive if it is shipped or stored in conditions that expose it to heat or humidity for prolonged periods of time. There have not been large field studies on the stability of misoprostol in tropical climates, but laboratory studies show that misoprostol is less stable when exposed to moisture or heat (Chu, Wang, Pang, & Rogers, 2007; WHO, 2009). Even in normal room temperature conditions (25°C and 60% humidity), when providers cut blister packs to distribute tablets, if the packaging on the remaining stored tablets is inadvertently opened, the tablets' potency degrades within 48 hours and continues to degrade over time (Berard et al., 2014).

Quality assurance

If providers notice a sudden decrease in medical abortion success rates from expected baseline, they should discard the lot of misoprostol being used and start a new lot. Providers should consult with each other to determine which local misoprostol brands are most effective. Store misoprostol in dry conditions at temperatures at or below 25°C (77°F) (Pfizer, 2002).

References

Berard, V., Fiala, C., Cameron, S., Bombas, T., Parachini, M., Gemzell-Danielsson, K. (2014). Instability of misoprostol tablets stored outside the blister: a potential serious concern for clinical outcome in medical abortion. *Public Library of Science ONE, 9*(12), e112401.

Cayman Chemical. (2012). Product Information: Misoprostol. Retrieved November 14, 2012, from https://www.caymanchem.com/pdfs/13820.pdf

Chu, K. O., Wang, C. C., Pang, C. P., & Rogers, M. S. (2007). Method to determine stability and recovery of carboprost and misoprostol in infusion preparations. *Journal of Chromatography B*, *857*(1), 83-91.

Hall, P. (2011). What do we know about the quality of misoprostol products? Proceedings from *Reproductive Health Supplies Coalition Membership Meeting* 2011. Addis Ababa, Ethiopia.

Pathfinder. (2011). Action on Misoprostol: Pathfinder International Technical Memo 1(4).

Pfizer. (2002). Cytotec product label. Retrieved January 8, 2015, from http://www.pfizer.com/files/products/ppi_cytotec.pdf

United Nations Population Fund. (2015). Procurement and Supply Chain web page. Retrieved from http://www.unfpa.org/public/home/procurement

World Health Organization. (2009). Application to include Misoprostol for prevention of postpartum haemorrhage in WHO Model List of Essential Medicines: Comments from Departments of Making Pregnancy Safer & Reproductive Health and Research. Retrieved from http://www.who.int/selection_medicines/committees/expert/17/application/WHO_Misoprostol.pdf

First-trimester medical abortion with mifepristone and misoprostol: Success and complication rates

Key information:

A combined regimen of mifepristone and misoprostol is effective and safe, with success rates of over 95% and complication rates of less than 1%.

Quality of evidence: High

Last reviewed: October 26, 2015

Background

The most robust data on safety and efficacy of medical abortion come from large studies done in multiple high-volume health centers with experienced providers using ultrasound (Gatter, Cleland, & Nucatola, 2015; Cleland, Creinin, Nucatola, Nshom, & Trussell, 2013; Goldstone, Michelson, & Williamson, 2012). Settings with lower volume and new or inexperienced providers may have different results.

Success of medical abortion

Medical abortion success is defined as a complete abortion that needs no further intervention. A 2015 systematic review reported data from 20 studies with a total of 33,846 women undergoing medical abortion through 70 days gestation (Chen & Creinin, 2015). The overall efficacy of mifepristone followed by buccal misoprostol was 96.7% and the continuing pregnancy rate was 0.8% in the approximately 33,000 pregnancies through 63 days gestation. The efficacy rate for the 332 women with pregnancies between 64-70 days gestation was 93.1%, and the continuing pregnancy rate was 2.9%.

Complication rates

A review of 233,815 medical abortions under nine weeks done at private clinics in the United States from 2009-2010 with mifepristone and buccal misoprostol found a complication rate of 0.65% (Cleland et al., 2013). In this study, complications included both serious outcomes—such as ongoing pregnancy or an unrecognized ectopic pregnancy—and serious adverse events such as transfer, hospitalization, intravenous antibiotics, blood transfusion and death; the need for an outpatient repeat procedure was not tracked or included in the complication rate. The most common complication was ongoing pregnancy affecting 0.5% of the study population. The rate of serious adverse events was 0.16%. There was only one death in a woman with an undiagnosed ectopic pregnancy, thereby producing a mortality rate of 0.4 per 100,000 medical abortion procedures.

A large retrospective U.S. cohort study of 11,319 first-trimester medical abortions evaluated all complications from abortions provided in the state of California from 2009-2010 (Upadhyay et al., 2015). Uniquely, researchers were able to assess complications arising at the time of the abortion, as well as complications diagnosed when patients sought additional care from sites other than the site where the abortion was provided, such as emergency departments. The overall rate of complications during the six weeks following medical abortion was 5.2%; only 0.3% were major complications—defined as requiring hospitalization, surgery

or blood transfusion. Complications included incomplete abortion (0.87%), failed abortion (0.13%), hemorrhage (0.14%), infection (0.23%) and undetermined/other (3.82%).

Young women

Young women and adolescents have similar or higher success rates compared to older women and similar or lower complication rates (Niinimäki et al., 2011).

Complications by study

	Goldstone, 2012	**Cleland, 2013**	**Gatter, 2015**
Number of women	13,345	233,805	13,373
Location / Organization	MSI Australia	Planned Parenthood USA	Planned Parenthood USA
Time period	2009-2011	2009-2010	2006-2011
Incomplete abortion requiring aspiration	2.9%	Not reported	2.3%
Unrecognized ectopic pregnancy	Not reported	0.007%	Not reported
Ongoing pregnancy	0.6%	0.5%	0.5%
Transfusion	0.08%	0.05%	0.03%
Infection	0.03%	0.02%	0.01%
Death	0.007% (1 death from infection)	0.0004% (1 death from unrecognized ectopic pregnancy)	No deaths

References

Chen, M.J., Creinin, M.D. (2015). Mifepristone with buccal misoprostol for medical abortion: a systematic review. *Obstetrics & Gynecology*, 126(1), 12-21.

Cleland, K., Creinin, M. D., Nucatola, D., Nshom, M., & Trussell, J. (2013). Significant Adverse Events and Outcomes After Medical Abortion. *Obstetrics & Gynecology*, *121*(1), 166-171.

Gatter, M., Cleland, K., & Nucatola, D. L. (2015). Efficacy and safety of medical abortion using mifepristone and buccal misoprostol through 63 days. *Contraception, 91*(4), 269-73.

Goldstone, P., Michelson, J., & Williamson, E. (2012). Early medical abortion using low-dose mifepristone followed by buccal misoprostol: a large Australian observational study. *Medical Journal of Australia*, *197*(5), 282.

Niinimäki, M., Suhonen, S., Mentula, M., Hemminki, E., Heikinheimo, O., & Gissler, M. (2011). Comparison of rates of adverse events in adolescent and adult women undergoing medical abortion: population register based study. *BMJ: British Medical Journal*, *342*.

Upadhyay, U. D., Desai, S., Zlidar, V., Weitz, T. A., Grossman, D., Anderson, P., & Taylor, D. (2015). Incidence of emergency department visits and complications after abortion. *Obstetrics & Gynecology, 125*(1), 175-183.

First-trimester medical abortion with mifepristone and misoprostol: Recommended regimen

Key information:

- **Up to nine weeks gestation:** Mifepristone 200mg orally followed 24-48 hours later by misoprostol 800mcg buccally, sublingually or vaginally.
- **9-10 weeks gestation:** Mifepristone 200mg orally followed 24-48 hours later by misoprostol 800mcg buccally.
- **10-13 weeks gestation:** Mifepristone 200mg orally followed 36-48 hours later by misoprostol 800mcg vaginally then 400mcg vaginally or sublingually every three hours for a maximum of five doses of misoprostol.

Strength of recommendation: Strong

Quality of evidence:

- **Up to nine weeks gestation: High**
- **9-10 weeks gestation: Moderate**
- **10-13 weeks gestation: Low**

Last reviewed: October 28, 2015

Up to nine weeks

Multiple randomized controlled clinical trials have shown that the combination of mifepristone and misoprostol is an effective medical abortion regimen with success rates ranging from 95-98% (Chen & Creinin, 2015; Kulier et al., 2011; Raymond, Shannon, Weaver, & Winikoff, 2012). Vaginal, buccal and sublingual misoprostol are more effective than oral misoprostol (Kulier et al., 2011). Buccal dosing (Middleton et al., 2005) and sublingual dosing (Tang, Lau, Ng, Lee, & Ho, 2003; von Hertzen et al., 2010) have higher rates of gastrointestinal side effects than vaginal dosing. Sublingual dosing is associated with more side effects than buccal dosing (Chai, Wong, & Ho, 2013). In some settings, buccal or sublingual dosing may be preferred due to infection prevention (Fjerstad et al., 2009), legal restrictions or a woman's preference.

Although effective, 400mcg of sublingual misoprostol (instead of the recommended 800mcg) following mifepristone is associated with higher rates of incomplete abortion and ongoing pregnancy (von Hertzen et al., 2010; Raghavan et al., 2013; Bracken et al., 2014), and therefore should not be substituted for the 800mcg dose. Lower doses of mifepristone and misoprostol for use in very early pregnancy are under investigation (Li et al., 2015).

9-10 weeks

Rapidly evolving evidence confirms the safety and efficacy of medical abortion between 9-10 weeks gestation. A 2015 review reports data from six medical abortion studies which included 928 women with gestations between 64-70 days and 1,163 with gestations from 57-63 days (Abbas, Chong, & Raymond, 2015). Although regimens varied between studies—200mg mifepristone followed by 800mcg buccal, 800mcg vaginal or 400mcg sublingual misoprostol—there was no difference in success rates between the two gestational groups (93.9% at 57-63 days

compared to 92.3% at 64-70 days). Further, there were no differences in serious adverse events, such as hospital admissions or transfers, between the groups (0.7% and 0.5% respectively).

10-13 weeks

A cohort study of 1,076 women showed a combination of mifepristone and repeat doses of misoprostol is safe and effective between 9-13 weeks (Hamoda, Ashok, Flett, & Templeton, 2005). All women took misoprostol in the health facility. The success rate for this regimen was high at 95.8%, with a low rate of serious adverse events. Repeat dosing of misoprostol has been shown to increase the efficacy of second-trimester medical abortion and may be used for women in the late first trimester (Wildschut et al., 2011).

Young women

This recommendation is the same for young women.

References

Chai, J., Wong, C. Y. G., & Ho, P. C. (2013). A randomized clinical trial comparing the short-term side effects of sublingual and buccal routes of misoprostol administration for medical abortions up to 63 days' gestation. *Contraception, 87*(4), 480-485.

Chen, M. J., & Creinin, M. D. (2015). Mifepristone with buccal misoprostol for medical abortion: a systematic review. *Obstetrics & Gynecology, 126*(1), 12-21.

Fjerstad, M., Sivin, I., Lichtenberg, E. S., Trussell, J., Cleland, K., & Cullins, V. (2009). Effectiveness of medical abortion with mifepristone and buccal misoprostol through 59 gestational days. *Contraception, 8*0(3), 282-286.

Hamoda, H., Ashok, P. W., Flett, G. M., & Templeton, A. (2005). Medical abortion at 9-13 weeks' gestation: a review of 1076 consecutive cases. *Contraception, 71*(5), 327-332.

Kulier, R., Kapp, N., Gulmezoglu, A. M., Hofmeyr, G. J., Cheng, L., & Campana, A. (2011). Medical methods for first trimester abortion. The Cochrane Database of Systematic Reviews (11), CD002855.

Li, C., Chen, D., Song, L., Wang, Y., Zhang, Z., Liu, M., & Chen, W. (2015). Effectiveness and safety of lower doses of mifepristone combined with misoprostol for the termination of ultra-early pregnancy: a dose-ranging randomized controlled trial. *Reproductive Sciences, 22*(6), 706-11.

Middleton, T., Schaff, E., Fielding, S. L., Scahill, M., Shannon, C., Westheimer, E., & Winikoff, B. (2005). Randomized trial of mifepristone and buccal or vaginal misoprostol for abortion through 56 days of last menstrual period. *Contraception, 72*(5), 328-332.

Raghavan, S., Tesereteli, T., Kamilov, A., Kurbanbekova, D., Yusupov, D., Kasimova, F., Jymagylova, D., Winikoff, B. (2013). Acceptability and feasibility of the use of 400mcg of sublingual misoprostol after mifepristone for medical aboriton up to 63 days since the last menstrual period: evidence from Uzbekistan. *The European Journal of Contraception and Reproductive Health Care,* 18:104-111.

Raymond, E. G., Shannon, C., Weaver, M. A., & Winikoff, B. (2012). First-trimester medical abortion with mifepristone 200 mg and misoprostol: a systematic review. *Contraception, 87*(1), 26-37.

Tang, O.S., Chan, C.C.W., Ng, E., Lee, S.W.H., Ho, P.C. (2003) A prospective, randomized, placebo-controlled trial on the use of mifepristone with sublingual or vaginal misoprostol for medical abortions of less than 9 weeks gestation. *Human Reproduction*, 18, 2315–8.

von Hertzen, H., Huong, N. T., Piaggio, G., Bayalag, M., Cabezas, E., Fang, A. H., & Peregoudov, A. (2010). Misoprostol dose and route after mifepristone for early medical abortion: a randomised controlled noninferiority trial. *BJOG: An International Journal of Obstetrics & Gynaecology*, 117(10), 1186-1196.

Wildschut, H., Both, M. I., Medema, S., Thomee, E., Wildhagen, M. F., & Kapp, N. (2011). Medical methods for mid-trimester termination of pregnancy. The Cochrane Database of Systematic Reviews (1), CD005216.

First-trimester medical abortion with mifepristone and misoprostol: Contraindications and precautions

Key information:

Contraindications:

- Previous allergic reaction to one of the drugs involved
- Inherited porphyria
- Chronic adrenal failure
- Known or suspected ectopic pregnancy

Precautions:

- IUD in place. Evaluate for the presence of ectopic pregnancy. If none, remove the IUD.

- Severe uncontrolled asthma or long-term corticosteroid therapy. No evidence exists regarding use of mifepristone in steroid-dependent women. Providers must use clinical judgment if no other alternatives to safe abortion exist. Increase steroid dose for 3-4 days and monitor the woman very closely. Conditions such as poorly controlled asthma may still be worsened.

- Severe/unstable health problems including but not limited to hemorrhagic disorders, heart disease, and severe anemia. No evidence exists on the use of medical abortion in women with hemorrhagic disorder, heart disease, severe anemia or severe/unstable health problems. Whether to provide medical abortion to women with these conditions will depend on the available options for safe abortion care, referrals, and clinical judgment. If medical abortion is provided, it should be given under close observation.

Strength of recommendation: Moderate

Quality of evidence: Graded for each specific contraindication or precaution below

Last reviewed: October 26, 2015

Definitions

Contraindications: If a woman has these specific conditions, under no circumstances should she be offered medical abortion with mifepristone and misoprostol. Vacuum aspiration should be considered or she should be referred to a facility where she can be offered alternate care.

Precautions: If a woman has these specific conditions, medical abortion with mifepristone and misoprostol has higher risks than normal. The risks, benefits and alternatives to medical abortion must be considered. Medical abortion provision may require a higher degree of clinical judgment, skill and monitoring. Referral to a higher-level facility may be appropriate.

Quality of evidence:

Contraindications

Previous allergic reaction to one of the drugs involved: Allergic reactions have been reported after the use of mifepristone and misoprostol (Hauseknecht, 2003; Schoen, 2014). *Quality of evidence: High*

Inherited porphyria: Porphyrias are rare metabolic disorders in which enzymes in heme are deficient. Theoretically, mifepristone could exacerbate porphyria (Ventura et al., 2009). *Quality of evidence: Low. No human studies exist, but animal models exhibit the effect of mifepristone* (Cable et al., 1994).

Chronic adrenal failure: Mifepristone is a glucocorticoid receptor antagonist (Spitz & Bardin, 1993). Mifepristone blocks negative feedback mechanisms that control cortisol secretion. In women with adrenal insufficiency on long-term corticosteroid therapy, mifepristone exposure may exacerbate the underlying condition (Sitruk-Ware & Spitz, 2003). *Quality of evidence: Low. There are no data on mifepristone use in pregnant women with adrenal insufficiency, but there is experimental and animal data to support the recommendation.*

Known or suspected ectopic pregnancy: Mifepristone and misoprostol do not treat ectopic pregnancy, and use of the medications may delay diagnosis of this life-threatening condition. *Quality of evidence: High*

Precautions

IUD in place: A woman who is pregnant with an IUD in place is at significantly elevated risk of ectopic pregnancy (Barnhart, 2009). The woman must be evaluated for the presence of ectopic pregnancy. If negative, the IUD should be removed before starting medical abortion due to the theoretical risk of uterine perforation from contractions during medical abortion and the potential risk of infection (Danco, 2010; Davey, 2006). *Quality of evidence: Low. There are no studies to verify whether having an IUD in place poses actual risks during medical abortion*.

Severe uncontrolled asthma or long-term corticosteroid therapy: Mifepristone is a glucocorticoid receptor antagonist (Spitz & Bardin, 1993). Mifepristone blocks negative feedback mechanisms that control cortisol secretion. In women on long-term corticosteroid therapy for severe or uncontrolled asthma, mifepristone exposure may exacerbate the underlying condition (Sitruk-Ware & Spitz, 2003). There are no direct studies of medical abortion among women on corticosteroid treatment, but one review suggested that increasing the dose of the steroid medications can counteract the cortisol blunting effect of mifepristone (Davey, 2006). For most conditions, adjusting the dose of corticosteroid medications after mifepristone administration and careful monitoring may allow for medical abortion.

Medical abortion in asthmatic women requiring systemic corticosteroids has not been studied. One review suggests using a high level of caution when giving mifepristone to such women and only doing so if the asthma is well controlled (Davey, 2006). The glucocorticoid dose should be increased for several days before and after mifepristone. Other experts recommend that women with severe, poorly controlled asthma who are on long-term corticosteroids not take mifepristone due to the life-threatening nature of acute asthma exacerbation (Christin-Maitre et al., 2000; Creinin & Gemzell Danielsson, 2009; Sitruk-Ware, 2006). Giving mifepristone to such women risks exacerbating asthma.

Inhaled corticosteroids for asthma are not systemically absorbed and are not a contraindication to mifepristone. Some experts recommend that mifepristone and misoprostol should be available to women with asthma as long

as they are not on long-term systemic steroids (Creinin & Gemzell Danielsson, 2009). *Quality of evidence: Moderate*

Severe medical problems: Medical abortion studies tend to exclude women with severe anemia or severe medical problems (Christin-Maitre et al., 2000; Sitruk-Ware & Spitz, 2003). Whether to provide medical abortion to women with these conditions will depend on clinical judgment, monitoring and options available for safe abortion care. *Quality of evidence: Low*

Young women

This information is the same for young women.

References

Barnhart, K. T. (2009). Clinical practice. Ectopic pregnancy. *New England Journal of Medicine*, *361*(4), 379-387.

Cable, E. E., Pepe, J. A., Donohue, S. E., Lambrecht, R. W., & Bonkovsky, H. L. (1994). Effects of mifepristone (RU-486) on heme metabolism and cytochromes P-450 in cultured chick embryo liver cells, possible implications for acute porphyria. *European Journal of Biochemistry*, *225*(2), 651-657.

Christin-Maitre, Sophie, Philippe Bouchard and Irving M. Spitz. (2000). Medical termination of pregnancy. *New England Journal of Medicine*. *342*(13), 946-956.

Creinin, M. & Gemzell Danielsson K. (2009). Medical abortion in early pregnancy. In M. Paul, E. S. Lichtenberg, L. Borgatta, D. A. Grimes, P. G. Stubblefield & M. D. Creinin (Eds.), *Management of unintended and abnormal pregnancy*. West Sussex UK: Wiley-Blackwell.

Danco Laboratories, LLC. (2010). Mifeprex® Prescribing Information. Retrieved from: http://earlyoptionpill.com/section/health_professionals/prescribing_information/

Davey, A. (2006). Mifepristone and prostaglandin for termination of pregnancy: contraindications for use, reasons, and rationale. *Contraception, 74*(1), 16-20.

Hausknecht, R. (2003). Mifepristone and misoprostol for early medical abortion: 18 months experience in the United States. *Contraception*, *67*(6), 463-465.

Schoen, C., Campbell, C., Maratas, A., & Cheung, K. (2014). Anaphylaxis to buccal misoprostol for labor induction. *Obstetrics & Gynecology*, *124*(2, Part 2, Supplement 1), 466-468.

Sitruk-Ware, R. (2006). Mifepristone and misoprostol sequential regimen side effects, complications and safety. *Contraception*, *74*(1), 48-55.

Sitruk-Ware, R. & Spitz, I. M. (2003). Pharmacological properties of mifepristone: toxicology and safety in animal and human studies*. Contraception, 68*(6), 409-20.

Spitz, I. M. & Bardin, C. W. (1993). Mifepristone (RU-486)—A modulator of progestin and glucocorticoid action. *New England Journal of Medicine, 329*(6), 404-12.

Ventura, P., Cappellini M. D., & Rochi, E. (2009). The acute porphyrias: a diagnostic and therapeutic challenge in internal and emergency medicine. *Internal and Emergency Medicine*, *4*(4), 297-308.

First-trimester medical abortion with mifepristone and misoprostol: Confirmation of success

Recommendation:

- Most women can confirm a successful medical abortion with mifepristone and misoprostol.
- Providers may perform a clinical assessment to assist in the confirmation of successful abortion.
- Ultrasound or other testing is needed only in cases where the diagnosis is unclear.

Strength of recommendation: Strong

Quality of evidence: Moderate

Last reviewed: October 31, 2015

Woman's assessment of successful abortion

Evidence indicates that women can accurately determine when their medical abortion is successful—that is whether pregnancy expulsion has occurred. In studies comparing women's assessments of expulsion to those made by clinicians (Cameron et al., 2012; Perriera et al., 2010; Clark et al., 2010; Rossi, 2004) and by ultrasound (Rossi, 2004), particularly when standardized questions are used (Perriera et al., 2010; Clark et al., 2010; Cameron et al., 2012), women have repeatedly proven themselves to be nearly as accurate as both. The World Health Organization (WHO) has determined that routine follow-up after medical abortion with mifepristone and misoprostol in not required (2012).

Clinical assessment

Providers may help confirm successful abortion at a follow-up visit by reviewing a patient history and performing a bimanual exam if indicated. In three studies comparing clinical assessment to ultrasound (Perreira et al., 2010; Rossi et al., 2004; Pymar et al., 2001), clinicians were able to determine pregnancy expulsion with high levels of accuracy.

Ultrasound

Ultrasound can be used to confirm successful abortion but is not necessary and can add to the cost and complexity of medical abortion (Kaneshiro, Edelman, Sneeringer, & Ponce de Leon, 2011). Ultrasound is helpful in cases where there is doubt about whether the abortion has been successful.

Serum pregnancy testing

Serum pregnancy testing has been used as an alternative to ultrasound to diagnose successful medical abortion and compares favorably to ultrasound in reducing interventions at the time of follow-up (Clark, Panton, Hann, & Gold, 2007; Dayananda, Maurer, Fortin, & Goldberg, 2013; Fiala, Safar, Bygdeman, & Gemzell-Danielsson, 2003). Serum pregnancy testing is only useful when a pre-treatment hCG has been obtained for comparison. The utility of serum pregnancy testing is low in areas where access to laboratory testing is limited.

Urine pregnancy testing

A negative urine pregnancy test is usually reassuring that an abortion has been successful; however, it is rare, but does occur, that a pregnancy test is negative but a woman is still pregnant (false negative). Both high-sensitivity and low-sensitivity urine pregnancy tests can have positive results even when the medical abortion has been successful (false positive) (Cameron et al., 2012; Clark et al., 2010; Godfrey, Anderson, Fielding, Meyn, & Creinin, 2007; Perriera et al., 2010). Use of low-sensitivity (Iyengar et al., 2015; Cameron et al., 2012)and semi-quantitative (Platais et al., 2015; Oppegaard et al., 2015; Ngoc et al., 2014; Blum et al., 2012; Lynd et al., 2013) urine pregnancy tests to confirm success of medical abortion is an area of active research.

Young women

This recommendation is the same for young women.

References

Blum, J., Shochet, T., Lynd, K., Lichtenberg, E. S., Fischer, D., Arnesen, M., Blumenthal, P. D. (2012). Can at-home semi-quantitative pregnancy tests serve as a replacement for clinical follow-up of medical abortion? A US study. *Contraception*, *86*(6), 757-62.

Cameron, S. T., Glasier, A., Dewart, H., Johnstone, A., & Burnside, A. (2012). Telephone follow-up and self-performed urine pregnancy testing after early medical abortion: a service evaluation. *Contraception*, *86*(1), 67-73.

Clark, W., Bracken, H., Tanenhaus, J., Schweikert, S., Lichtenberg, E. S., & Winikoff, B. (2010). Alternatives to a routine follow-up visit for early medical abortion*. Obstetrics & Gynecology*, *115*(2 Pt 1), 264-272.

Clark, W., Panton, T., Hann, L., & Gold, M. (2007). Medication abortion employing routine sequential measurements of serum hCG and sonography only when indicated. *Contraception*, *75*(2), 131-135.

Dayananda, I., Maurer, R., Fortin, J., & Goldberg, A. B. (2013). Medical abortion follow-up with serum human chorionic gonadotropin compared with ultrasonography: A randomized controlled trial. *Obstetrics & Gynecology, 121*(3), 607-613.

Fiala, C., Safar, P., Bygdeman, M., & Gemzell-Danielsson, K. (2003). Verifying the effectiveness of medical abortion; ultrasound versus hCG testing. *European Journal of Obstetrics Gynecology and Reproductive Biology, 109*(2), 190-195.

Godfrey, E. M., Anderson, A., Fielding, S. L., Meyn, L., & Creinin, M. D. (2007). Clinical utility of urine pregnancy assays to determine medical abortion outcome is limited. *Contraception*, *75*(5), 378-382.

Grossman, D., & Grindlay, K. (2011). Alternatives to ultrasound for follow-up after medication abortion: a systematic review. *Contraception, 83*(6), 504-510.

Iyengar, K., Paul, M., Iyengar, S. D., Klingberg-Allvin, M., Essen, B., Bring, J., Soni, S., & Gemzell-Danielsson, K. (2015). Self-assessment of the outcome of early medical abortion vs. clinic follow-up in India: a randomised, controlled, non-inferiority trial. *Lancet Global Health*, *3*(9), e537-545.

Jackson, A. V., Dayananda, I., Fortin, J. M., Fitzmaurice, G., & Goldberg, A. B. (2012). Can women accurately assess the outcome of medical abortion based on symptoms alone? *Contraception*, *85*(2), 192-197.

Kaneshiro, B., Edelman, A., Sneeringer, R. K., & Ponce de Leon, R. G. (2011). Expanding medical abortion: can medical abortion be effectively provided without the routine use of ultrasound? *Contraception*, *83*(3), 194-201.

Lynd, K., Blum, J., Ngoc, N. T. N., Shochet, T., Blumenthal, P. D., & Winikoff, B. (2013). Simplified medical abortion using a semi-quantitative pregnancy test for home-based follow-up. *International Journal of Gynecology & Obstetrics*, *121*(2), 144-148.

Ngoc, N. T. N., Bracken, H., Blum, J., Nga, N. T. B., Minh, N. H., van Nhang, N., Lynd, K., Winikoff, B., & Blumenthal, P. (2014). Acceptability and feasibility of phone follow-up after early medical abortion in Vietnam: a randomized controlled trial. *Obstetrics & Gynecology*, *123*(1), 88-95.

Oppegaard, K. S., Qvigstad, R., Fiala, C., Heikinheimo, O., Benson, L., & Gemzell-Danielsson, K. (2015). Clinical follow-up compared with self-assessment of outcome after medical abortion: a multicentre, non-inferiority, randomised, controlled trial. *Lancet*, *385*(9969), 698-704.

Perriera, L. K., Reeves, M. F., Chen, B. A., Hohmann, H. L., Hayes, J., & Creinin, M. D. (2010). Feasibility of telephone follow-up after medical abortion. *Contraception*, *81*(2), 143-149.

Platais, I., Tsereteli, T., Comendant, R., Kurbanbekova, D., & Winikoff, B. (2015). Acceptability and feasibility of phone follow-up with a semiquantitative urine pregnancy test after medical abortion in Moldova and Uzbekistan. *Contraception*, *91*(2), 178-183.

Pymar H, MD Creinin, JL Schwartz. (2001). Mifepristone followed on the same day by vaginal misoprostol for early abortion. *Contraception, 64*, 87-92.

Rossi, B., Creinin, M. D., & Meyn, L. A. (2004). Ability of the clinician and patient to predict the outcome of mifepristone and misoprostol medical abortion. *Contraception*, *70*(4), 313-317.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

First-trimester medical abortion with misoprostol only: Recommended regimen

Recommended regimen up to 13 weeks:

Dose	Route	Timing
Misoprostol 800mcg (4 200mcg pills)	Vaginal	Every 3-12 hours for a maximum of 3 doses
Misoprostol 800mcg (4 200mcg pills)	Sublingual	Every 3 hours for a maximum of 3 doses

Strength of recommendation: Strong

Quality of evidence:

- Up to nine weeks: Moderate
- 9-13 weeks: Low

Last reviewed: October 24, 2015

Success of misoprostol-only medical abortion

The success rate of medical abortion with misoprostol only is around 85% (von Hertzen et al., 2007). Misoprostol-only treatment should be considered when mifepristone is not available. In general, misoprostol-only regimens have higher rates of success at lower gestational age (von Hertzen et al., 2007; Zikopoulos et al., 2002), with higher numbers of doses (Carbonell, Varela, Velazco, Tanda, & Sanchez, 1999) and with a longer time period before provider follow-up to confirm abortion success (Bugalho, Mocumbi, Faundes, & David, 2000). However, women's satisfaction decreases the longer the abortion process lasts (Ngai, Tang, Chan, & Ho, 2000).

Misoprostol-only abortion up to nine weeks

The only multicenter randomized controlled trial to compare different misoprostol-only dosing intervals showed that complete abortion rates are equivalent when misoprostol is given vaginally every 3-12 hours or sublingually every three hours for three doses. Sublingual dosing had a higher incidence of side effects than vaginal dosing (von Hertzen et al., 2007).

Misoprostol-only abortion between 9-13 weeks

There is scant evidence to recommend an appropriate dosing regimen between 9-13 weeks. The only direct evidence for this gestational range comes from three small cohort studies where misoprostol 800mcg was given vaginally every 12 or 24 hours for up to three doses (Carbonell Esteve et al., 1998; Carbonell et al., 1999; Carbonell et al., 2001). However, there is strong evidence in randomized controlled trials of misoprostol-only in the early second trimester that support using a vaginal dosing interval of every three hours over 13 weeks (von Hertzen et al., 2009). Given the evidence supporting repeat doses of sublingual or vaginal misoprostol below nine and above 13 weeks, the evidence-based regimen for below nine weeks may be used between 9-13 weeks.

Young women

This recommendation is the same for young women.

References

Bugalho, A., Mocumbi, S., Faundes, A., & David, E. (2000). Termination of pregnancies of <6 weeks gestation with a single dose of 800 microg of vaginal misoprostol. *Contraception*, *61*(1), 47-50.

Carbonell Esteve, J. L., Varela, L., Velazco, A., Cabezas, E., Tanda, R., & Sanchez, C. (1998). Vaginal misoprostol for late first trimester abortion. *Contraception*, *57*(5), 329-333.

Carbonell, J. L., Varela, L., Velazco, A., Tanda, R., & Sanchez, C. (1999). Vaginal misoprostol for abortion at 10-13 weeks' gestation. *The European Journal of Contraception and Reproductive Health Care*, *4*(1), 35-40.

Carbonell, J. L., Velazco, A., Varela, L., Tanda, R., Sanchez, C., Barambio, S.,& Mari, J. (2001). Misoprostol for abortion at 9-12 weeks' gestation in adolescents. *The European Journal of Contraception and Reproductive Health Care*, *6*(1), 39-45.

Ngai, S. W., Tang, O. S., Chan, Y. M., & Ho, P. C. (2000). Vaginal misoprostol alone for medical abortion up to 9 weeks of gestation: efficacy and acceptability. *Human Reproduction*, *15*(5), 1159-1162.

von Hertzen, H., Piaggio, G., Huong, N. T., Arustamyan, K., Cabezas, E., Gomez, M., & Peregoudov, A. (2007). Efficacy of two intervals and two routes of administration of misoprostol for termination of early pregnancy: a randomised controlled equivalence trial. *The Lancet*, *369*(9577), 1938-1946.

von Hertzen, H., Piaggio, G., Wojdyla, D., Nguyen, T. M., Marions, L., Okoev, G.,& Peregoudov, A. (2009). Comparison of vaginal and sublingual misoprostol for second trimester abortion: randomized controlled equivalence trial. *Human Reproduction*, *24*(1), 106-112.

Zikopoulos, K. A., Papanikolaou, E. G., Kalantaridou, S. N., Tsanadis, G. D., Plachouras, N. I., Dalkalitsis, N. A., & Paraskevaidis, E. A. (2002). Early pregnancy termination with vaginal misoprostol before and after 42 days gestation. *Human Reproduction*, *17*(12), 3079-3083.

First-trimester medical abortion with misoprostol only: Contraindications and precautions

Recommendation:

Contraindications:

- Previous allergic reaction to misoprostol
- Known or suspected ectopic pregnancy

Precautions:

- Intrauterine device (IUD) in place. Evaluate for the presence of ectopic pregnancy. If none, remove the IUD.

- Severe/unstable health problems including but not limited to hemorrhagic disorders, heart disease and severe anemia. No evidence exists on the use of medical abortion in women with hemorrhagic disorder, heart disease, severe anemia or severe/unstable health problems. Whether to provide medical abortion to women with these conditions will depend on the available options for safe abortion care, referrals, and clinical judgment. If medical abortion is given, it should be under close observation.

Strength of recommendation: Moderate

Quality of evidence: Graded for each specific contraindication or precaution below.

Last reviewed: October 28, 2015

Definitions

Contraindications: If a woman has these specific conditions, under no circumstances should she be offered medical abortion with misoprostol only. Vacuum aspiration should be considered or she should be referred to a facility where she can be offered alternate care.

Precautions: If a woman has these specific conditions, medical abortion with misoprostol only has higher risks than normal. The risks, benefits and alternatives to medical abortion must be considered. Medical abortion provision may require a higher degree of clinical judgment, skill and monitoring. Referral to a higher-level facility may be appropriate.

Quality of evidence:

Contraindications

Previous allergic reaction to misoprostol: Very rare allergic reactions have been reported after the use of misoprostol (Schoen, 2014). *Quality of evidence: Low*

Known or suspected ectopic pregnancy: Misoprostol does not treat ectopic pregnancy and use of the medications may delay diagnosis of this life-threatening condition. *Quality of evidence: High*

Precautions

IUD in place: A woman who is pregnant with an IUD in place is at significantly elevated risk of ectopic pregnancy (Barnhart, 2009). The woman must be evaluated for the presence of ectopic pregnancy. If negative, the IUD should be removed before starting medical abortion due to the theoretical risk of uterine perforation from contractions during medical abortion and the potential risk of infection (Danco, 2010; Davey, 2006). There are no studies to verify whether having an IUD in place poses actual risks during medical abortion. *Quality of evidence: Low*

Severe/unstable health problems: Medical abortion studies tend to exclude women with severe anemia or severe medical problems (Christin-Maitre, Bouchard, & Spitz, 2000; Sitruk-Ware, 2006) Whether to provide medical abortion to women with these conditions will depend on clinical judgment, monitoring and options available for safe abortion care. *Quality of evidence: Low*

Young women

This recommendation is the same for young women.

References

Barnhart, K. T. (2009). Clinical practice. Ectopic pregnancy. *New England Journal of Medicine*, *361*(4), 379-387.

Christin-Maitre, S., Bouchard, P., & Spitz, I. M. (2000). Medical termination of pregnancy. *New England Journal of Medicine*, *342*(13), 946-956.

Danco. (2010). Mifeprex® Prescribing Information.

Davey, A. (2006). Mifepristone and prostaglandin for termination of pregnancy: contraindications for use, reasons and rationale. *Contraception*, *74*(1), 16-20.

Schoen, C., Campbell, C., Maratas, A., & Cheung, K. (2014). Anaphylaxis to buccal misoprostol for labor induction. *Obstetrics & Gynecology*, *124*(2, Part 2, Supplement 1), 466-468.

Sitruk-Ware, R. (2006). Mifepristone and misoprostol sequential regimen side effects, complications and safety. *Contraception*, *74*(1), 48-55.

Who has second-trimester abortions?

Key information:

Women who present for abortion in the second trimester of pregnancy tend to be younger, detect their pregnancy later, feel ambivalent about the abortion decision, and/or have financial and logistical barriers to care. Additionally, women may have medical or fetal indications for an abortion that are not apparent until the second trimester. Reasons for presenting in the second trimester appear similar across countries and cultures. Second-trimester abortion disproportionately affects more underserved women.

Quality of evidence: High

Last reviewed: May 28, 2015

Background

While second-trimester abortions are a small percentage (around 10%) of all abortions worldwide, these abortions are responsible for the majority of major complications (Harris & Grossman, 2011; Loeber & Wijsen, 2008; Pazol, Creanga, Burley, & Jamieson, 2014). In restrictive settings where abortion complications are prevalent, second-trimester presentation for postabortion care is common. In Cambodia, 17% of women needing postabortion care present in the second trimester, 38% in Ethiopia, and 41% in Kenya (African Population and Health Research Center, Ministry of Health Kenya, Ipas Kenya, & Guttmacher Institute, 2013; Fetters, Vonthanak, Picardo, & Rathavy, 2008; Gebreselassie et al., 2010).

Why do women need second-trimester abortions?

Young age: Young women are disproportionately likely to seek abortion in the second trimester. In the United States, 9% of all women who present for abortions do so in the second trimester, but the rate is 21.7% for girls younger than age 15 and 12.4% for adolescents ages 15-19 (Pazol et al., 2014). Smaller case-control and cohort studies in the United States, Singapore, Ethiopia, India, and Nepal find young age is a risk factor for second-trimester presentation (Bonnen, Tuijje, & Rasch, 2014; Foster & Kimport, 2013; Lim, Wong, Yong, & Singh, 2012; Sowmini, 2013).

Late detection of pregnancy: A common risk factor in all studies of women presenting for second-trimester abortion is late recognition of pregnancy. Absence of pregnancy signs and symptoms, menstrual irregularity, contraceptive use, or amenorrhea after recent pregnancy can mask physical signs of pregnancy and delay pregnancy diagnosis (Drey et al., 2006; Gallo & Nghia, 2007; Harries, Orner, Gabriel, & Mitchell, 2007; Ingham, Lee, Clements, & Stone, 2008; Purcell et al., 2014). In one case-controlled study of women in the United States, women who sought abortion after 20 weeks were much more likely to have been eight weeks pregnant or more at the time they discovered they were pregnant (68%), compared to women who had first-trimester abortion (12%)(Foster & Kimport, 2013).

Ambivalence and/or difficulty with abortion decision: Some women need time to make a decision due to social pressures, fears, religious attitudes, and changes in relationship status. For other women, changed circumstances (such as abandonment by partner) cause them to seek an abortion after initially planning to carry to term (Foster

& Kimport, 2013; Gallo & Nghia, 2007; Harries et al., 2007). Discouraging family and friends can also delay a woman seeking care (Waddington, Hahn, & Reid, 2015).

Financial and logistical barriers: Studies in the United States show that unemployment and lack of insurance are risk factors for second-trimester presentation. In addition, because second-trimester abortion is often more expensive, delays may be related to raising enough money to cover the cost of the procedure (Foster & Kimport, 2013; Kiley, Yee, Niemi, Feinglass, & Simon, 2010). Poverty (Usta, Mitchell, Gebreselassie, Brookman-Amissah, & Kwizera, 2008), immigration status (Loeber & Wijsen, 2008) and rural residence (Bonnen et al., 2014), all of which make access to safe care more difficult, are all associated with late presentation. Second-trimester abortions are provided at a limited number of facilities and it may be difficult for women to find the time to travel. In one case-controlled study of women presenting over 20 weeks, women needing second-trimester abortion were much more likely to have travelled over three hours to access care (Foster & Kimport, 2013). Second-trimester clients may be referred by other providers or have trouble finding a provider before finally getting care (Drey et al., 2006; Harries et al., 2007). Women may need to travel out of their own country to access legal second-trimester abortion (Loeber & Wijsen, 2008).

Fetal indications: Diagnosis of fetal anomalies typically occurs after the first trimester of pregnancy, and women may make the decision to terminate pregnancy based on the diagnosis (Lyus, Robson, Parsons, Fisher, & Cameron, 2013).

Maternal indications: A woman may have a medical condition that worsens through the course of pregnancy or a new condition may arise in pregnancy that makes continuing a pregnancy dangerous to her life or health. Severe preeclampsia or preterm premature rupture of membranes occurring in the second trimester may require termination of pregnancy to save a woman's life (American College of Obstetrics and Gynecology, 2013).

Victims of violence: Victims of violence have a higher risk of late presentation (Colarossi & Dean, 2014; Perry et al., 2015).

Failed contraceptive method: Contraceptive methods may mask the early signs of pregnancy or women using contraception may not be aware of method failure (Foster & Kimport, 2013).

Failed first-trimester abortion: Although failures are rare, women who experience an ongoing pregnancy after a first-trimester abortion may not discover they are still pregnant until the second trimester (Gallo & Nghia, 2007).

Cultural beliefs: In rare cases there are local beliefs that having an abortion in the second trimester is safer than the first trimester, thus causing women to delay care (Marlow et al., 2014).

Young women

Young women are at disproportionately higher risk of needing second-trimester services.

References

American College of Obstetricians and Gynecologists. (2013). Practice Bulletin No. 135: Second-trimester abortion. *Obstetrics and gynecology, 121*(6), 1394-1406.

African Population and Health Research Center, Ministry of Health Kenya, Ipas Kenya, & Guttmacher Institute. (2013). Incidence and complications of unsafe abortion in Kenya: key findings of a national study. Retrieved from https://www.guttmacher.org/pubs/abortion-in-Kenya.pdf

Bonnen, K. I., Tuijje, D. N., & Rasch, V. (2014). Determinants of first and second trimester induced abortion - results from a cross-sectional study taken place 7 years after abortion law revisions in Ethiopia. *BioMed Central Pregnancy & Childbirth, 14*(416), 014-0416.

Colarossi, L., & Dean, G. (2014). Partner violence and abortion characteristics. *Women Health, 54*(3), 177-193.

Drey, E. A., Foster, D. G., Jackson, R. A., Lee, S. J., Cardenas, L. H., & Darney, P. D. (2006). Risk factors associated with presenting for abortion in the second trimester. *Obstetrics and Gynecology, 107*(1), 128-135.

Fetters, T., Vonthanak, S., Picardo, C., & Rathavy, T. (2008). Abortion-related complications in Cambodia. *BJOG: An International Journal of Obstetrics & Gynaecology, 115*(8), 957-968.

Foster, D. G., & Kimport, K. (2013). Who seeks abortions at or after 20 weeks? *Perspectives on Sexual and Reproductive Health, 45*(4), 210-218. doi: 10.1363/4521013

Gallo, M. F., & Nghia, N. C. (2007). Real life is different: a qualitative study of why women delay abortion until the second trimester in Vietnam. *Social Science & Medicine, 64*(9), 1812-1822.

Gebreselassie, H., Fetters, T., Singh, S., Abdella, A., Gebrehiwot, Y., Tesfaye, S., & Kumbi, S. (2010). Caring for women with abortion complications in Ethiopia: national estimates and future implications. *International perspectives on sexual and reproductive health*, 6-15.

Harries, J., Orner, P., Gabriel, M., & Mitchell, E. (2007). Delays in seeking an abortion until the second trimester: a qualitative study in South Africa. *Reproductive Health, 4*(7), 13-26.

Harris, L. H., & Grossman, D. (2011). Confronting the challenge of unsafe second-trimester abortion. *International Journal of Gynecology & Obstetrics, 115*(1), 77-79.

Ingham, R., Lee, E., Clements, S. J., & Stone, N. (2008). Reasons for second trimester abortions in England and Wales. *Reproductive Health Matters, 16*(31 Suppl), 18-29.

Kiley, J. W., Yee, L. M., Niemi, C. M., Feinglass, J. M., & Simon, M. A. (2010). Delays in request for pregnancy termination: comparison of patients in the first and second trimesters. *Contraception, 81*(5), 446-451.

Lim, L., Wong, H., Yong, E., & Singh, K. (2012). Profiles of women presenting for abortions in Singapore: focus on teenage abortions and late abortions. *European Journal of Obstetrics & Gynecology and Reproductive Biology, 160*(2), 219-222.

Loeber, O., & Wijsen, C. (2008). Factors influencing the percentage of second trimester abortions in the Netherlands. *Reproductive Health Matters, 16*(31 Suppl), 30-36. doi: 10.1016/s0968-8080(08)31377-9

Lyus, R., Robson, S., Parsons, J., Fisher, J., & Cameron, M. (2013). Second trimester abortion for fetal abnormality. *British Medical Journal, 3*(347).

Marlow, H. M., Wamugi, S., Yegon, E., Fetters, T., Wanaswa, L., & Msipa-Ndebele, S. (2014). Women's perceptions about abortion in their communities: perspectives from western Kenya. *Reproductive Health Matters, 22*(43), 149-158.

Pazol, K., Creanga, A. A., Burley, K. D., & Jamieson, D. J. (2014). Abortion surveillance - United States, 2011. *Morbidity and Mortality Weekly Report Surveillance Summary, 63*(11), 1-41.

Perry, R., Zimmerman, L., Al-Saden, I., Fatima, A., Cowett, A., & Patel, A. (2015). Prevalence of rape-related pregnancy as an indication for abortion at two urban family planning clinics. *Contraception, 91*(5), 393-397.

Purcell, C., Cameron, S., Caird, L., Flett, G., Laird, G., Melville, C., & McDaid, L. M. (2014). Access to and experience of later abortion: accounts from women in Scotland. *Perspectives on Sexual and Reproductive Health, 46*(2), 101-108.

Sowmini, C. V. (2013). Delay in termination of pregnancy among unmarried adolescents and young women attending a tertiary hospital abortion clinic in Trivandrum, Kerala, India. *Reproductive Health Matters, 21*(41), 243-250. doi: 10.1016/s0968-8080(13)41700-7

Usta, M. B., Mitchell, E. M., Gebreselassie, H., Brookman-Amissah, E., & Kwizera, A. (2008). Who is excluded when abortion access is restricted to twelve weeks? Evidence from Maputo, Mozambique. *Reproductive Health Matters, 16*(31 Suppl), 14-17.

Waddington, A., Hahn, P. M., & Reid, R. (2015). Determinants of late presentation for induced abortion care. *Journal of Obstetrics and Gynaecology Canada, 37*(1), 40-45.

Second-trimester abortion with dilatation and evacuation or medical abortion: Comparing methods

Recommendation:

- Dilatation and evacuation (D&E) and medical abortion with mifepristone and misoprostol or misoprostol only are safe and effective methods of second-trimester abortion (WHO, 2012).
- Medical abortion has a higher rate of retained products of conception, failed abortion and minor adverse events.
- Significant adverse event rates do not differ between the two methods.
- D&E requires a trained, experienced provider and specialized equipment.
- When both methods are available and a woman is eligible, she should be allowed to choose the method that is appropriate for her.

Strength of recommendation: Strong

Quality of evidence: Moderate

Last reviewed: October 28, 2015

Comparison of methods

In retrospective cohort studies, women in the second trimester who have medical abortion have an increased rate of failed abortion and retained products of conception with a need for further intervention compared to women who have dilatation and evacuation (D&E) (Autry, Hayes, Jacobson, & Kirby, 2002; Bryant, Grimes, Garrett, & Stuart, 2011). However, the rate of major adverse events including infection, transfusion, hysterectomy and death is not increased.

The largest randomized trial of second-trimester abortion methods included 122 women and showed a similar rate of complications for both D&E and medical abortion with mifepristone and misoprostol (Kelly, Suddes, Howel, Hewison, & Robson, 2010). However, women randomized to medical abortion had more bleeding and pain and were less satisfied than women who had D&E. A pilot randomized trial of 18 women comparing D&E and medical abortion with misoprostol only had a higher rate of adverse events in the women undergoing medical abortion (Grimes, Smith, & Witham, 2004). Both randomized trials had difficulty with recruitment due to women's strong preferences for one type of procedure over another.

In published studies of medical abortion compared to D&E, rates of intervention for medical abortion may be artificially high because failure was defined as no delivery within 24 hours (Bryant et al., 2011) and retained placenta was diagnosed after two hours (Grimes et al., 2004). In practice, more time may be allowed for successful medical abortion to occur.

The importance of choice

In settings where D&E and medical abortion are available, if a woman is a candidate for either procedure, she should be offered a choice. A study of women undergoing second-trimester abortions for fetal abnormalities demonstrated that when women chose their method, their rates of post-procedure depression did not differ

(Burgoine et al., 2005). Choice of methods is very individual—some women prefer the speed, predictability and comfort of D&E, while others prefer a more "labor-like" process with an intact fetus (Kelly et al., 2010; Kerns et al., 2012). Some women may want to see or hold an intact fetus while others prefer not to. In some cases, an intact fetus may allow for a more comprehensive fetal autopsy where it is needed.

Young women

This recommendation is the same for young women.

References

Autry, A. M., Hayes, E. C., Jacobson, G. F., & Kirby, R. S. (2002). A comparison of medical induction and dilation and evacuation for second-trimester abortion. *American Journal of Obstetrics & Gynecology*, *187*(2), 393-397.

Bryant, A. G., Grimes, D. A., Garrett, J. M., & Stuart, G. S. (2011). Second-trimester abortion for fetal anomalies or fetal death: labor induction compared with dilation and evacuation. *Obstetrics & Gynecology*, *117*(4), 788-792.

Burgoine, G. A., Van Kirk, S. D., Romm, J., Edelman, A. B., Jacobson, S. L., & Jensen, J. T. (2005). Comparison of perinatal grief after dilation and evacuation or labor induction in second trimester terminations for fetal anomalies. *American Journal of Obstetrics & Gynecology*, *192*(6), 1928-1932.

Grimes, D. A., Smith, M. S., & Witham, A. D. (2004). Mifepristone and misoprostol versus dilation and evacuation for midtrimester abortion: a pilot randomised controlled trial. *BJOG: An International Journal of Obstetrics and Gynaecology*, *111*(2), 148-153.

Kelly, T., Suddes, J., Howel, D., Hewison, J., & Robson, S. (2010). Comparing medical versus surgical termination of pregnancy at 13-20 weeks of gestation: a randomised controlled trial. *BJOG: An International Journal of Obstetrics and Gynaecology*, *117*(12), 1512-1520.

Kerns, J., Vanjani, R., Freedman, L., Meckstroth, K., Drey, E. A., & Steinauer, J. (2012). Women's decision making regarding choice of second trimester termination method for pregnancy complications. *International Journal of Gynecology & Obstetrics*, *116*(3), 244-248.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Second-trimester abortion with dilatation and evacuation or medical abortion: Gestational dating

Recommendation:

Accurate assessment of gestational age is important for second-trimester abortion services, especially when dilatation and evacuation (D&E) is used. Gestational age can be estimated by a woman's report of her last menstrual period (LMP) and a physical exam. Ideally, ultrasound should be used to confirm the duration of pregnancy.

Strength of recommendation: Strong

Quality of evidence: Low

Last reviewed: October 24, 2015

Background

Errors in gestational dating can increase the risks associated with second-trimester abortion. In facilities using dilatation and evacuation (D&E), if gestational age is underestimated, providers may not have the experience and equipment to complete the procedure safely. Accurate assessment of gestational age may help providers and women choose a safer procedure or indicate the need for referral to another facility.

Dating

There is no evidence to recommend the most appropriate way to confirm gestational age in the second trimester prior to abortion care (Kulier & Kapp, 2011). In the United States, 99% of providers use ultrasound in the second trimester, but data is lacking from other country contexts (O'Connell, Jones, Lichtenberg, & Paul, 2008).

Ideally, providers should use ultrasound to confirm the duration of the pregnancy and also use the date of the last menstrual period and pelvic exam to check size, consistency and position of the uterus. A single biparietal diameter is a simple and accurate method to confirm gestational age (Goldstein & Reeves, 2009). A femur length measurement can be used to confirm the biparietal diameter or used if there are technical difficulties in obtaining a biparietal measurement.

In settings where it is not possible to confirm gestational age by ultrasound, it is extremely important that staff be adequately trained in pregnancy dating. After the abortion, clinicians can confirm gestational age by comparing actual fetal measurements (fetal foot length) to the expected gestational age (Drey, Kang, McFarland, & Darney, 2005). This comparison gives the clinicians feedback regarding the accuracy of their pre-procedure dating estimates.

Young women

This recommendation is the same for young women.

References

Drey, E. A., Kang, M. S., McFarland, W., & Darney, P. D. (2005). Improving the accuracy of fetal foot length to confirm gestational duration. *Obstetrics & Gynecology*, *105*(4), 773-778.

Kulier, R., & Kapp, N. (2011). Comprehensive analysis of the use of pre-procedure ultrasound for first- and second-trimester abortion. *Contraception*, *83*(1), 30-33.

Goldstein, S. R., & Reeves, M. F. (2009). Clinical assessment and ultrasound in early pregnancy. In M. Paul, E. S. Lichtenberg, L. Borgatta, D. A. Grimes, P. G. Stubblefield & M. D. Creinin (Eds.), *Management of unintended and abnormal pregnancy: Comprehensive abortion care*. Oxford: Wiley-Blackwell.

O'Connell, K., Jones, H. E., Lichtenberg, E. S., & Paul, M. (2008). Second-trimester surgical abortion practices: a survey of National Abortion Federation members. *Contraception*, *78*(6), 492-499.

Second-trimester abortion: Identification of fetal sex via ultrasound

Key information:

Ultrasound identification of fetal sex before 12 weeks gestation is inaccurate. Accurate identification between 12-16 weeks gestation depends on the technology and skill of the technician. After 16 weeks, fetal sex determination cannot always be made, is not perfect, and male fetuses are more likely to be classified as female.

Quality of evidence: High

Last reviewed: June 9, 2015

In the embryo, the male and female genitals are similar in size and appearance on ultrasound until approximately 14 weeks gestation (Elejalde, de Elejalde, & Heitman, 1985). Differences in size exist by the second and third trimester, and then ultrasound can be used determine fetal sex. Earlier in gestation, only indirect inferences can be made based on the genital tubercle which is a protuberance on the lower ventral wall of the embryo that eventually becomes the penis or clitoris (Colmant, Morin-Surroca, Fuchs, Fernandez, & Senat, 2013).

The studies of ultrasound determination of fetal sex are limited by their varied methodology, especially by their method of determination of gestational age, which impacts the timing of fetal sex detection. However, all studies reported difficulties in accurate determination of sex prior to 12 weeks gestation (Efrat, Akinfenwa, & Nicolaides, 1999; Hsiao, Wang, Hsieh, & Hsu, 2008). Sensitivity of ultrasound improved by 13 weeks gestation to 100%, but these studies employed state-of-the-art ultrasound technology as well as highly trained technicians (Colmant, Morin-Surroca, Fuchs, Fernandez, & Senat, 2013). Data from low-resource settings is more limited. A study in Ethiopia of women having ultrasound starting from 16 weeks showed that in 260 of 275 women (93.8%) sex was accurately determined (Gelaw & Bisrat, 2011). In the majority of studies, no matter the gestational age, a greater risk of misclassifying males as females exists.

Young women

This information is the same for young women.

References

Colmant, C., Morin-Surroca, M., Fuchs, F., Fernandez, H., & Senat, M. V. (2013). Non-invasive prenatal testing for fetal sex determination: is ultrasound still relevant? *European Journal of Obstetrics & Gynecology and Reproductive Biology, 171*(2), 197-204.

Efrat, Z., Akinfenwa, O. O., & Nicolaides, K. H. (1999). First-trimester determination of fetal gender by ultrasound. *Ultrasound in Obstetrics and Gynecology, 13*(5), 305-307.

Elejalde, B. R., de Elejalde, M. M., & Heitman, T. (1985). Visualization of the fetal genitalia by ultrasonography: a review of the literature and analysis of its accuracy and ethical implications. *Journal of Ultrasound in Medicine, 4*(12), 633-639.

Gelaw, S. M., & Bisrat, H. (2011). The role of ultrasound in determining fetal sex. *Ethiopian Journal of Health Development, 25*(3), 216-221.

Hsiao, C. H., Wang, H. C., Hsieh, C. F., & Hsu, J. J. (2008). Fetal gender screening by ultrasound at 11 to 13(+6) weeks. *Acta Obstetricia et Gynecologica Scandinavica, 87*(1), 8-13.

Second-trimester abortion with dilatation and evacuation or medical abortion: Induced fetal demise

Recommendation:

Induced fetal demise prior to second-trimester medical abortion or dilatation and evacuation (D&E) does not increase the safety of abortion and is not recommended for medical indications. There may be legal or ethical indications for inducing fetal demise.

Strength of recommendation: Strong

Quality of evidence: Low

Last reviewed: October 24, 2051

Background

Some providers use induced fetal demise prior to second-trimester medical abortion or D&E. Practices and techniques used vary between providers (Denny et al., 2015). In some cases, patients, providers or staff may prefer that fetal demise occurs before an abortion procedure (Jackson, Teplin, Drey, Thomas, & Darney, 2001). Before medical abortion, induced fetal demise can prevent transient fetal survival. Although the rate of complications in women with digoxin injection may be acceptably low in some published case series (Steward, Melamed, Kim, Nucatola, & Gatter, 2012), there is no current evidence that shows a medical benefit for the practice.

Evidence related to induced fetal demise

D&E: A randomized, controlled trial of induced fetal demise with digoxin prior to D&E which compared digoxin to saline injection showed no benefit to digoxin and an increased rate of vomiting (Jackson et al., 2001). A retrospective cohort study comparing women with digoxin injection prior to D&E with historical controls showed an increase in complications including more hospital admissions, extramural deliveries, and infections in women who had digoxin (Dean et al., 2012).

Medical abortion: There are no trials to evaluate the safety and efficacy of induced fetal demise before medical abortion with the currently recommended second-trimester regimens.

Technique

Fetal demise can be achieved prior to a second-trimester abortion by interrupting the fetal umbilical cord or by injecting either potassium chloride directly into the fetal heart or digoxin into the fetus or amniotic fluid.

Potassium chloride: Potassium chloride injection requires skill in ultrasound guidance techniques and has more potential risk due to the possibility of maternal intravascular injection, which can cause cardiac arrest (Borgatta & Kapp, 2011; Coke, Baschat, Mighty, & Malinow, 2004). It is not recommended in a low-resource setting.

Digoxin: In a pharmacokinetic study of eight women who had intra-amniotic injection of digoxin 1mg prior to second-trimester D&E, maternal serum digoxin levels were in the low therapeutic range and were not

associated with cardiac changes (Drey, Thomas, Benowitz, Goldschlager, & Darney, 2000). A pilot randomized trial of intra-amniotic or intra-fetal digoxin at doses of 1mg or 1.5mg showed an overall rate of fetal demise of 87% with no difference in efficacy based on the dose or route of administration (Nucatola, Roth, & Gatter, 2010). To be effective, digoxin intra-amniotic injection should be performed 1-2 days before the planned abortion procedure. Digoxin may be given transabdominally or transvaginally (Tocce, Sheeder, Edwards, & Teal, 2013).

Transecting the fetal cord: In one retrospective case series of 407 women having D&E between 16-23 weeks gestation, amniotomy was performed, and then the cord was brought to the level of the external os by electric vacuum aspiration and transected. Fetal asystole occurred in all cases with a mean time of 3.35 $\pm$ 2.11 minutes (range <1-11 minutes) from the time of umbilical cord transection (Tocce, Leach, Sheeder, Nelson, & Teal, 2013).

Young women

This recommendation is the same for young women.

References

Borgatta, L., & Kapp, N. (2011). Clinical guidelines. Labor induction abortion in the second trimester. *Contraception*, *84*(1), 4-18.

Coke, G. A., Baschat, A. A., Mighty, H. E., & Malinow, A. M. (2004). Maternal cardiac arrest associated with attempted fetal injection of potassium chloride. *International Journal of Obstetric Anesthesia*, *13*(4), 287-290.

Dean, G., Colarossi, L., Lunde, B., Jacobs, A. R., Porsch, L. M., & Paul, M. E. (2012). Safety of digoxin for fetal demise before second-trimester abortion by dilation and evacuation. *Contraception*, *85*(2), 144-149.

Denny, C. C., Baron, M. B., Lederle, L., Drey, E. A., & Kerns, J. L. (2015). Induction of fetal demise before pregnancy termination: practices of family planning providers. *Contraception, 92*(3), 241-245.

Drey, E. A., Thomas, L. J., Benowitz, N. L., Goldschlager, N., & Darney, P. D. (2000). Safety of intra-amniotic digoxin administration before late second-trimester abortion by dilation and evacuation. *American Journal of Obstetrics & Gynecology*, *182*(5), 1063-1066.

Jackson, R. A., Teplin, V. L., Drey, E. A., Thomas, L. J., & Darney, P. D. (2001). Digoxin to facilitate late second-trimester abortion: a randomized, masked, placebo-controlled trial. *Obstetrics & Gynecology*, *97*(3), 471-476.

Nucatola, D., Roth, N., & Gatter, M. (2010). A randomized pilot study on the effectiveness and side-effect profiles of two doses of digoxin as fetocide when administered intraamniotically or intrafetally prior to second-trimester surgical abortion. *Contraception*, *81*(1), 67-74.

Steward, R., Melamed, A., Kim, R., Nucatola, D., & Gatter, M. (2012). Infection and extramural delivery with use of digoxin as a feticidal agent. *Contraception, 85*(2), 150-154.

Tocce, K., Leach, K.L., Sheeder, J., Nielson, K., & Teal, S. (2013). Umbilical cord transection to induce fetal demise prior to second-trimester D&E abortion. *Contraception*, *88*(6), 712-716.

Tocce, K., Sheeder, J.L., Edwards, L.J., & Teal, S. (2013). Feasibility, effectiveness and safety of transvaginal digoxin administration prior to dilation and evacuation. *Contraception*, *88*(6), 706-711.

Second-trimester abortion with dilatation and evacuation or medical abortion: Postabortion contraception

Recommendation:

Immediate initiation of hormonal and non-hormonal contraception following second-trimester dilatation and evacuation (D&E) or medical abortion is encouraged and considered safe.

Strength of recommendation: Strong

Quality of evidence:

- **Intrauterine device after D&E: Moderate**
- **Other contraceptive methods: Low**

Last reviewed: October 28, 2015

Contraceptive methods other than intrauterine device

Although the immediate use of most methods of contraception has not been formally studied following second-trimester abortion, because of the demonstrated safety of contraception after first-trimester vacuum aspiration and medical abortion, the World Health Organization (WHO) categorizes the immediate initiation of hormonal injections, implants, combined hormonal contraception (pills, patches and rings) and progestin-only pills as category one, or safe for use.

Intrauterine device

A Cochrane meta-analysis of 11 trials of immediate postabortion insertion of intrauterine device (IUD) following surgical abortion concluded that although expulsion rates may be higher with immediate placement, continuation is higher with no increase in complications (Grimes, Lopez, Schulz, & Stanwood, 2010). In two randomized controlled trials of immediate versus delayed IUD placement after second-trimester D&E, rates of IUD use are significantly higher with immediate insertion, and without an increase in infection or complication rates (Cremer et al., 2011; Hohmann et al., 2012). Expulsion rates for women who had immediate insertion in both studies were low (3.1% and 6.8%) and were not different from delayed insertion. Notably, in both of these studies, about half of women randomized to delayed insertion did not come back to have the IUD inserted. Requiring a follow-up visit for IUD insertion is a significant barrier to obtaining the IUD (Stanek, Bednarek, Nichols, Jensen, & Edelman, 2009).

No studies exist of IUD placement immediately following second-trimester medical abortion and the WHO Medical Eligibility Criteria recommendations do not differ based on the type of abortion performed, whether medical or surgical. Although not directly translatable, the evidence from post-partum IUD insertion is reassuring (Grimes, Shulz, Van Vliet, & Stanwood, 2007). Because of the possible increased risk of expulsion, the WHO classifies IUD insertion after an uncomplicated second-trimester abortion as category two, which means the advantages of using the method generally outweigh the risks (WHO, 2009).

Quality of evidence

There is limited clinical data to support the recommendation of starting methods other than the IUD

immediately after second-trimester D&E. This recommendation is based on expert opinion (WHO, 2015). A woman's immediate need for reliable contraception after abortion, coupled with the risk that delayed contraceptive provision reduces uptake, strongly supports the recommendation to start these methods immediately.

Young women

The IUD for women under the age of 20 is classified by WHO as category two, in which the benefits generally outweigh the risks. While risk is slightly increased due to higher rates of sexually transmitted infections and expulsion in this patient population, IUDs are still a safe, effective and recommended method for women under the age of 20. Depot medroxyprogesterone acetate injection is also classified by WHO as a category two for women less than 18 years of age, due to theoretical concerns about bone mineral density. Sterilization may be performed, but a young woman will need special precautions due to the increased risk of regret (WHO, 2015).

References

Cremer, M., Bullard, K. A., Mosley, R. M., Weiselberg, C., Molaei, M., Lerner, V., & Alonzo, T. A. (2011). Immediate vs. delayed post-abortal copper T 380A IUD insertion in cases over 12 weeks of gestation. *Contraception*, *83*(6), 522-527.

Grimes, D. A., Lopez, L. M., Schulz, K. F., & Stanwood, N. L. (2010). Immediate postabortal insertion of intrauterine devices. *The Cochrane Database of Systematic Reviews*, Issue 6, CD001777.

Hohmann, H. L., Reeves, M. F., Chen, B. A., Perriera, L. K., Hayes, J. L., & Creinin, M. D. (2012). Immediate versus delayed insertion of the levonorgestrel-releasing intrauterine device following dilation and evacuation: a randomized controlled trial. *Contraception*, *85*(3), 240-245.

Stanek, A. M., Bednarek, P. H., Nichols, M. D., Jensen, J. T., & Edelman, A. B. (2009). Barriers associated with the failure to return for intrauterine device insertion following first-trimester abortion. *Contraception*, *79*(3), 216-220.

World Health Organization. (2015). *Medical eligibility criteria for contraceptive use, 5th edition*. Geneva: Department of Reproductive Health and Research, World Health Organization.

Second-trimester abortion with dilatation and evacuation or medical abortion: Follow-up

Recommendation:

Routine follow-up care is not necessary unless desired or requested by the woman or necessary for her chosen contraceptive method. She should receive adequate information regarding her postabortion care and warning signs to watch for prior to being sent home.

Strength of recommendation: Weak

Quality of evidence: Very low

Last reviewed: October 24, 2015

Follow-up

There is no scientific data to demonstrate that routine follow-up is beneficial after second-trimester abortion performed by a trained health-care provider. In addition, there is no evidence to suggest that a pelvic examination is beneficial in an asymptomatic woman if she does return for a routine follow-up visit.

Young women

This recommendation is the same for young women.

Quality of evidence

Very low. The recommendation is based on expert opinion (World Health Organization, 2012).

References

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Second-trimester abortion with dilation and evacuation or medical abortion: Safe disposal of products of conception

Recommendation:

Follow standards and guidelines from your setting for disposal of products of conception. For low-resource settings, burial in a properly built and maintained pit (placenta pit) is a recommended disposal method (WHO, 2014).

Strength of recommendation: Strong

Quality of evidence: High

Last reviewed: October 28, 2015

Background

Products of conception are pathologic waste, which is a category of health-care waste that includes human tissues, blood and bodily fluids. Pathologic waste is considered infectious waste because it is capable of spreading blood-borne diseases. Proper management of infectious waste is important to reduce health risks and environmental pollution.

Recommendations for first- and second-trimester products of conception are the same. Products of conception should be handled in accordance with prevailing religious, cultural and aesthetic norms. Unless local funeral procedures are being observed, disposal should be in accordance with guidelines for infectious waste.

Pathological waste handling, sorting, storage and transport

Handling: Personnel who handle pathologic waste should wear appropriate protective clothing (heavy-duty gloves, industrial apron, overalls/coveralls, leg protectors and/or industrial boots, face mask). Staff should handle pathological waste as little as possible before disposal.

Sorting: Pathologic waste should be separated from other health-care waste, placed in a leak-proof plastic bag or sealed container, and clearly marked with a biohazard symbol.

*Interim storage***:** Interim storage should ideally be short-term. Usually waste should be stored for only a few hours before disposal. If the pathologic waste must be stored, the storage area should be secure, contained, and marked by a biohazard sign. The storage area should be sealed or tiled to allow easy disinfection. The time from generation of the waste to treatment should not exceed the following:

Temperate climate	Warm climate
72 hours in winter	48 hours during the cool season
48 hours in summer	24 hours during the hot season

Transport: Some health facilities will dispose of pathologic waste off-site. Since the transport staff will be handling the waste, they must be educated about the infectious nature of the waste as well as the sensitivity surrounding the disposal of products of conception.

On-site pathologic waste disposal

Burial: Burial of pathologic waste in a properly built and maintained pit ("placenta pit") to allow for natural biodegradation is suitable for low-resource areas. The type of pit and dimensions should be built according to the amount of infectious waste the facility produces. Guidelines for pit construction can be found in the EngenderHealth, World Health Organization (WHO), Médecins Sans Frontières and Jhpiego manuals in the reference section. Some basic rules to follow include:

- Restrict access to authorized personnel only, and fence in the area to keep out animals, scavengers and children.
- Line the pit with a material of low permeability (clay, dung, river silt); a cement bottom should be used if available.
- The bottom of the pit should be at least 1.5 to two meters above the groundwater level and at least 50 meters from crops or water sources; the pit should be located away from areas that flood.
- Only infectious waste should be buried.
- Each waste layer should be covered by a 10cm layer of soil (ash or charcoal can also be used to reduce odor and speed up decomposition).
- The pit should be closed when the waste is 50cm below the ground surface.

Incineration: The benefit of incineration is a reduction in waste volume and weight and the elimination of microorganisms and recognizable material. Incinerators can range from large, sophisticated, permanent, high-temperature industrial models to very basic small ones (such as drum or brick units) that operate at much lower temperatures. Burning in an industrial incinerator is preferred, but if one is not available, a drum or brick incinerator can be used. Incinerators, particularly simple units, may release toxic chemicals into the air and do not run efficiently when burning pathologic waste with high moisture content.

If small incinerators are the only option, best practices include:

- Effective waste reduction and segregation, ensuring only the smallest amount of combustible waste is incinerated
- Using a design engineered to reach sufficient temperatures to allow complete combustion
- Placing incinerators away and downwind from health-care buildings and residential areas or where crops are grown
- Using a clearly described method of operation
- Periodic maintenance
- Not incinerating certain waste, which includes pressurized gas containers (aerosol cans), reactive chemical waste, silversalts and photographic/radiographic wastes, polyvinyl chloride (PVC) plastics, or waste with high mercury or cadmium content

Important: Construction guidelines for incinerators can be found in the EngenderHealth, WHO, Medecins Sans Frontieres and Jhpiego manuals in the reference section.

Pouring into a safe sewage system: Liquid infectious waste may be poured directly into a sink or drain connected to an adequately treated sewer or pit latrine. Rinse the sink, drain or toilet thoroughly and clean with disinfectant

cleaning solution daily or more frequently if heavily used or soiled (EngenderHealth, 2011; Tietjen, Bossemeyer, & MacIntosh, 2003).

Open-air burning: Open-air burning is not recommended. If it is the only option available, it should be done in a confined area (in a dugout pit and covered with soil when finished).

Open dumping: Open dumping is never an acceptable option due to the infectious nature of pathologic waste.

References

Médecins Sans Frontières. (2010). *Public Health Engineering in Precarious Situations*. Retrieved from http://refbooks.msf.org/msf_docs/en/public_health_en.pdf

Tietjen, L., Bossemeyer, D., & MacIntosh, N. (2003). *Infection prevention: Guidelines for healthcare facilities with limited resources*. Jhpeigo: Baltmore, Maryland. Retrieved from: http://www.jhpiego.org/files/IP_Manual.pdf

Pruss-Ustun, A., Emmanuel, J., Rushbrook, P. Zghondi, R., Stringer, R., Pieper, U., & Chartier, Y. (Eds.) (2014). *Safe management of wastes from health-care activities* (Second Edition). Geneva: World Health Organization. Retrieved from http://www.healthcarewaste.org/fileadmin/user_upload/resources/Safe-Management-of-Wastes-from-Health-Care-Activities-2.pdf

Second-trimester dilatation and evacuation: Cervical preparation

Recommendation:

- Routine preoperative cervical preparation is recommended before dilatation and evacuation (D&E) (WHO, 2012).
- Osmotic dilators, misoprostol and mifepristone are all choices for cervical preparation. The choice depends on availability, expense, gestational age and timing of the procedure.

Strength of recommendation: Strong

Quality of evidence: High

Last reviewed: October 20, 2015

Background

Cervical preparation prior to second-trimester dilatation and evacuation reduces the risk of complications (Fox & Krajewski, 2013; Peterson, Berry, Grace, & Gulbranson, 1983). Some methods, including misoprostol and synthetic osmotic dilators, may be used for same-day cervical preparation in the early second trimester. There is limited data to suggest the best method because the trials that exist have heterogeneous comparisons, small enrollment numbers and include few women with pregnancies over 20 weeks. Although trials may show differences in cervical dilation, they are not large enough to show differences in more serious outcomes like cervical or uterine injuries or inability to complete the procedure (Newmann et al., 2010). Moreover, method choice is often limited by availability, especially in low-resource settings.

Possible cervical preparation methods include:

Method	Dosing	Note
Osmotic dilators (laminaria or synthetic osmotic dilators)	6-24 hours prior to procedure	Synthetic osmotic dilators may be used the day of the D&E
Misoprostol	400mcg buccally or vaginally 3 hours prior to procedure	Limited data to support use as a single agent over 18-20 weeks May be combined with osmotic dilators or mifepristone May be repeated as needed
Mifepristone	200mg orally 24-48 hours prior to procedure	No data to support use as a single agent over 16 weeks May be combined with misoprostol

Osmotic dilators

Numerous cohort studies have demonstrated that osmotic dilators are safe and effective and their use does not increase infectious morbidity (Bryman, Granberg, & Norström, 1988; Fox & Krajewski, 2013; Jonasson, Larsson, Bygdeman, & Forsum, 1989; Peterson et al., 1983). A Cochrane meta-analysis of cervical preparation before D&E showed that osmotic dilators provide better cervical dilation when compared to prostaglandins throughout the second trimester and decreased procedure time in the early second trimester. There is not sufficient evidence to recommend a specific dilator type (laminaria or synthetic dilators) or regimen (Newmann, Dalve-Endres, & Drey, 2008). Decisions about the number and timing of dilators to place should be individualized and take into consideration the dilator's type and size, the woman's gestational age, parity and cervical compliance, and the provider's experience (Fox & Krajewski, 2013; Newmann et al., 2008).

Misoprostol

Misoprostol has been studied as an alternative or supplement to osmotic dilators and has been used as a single agent for cervical preparation before 16-18 weeks gestation. Multiple small randomized trials have compared misoprostol to dilators (Goldberg et al., 2005; Bartz, Maurer, Allen, Fortin, Kuang, & Goldberg, 2013; Sagiv et al., 2015). Studies have looked at different gestational ages, different misoprostol doses and routes, and different dilator types, however all studies found that all women were able to have their procedures completed on the same day as cervical preparation. In some cases dilators provided more procedural dilation, however women often preferred misoprostol.

Misoprostol is inexpensive, safe (Nucatola, Roth, Saulsberry, & Gatter, 2008), and more readily available than osmotic dilators in some low-resource settings, and may be used for cervical preparation prior to D&E up to 18 weeks gestation (Baird, Castleman, Hyman, Gringle, & Blumenthal, 2007). Misoprostol may be given to women with a prior cesarean delivery, as uterine rupture is rare (Fox & Hayes, 2007).

Misoprostol plus laminaria

Two randomized controlled trials have shown that misoprostol added to laminaria improves cervical dilation and operating time over 19-21 weeks (Edelman, Buckmaster, Goetsch, Nichols, & Jensen, 2006; Drey et al., 2013). This effect was not seen at lower gestational ages and side effects were greater with women using misoprostol.

Mifepristone

In a randomized trial of 50 women between 14-16 weeks gestation, women who had cervical preparation with osmotic dilators had a slightly shorter procedure time and greater dilation compared to mifepristone, but women had less pain with mifepristone and strongly preferred mifepristone to osmotic dilators (Borgatta et al., 2012).

In one randomized clinical trial of 900 women between 12-20 weeks gestation given mifepristone with misoprostol, the combined regimen improved dilation compared to misoprostol alone but had an increased rate of preprocedure fetal expulsions (Carbonell et al., 2007). A single-center retrospective cohort study of 512 women from 14-19 weeks showed mifepristone and misoprostol prior to D&E to be as effective as misoprostol alone or misoprostol and laminaria (Searle, Tait, Langdana, & Maharaj, 2014).

Finally, one small randomized, non-inferiority trial of 50 women between 19 and 23 and 6/7 weeks gestation compared mifepristone used with one set of osmotic dilators one day prior to D&E procedure compared to two

sets of dilators inserted serially over two days without mifepristone. All women received misoprostol on the day of their procedure (Shaw et al., 2015). There were no differences in procedure time or cervical dilation.

Young women

This recommendation is the same for young women.

References

Bartz, D., Maurer, R., Allen, R. H., Fortin, J., Kuang, B., & Goldberg, A. B. (2013). Buccal misoprostol compared with synthetic osmotic cervical dilator before surgical abortion: a randomized controlled trial. *Obstetrics & Gynecology*, *122*(1), 57-63.

Borgatta, L., Roncari, D., Sonalkar, S., Mark, A., Hou, M. Y., Finneseth, M., & Vragovic, O. (2012). Mifepristone vs. osmotic dilator insertion for cervical preparation prior to surgical abortion at 14–16 weeks: a randomized trial. *Contraception*, *86*(5), 567-571.

Bryman, I., Granberg, S., & Norström, A. (1988). Reduced incidence of postoperative endometritis by the use of laminaria tents in connection with first trimester abortion. *Acta Obstetricia et Gynecologica Scandinavica*, *67*(4), 323-325.

Carbonell, J. L., Gallego, F. G., Llorente, M. P., Bermudez, S. B., Sala, E. S., González, L. V., & Texido, C. S. (2007). Vaginal vs. sublingual misoprostol with mifepristone for cervical priming in second-trimester abortion by dilation and evacuation: a randomized clinical trial. *Contraception*, *75*(3), 230.

Drey, E. A., Benson, L. S., Sokoloff, A., Steinauer, J. E., Roy, G., & Jackson, R. A. (2013). Buccal misoprostol plus laminaria for cervical preparation before dilation and evacuation at 21-23 weeks' gestation: a randomized controlled trial. *Contraception*, *89*(4), 307-13.

Edelman, A. B., Buckmaster, J. G., Goetsch, M. F., Nichols, M. D., & Jensen, J. T. (2006). Cervical preparation using laminaria with adjunctive buccal misoprostol before second-trimester dilation and evacuation procedures: a randomized clinical trial. *American Journal of Obstetrics & Gynecology*, *194*(2), 425-430.

Fox, M., & Hayes, J. (2007). Cervical preparation for second-trimester surgical abortion prior to 20 weeks of gestation. *Contraception*, *76*(6), 486.

Goldberg, A. B., Drey, E. A., Whitaker, A. K., Kang, M. S., Meckstroth, K. R., & Darney, P. D. (2005). Misoprostol compared with laminaria before early second-trimester surgical abortion: a randomized trial. *Obstetrics & Gynecology*, *106*(2), 234-241.

Lyus, R., Lohr, P. A., Taylor, J., & Morroni, C. (2013). Outcomes with same-day cervical preparation with Dilapan-S osmotic dilators and vaginal misoprostol before dilatation and evacuation at 18 to 21+ 6 weeks' gestation. *Contraception*, *87*(1), 71-75.

Jonasson, A., Larsson, B., Bygdeman, S., & Forsum, U. (1989). The influence of cervical dilatation by laminaria tent and with Hegar dilators on the intrauterine microflora and the rate of postabortal pelvic inflammatory disease. *Acta Obstetricia et Gynecologica Scandinavica*, *68*(5), 405-410.

Newmann, S., Dalve-Endres, A., & Drey, E. (2008). Clinical guidelines. Cervical preparation for surgical abortion from 20 to 24 weeks' gestation. *Contraception*, *77*(4), 308.

Newmann, S. J., Dalve-Endres, A., Diedrich, J. T., Steinauer, J. E., Meckstroth, K., & Drey, E. A. (2010). Cervical preparation for second trimester dilation and evacuation. *The Cochrane Database of Systematic Reviews*, Issue 8, CD007310.

Newmann, S.J., Sokoloff, A., Tharull, M., Illangasekare, T., Steinauer, J.E., Drey, E.A. (2014). Same-day synthetic osmotic dilators compared with overnight laminaria before abortion at 14-18 weeks of gestation: A randomized controlled trial. *Obstetrics & Gynecology*, *123*(2, pt 1), 271-278.

Nucatola, D., Roth, N., Saulsberry, V., & Gatter, M. (2008). Serious adverse events associated with the use of misoprostol alone for cervical preparation prior to early second trimester surgical abortion (12–16 weeks). *Contraception*, *78*(3), 245-248.

Peterson, W. F., Berry, F. N., Grace, M. R., & Gulbranson, C. L. (1983). Second-trimester abortion by dilatation and evacuation: an analysis of 11,747 cases. *Obstetrics & Gynecology*, *62*(2), 185-190.

Sagiv, R., Mizrachi, Y., Glickman, H., Kerner, R., Keider, R., Bar, J., & Golan, A. (2015). Laminaria vs. vaginal misoprostol for cervical preparation before second-trimester surgical abortion: a randomized clinical trial. *Contraception, 91*(5), 406-411.

Searle, L., Tait, J., Langdana, F., & Maharaj, D. (2014). Efficacy of mifepristone for cervical priming for second-trimester surgical termination of pregnancy. *International Journal of Gynecology & Obstetrics*, 124(1):38-41.

Shaw, K. A., Shaw, J. G., Hugin, M., Velasquez, G., Hopkins, F. W., & Blumenthal, P. D. (2015). Adjunct mifepristone for cervical preparation prior to dilation and evacuation: a randomized trial. *Contraception, 91*(4), 313-319.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Second-trimester dilatation and evacuation: Pain management

Recommendation:

- Women undergoing second-trimester dilatation and evacuation (D&E) should receive pain medications and non-pharmacologic approaches to treat pain (WHO, 2012).
- A combination regimen of local anesthesia (paracervical block), non-steroidal anti-inflammatory drugs and narcotic analgesics with or without anxiolytics is recommended. If the personnel, monitoring and equipment are available to safely provide deeper levels of sedation, these services may be offered. The increased risks of deep sedation or general anesthesia must be weighed against the benefits to the woman.

Strength of recommendation: Strong

Quality of evidence: Low

Last reviewed: October 24, 2015

Pain during second-trimester dilatation and evacuation

There is a lack of published evidence regarding the level of pain associated with dilatation and evacuation (D&E). Most experts agree that D&E is more painful than first-trimester vacuum aspiration; D&E requires more dilation, longer procedure times and deeper uterine manipulation.

Regimens for pain control

Specific studies in second-trimester D&E are lacking. The optimal regimen for pain management has not been established. Most international consensus statements focus on the minimum amount of anesthesia at which a D&E can be performed to ensure access at lower-level facilities rather than optimizing pain control (Royal College of Obstetrician and Gynaecologists, 2011; World Health Organization [WHO], 2012). Ipas recommends a combination of local anesthesia (paracervical block) with nonsteroidal anti-inflammatory drugs (NSAIDs) and narcotic analgesics with or without anxiolytics. Medications may be given orally or parenterally (Baird, Castleman, Hyman, Gringle, & Blumenthal, 2007).

Some women may need deeper sedation based on the clinical situation. Intravenous sedation may be offered in facilities where there is a trained provider with adequate equipment for patient monitoring. General anesthesia increases the risks associated with abortion and is not recommended for routine procedures (Atrash, Cheek, & Hogue, 1988; WHO, 2012). If general anesthesia is used, the addition of a paracervical block does not appear to help with postoperative pain control (Lazenby, Fogelson, & Aeby, 2009). Medication choice and sedation level depend on the woman's preference as well as the level of provider training, supplies and monitoring equipment in the facility.

Young women

This recommendation is the same for young women.

References

Atrash, H., Cheek, T., & Hogue, C. (1988). Legal abortion mortality and general anesthesia. *American Journal of Obstetrics & Gynecology*, *158*(2), 420.

Baird, T. L., Castleman, L. D., Hyman, A. G., Gringle, R. E., & Blumenthal, P. D. (2007). *Clinician's guide for second-trimester abortion* (2nd ed.). Chapel Hill, NC: Ipas.

Lazenby, G. B., Fogelson, N. S., & Aeby, T. (2009). Impact of paracervical block on postabortion pain in patients undergoing abortion under general anesthesia. *Contraception*, 80(6), 578-582.

Royal College of Obstetrician and Gynaecologists. (2011). *The Care of Women Requesting Induced Abortion* (3rd ed.). London: Royal College of Obstetrician and Gynaecologists.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Second-trimester dilatation and evacuation: Prophylactic antibiotics

Recommendation:

Administer prophylactic antibiotics for all women prior to dilatation and evacuation (D&E). Where antibiotics are unavailable, D&E may still be offered. Some providers start antibiotics at the time of osmotic dilator placement, but there are no studies comparing different start times and the risk of infection.

Strength of recommendation: Strong

Quality of evidence: Low

Last reviewed: October 23, 2015

Background

There is evidence to support the use of prophylactic antibiotics before first-trimester vacuum aspiration. However, evidence in the second trimester is more limited. Because of the demonstrated benefit of first-trimester antibiotics, the World Health Organization (2012), Society of Family Planning (Achilles & Reeves, 2011), American Congress of Obstetricians and Gynecologists (2009) and Royal College of Obstetricians and Gynaecologists (2011) recommend prophylactic antibiotics for all women having D&E. Giving prophylactic antibiotics is more effective (Levallois & Rioux, 1988) and cheaper (Penney et al., 1998) than screening all women and treating only those with evidence of infection. Because the rate of infection after D&E is very low, the inability to provide antibiotics should not limit access to abortion (Peterson, Berry, Grace, & Gulbranson, 1983; WHO, 2012).

Regimen

Many antibiotic regimens for abortion prophylaxis have been studied, but the ideal antibiotic, dose and timing has not yet been established (Achilles & Reeves, 2011). Tetracyclines (doxycycline) and nitroimidazoles (metronidazole and tinidizole) are commonly used because of their clinical efficacy, oral availability, low cost and low risk of allergic reactions (Achilles & Reeves, 2011; O'Connell, Jones, Lichtenberg, & Paul, 2008). Although studies of abortion are limited (Caruso et al., 2008) evidence from the obstetrical (Costantine et al., 2008), gynecologic (Mittendorf et al., 1993) and general surgery (Classen et al., 1992) literature supports the practice of giving antibiotics before the procedure to decrease the risk of infection. Antibiotic regimens do not need to be extended beyond the immediate postabortion period (Achilles & Reeves, 2011; Levallois & Rioux, 1988; Caruso et al., 2008; Lichtenberg & Shott, 2003).

The following table lists some common regimens used in clinical practice or recommended by professional organizations. These regimens are based on clinical evidence and expert opinion. Providers should choose a regimen based on the expense and availability of the antibiotics as well as practices around testing and treating women for sexually transmitted infections.

Common regimens	Recommender
Doxycycline 100mg orally 1 hour before the procedure and 200mg after the procedure *or* Metronidazole 500mg orally twice daily for 5 days	American Congress of Obstetricians and Gynecologists (2009)
Doxycycline 200mg orally before the procedure *or* Azithromycin 500mg orally before the procedure *or* Metronidazole 500mg orally before the procedure	Planned Parenthood Federation of America (Manual of Medical Standards and Guidelines, 2014)

Antibiotics with cervical preparation

Although not well studied, cervical preparation with osmotic dilators does not appear to increase the risk of infection (Fox & Hayes, 2007; Jonasson, Larsson, Bygdeman, & Forsum, 1989). Some providers start antibiotics at the time of osmotic dilator placement, but there are no studies comparing different start times and the risk of infection (O'Connell et al., 2008).

Therapeutic antibiotics

If possible, women at high risk should be screened and treated for sexually transmitted infections in addition to receiving prophylactic antibiotics. Women who have signs and symptoms of active infection should be provided with abortion services without delay and treated appropriately once the procedure is completed.

Young women

This recommendation is the same for young women.

References

Achilles, S. L., & Reeves, M. F. (2011). Prevention of infection after induced abortion: release date October 2010: SFP guideline 20102. *Contraception*, *83*(4), 295-309.

American Congress of Obstetricians and Gynecologists. (2009). Antibiotic prophylaxis for gynecologic procedures. Practice Bulletin No. 104. *Obstetrics & Gynecology*, *113*, 1180-9.

Caruso, S., Di Mari, L., Cacciatore, A., Mammana, G., Agnello, C., & Cianci, A. (2008). [Antibiotic prophylaxis with prulifloxacin in women undergoing induced abortion: a randomized controlled trial]. *Minerva Ginecologica*, *60*(1), 1-5.

Classen, D. C., Evans, R. S., Pestotnik, S. L., Horn, S. D., Menlove, R. L., & Burke, J. P. (1992). The timing of prophylactic administration of antibiotics and the risk of surgical-wound infection. *New England Journal of Medicine, 326*(5), 281-286.

Costantine, M. M., Rahman, M., Ghulmiyah, L., Byers, B. D., Longo, M., Wen, T.., Saade, G. R. (2008). Timing of perioperative antibiotics for cesarean delivery: a metaanalysis. *American Journal of Obstetrics & Gynecology*, *199*(3), 301-306.

Fox, M., & Hayes, J. (2007). Cervical preparation for second-trimester surgical abortion prior to 20 weeks of gestation. *Contraception*, *76*(6), 486.

Jonasson, A., Larsson, B., Bygdeman, S., & Forsum, U. (1989). The influence of cervical dilatation by laminaria tent and with Hegar dilators on the intrauterine microflora and the rate of postabortal pelvic inflammatory disease. *Acta Obstetricia et Gynecologica Scandinavica*, *68*(5), 405-410.

Levallois, P., & Rioux, J. E. (1988). Prophylactic antibiotics for suction curettage abortion: results of a clinical controlled trial. *American Journal of Obstetrics & Gynecology*, *158*(1), 100-105.

Lichtenberg, E. S., & Shott, S. (2003). A randomized clinical trial of prophylaxis for vacuum abortion: 3 versus 7 days of doxycycline. *Obstetrics & Gynecology*, *101*(4), 726-731.

O'Connell, K., Jones, H. E., Lichtenberg, E. S., & Paul, M. (2008). Second-trimester surgical abortion practices: a survey of National Abortion Federation members. *Contraception, 78*(6), 492-499.

Mittendorf, R., Aronson, M. P., Berry, R. E., Williams, M. A., Kupelnick, B., Klickstein, A., Chalmers, T. C. (1993). Avoiding serious infections associated with abdominal hysterectomy: a meta-analysis of antibiotic prophylaxis. *American Journal of Obstetrics & Gynecology*, *169*(5), 1119-1124.

Penney, G. C., Thomson, M., Norman, J., McKenzie, H., Vale, L., Smith, R., & Imrie, M. (1998). A randomised comparison of strategies for reducing infective complications of induced abortion. *BJOG: An International Journal of Obstetrics and Gynaecology, 105*(6), 599-604.

Peterson, W. F., Berry, F. N., Grace, M. R., & Gulbranson, C. L. (1983). Second-trimester abortion by dilatation and evacuation: an analysis of 11,747 cases. *Obstetrics & Gynecology*, *62*(2), 185-190.

Planned Parenthood Federation of America. (2014). *Manual of Medical Standards and Guidelines*. Washington, D.C.: Planned Parenthood Federation of America.

Royal College of Obstetrics and Gynaecology. (2011). *The care of women requesting induced abortion* (3rd ed.). London: Royal College of Obstetrics and Gynaecology Press.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Second-trimester medical abortion: Previous uterine scar

Recommendation:

Less than 22-24 weeks gestation with one uterine scar
No changes to recommended regimens necessary.

More than 22-24 weeks gestation with one uterine scar or throughout second trimester with more than one uterine scar
Consider removing the misoprostol loading dose and decreasing the misoprostol dose with or without increasing the misoprostol dosing interval. There is insufficient evidence to suggest that these interventions will decrease the risk of uterine rupture in these women.

Strength of recommendation: Weak

Quality of evidence: Very Low

Last reviewed: October 21, 2015

Risk of uterine rupture with medical abortion
Uterine rupture has been reported during second-trimester medical abortion in women both with and without a uterine scar. The risk of uterine rupture for any woman undergoing a second-trimester medical abortion is very rare, occurring in less than 1 in 1,000 women (Goyal, 2009). In a meta-analysis of 16 studies of 3,556 women undergoing second-trimester medical abortion with combined or misoprostol-only regimens, there were three women who suffered uterine rupture resulting in a rate of 0.28% with a previous cesarean section and 0.04% without a previous cesarean section (Goyal, 2009).

One single-center retrospective review of 279 women undergoing second-trimester abortion with misoprostol every four hours included 26 women with more than one scar. These women received misoprostol 200mcg every four hours; three had a uterine rupture (Küçükgöz Güleç et al., 2013).

Regimen for women with a uterine scar
Due to the rarity of uterine rupture in women with a previous scar, no clear guidance can be obtained from the published literature (Borgatta & Kapp, 2011; Daponte, Nzewenga, Dimopoulos, & Guidozzi, 2006; Daskalakis et al., 2004; Dickinson, 2005).

Expert opinion supports:

1. No change in medical abortion regimen for women whose gestation is less than 22-24 weeks.
2. After 22-24 weeks gestation with a single uterine scar or throughout the second trimester with more than one uterine scar:
    - Do not use a misoprostol loading dose.
    - Consider decreasing the dose of misoprostol with or without increasing the dosing interval (Ho et al., 2007; Küçükgöz Güleç et al., 2013).
    - There is insufficient evidence to suggest that changing the dosing regimen will decrease the risk of uterine rupture.

Young women

This recommendation is the same for young women.

References

Borgatta, L., & Kapp, N. (2011). Labor induction abortion in the second trimester. *Contraception*, *84*(1), 4-18.

Daponte, A., Nzewenga, G., Dimopoulos, K. D., & Guidozzi, F. (2006). The use of vaginal misoprostol for second-trimester pregnancy termination in women with previous single cesarean section. *Contraception*, *74*(4), 324-327.

Daskalakis, G. J., Mesogitis, S. A., Papantoniou, N. E., Moulopoulos, G. G., Papapanagiotou, A. A., & Antsaklis, A. J. (2004). Misoprostol for second trimester pregnancy termination in women with prior caesarean section. BJOG*: An International Journal of Obstetrics & Gynaecology*, *112*(1), 97-99.

Dickinson, J. E. (2005). Misoprostol for second-trimester pregnancy termination in women with a prior cesarean delivery. *Obstetrics & Gynecology*, *105*(2), 352-356.

Goyal, V. (2009). Uterine rupture in second-trimester misoprostol-induced abortion after cesarean delivery: a systematic review. *Obstetrics & Gynecology*, *113*(5), 1117-1123.

Ho, P. C., Blumenthal, P. D., Gemzell-Danielsson, K., Gomez Ponce de Leon, R., Mittal, S., & Tang, O. S. (2007). Misoprostol for the termination of pregnancy with a live fetus at 13 to 26 weeks. *International Journal of Gynecology and Obstetrics*, *99*(2), 178-181.

Küçükgöz Güleç, Ü., Urunsak, I. F., Eser, E., Guzel, A. B., Ozgunen, F. T., Evruke, I. C., & Buyukkurt, S. (2013). Misoprostol for midtrimester termination of pregnancy in women with 1 or more prior cesarean deliveries. *International Journal of Gynecology & Obstetrics*, *120*, 85-87.

Second-trimester medical abortion: Pain management

Recommendation:

- All women undergoing medical abortion in the second trimester should be offered pain management (WHO, 2012).
- Prophylactic non-steroidal anti-inflammatory drugs reduce the need for narcotic analgesics during second-trimester medical abortion.
- All women should be given nonsteroidal anti-inflammatory drug (NSAIDs) when they begin misoprostol. Narcotic analgesics, anxiolytics, and non-pharmacologic measures may be used as needed. If the personnel, monitoring and equipment are available, regional anesthesia or patient-controlled anesthesia may be offered.

Strength of recommendation: Strong

Quality of evidence: Low

Last reviewed: October 24, 2015

Pain during second-trimester medical abortion

In multiple cohort studies of second-trimester medical abortion, the majority of women require pain medication (Ashok, Templeton, Wagaarachchi, & Flett, 2004; Gemzell-Danielsson & Östlund, 2000; Goh & Thong, 2006; Hamoda, Ashok, Flett, & Templeton, 2004; Rose, Shand, & Simmons, 2006). Advanced gestational age, number of misoprostol doses and induction-to-abortion interval are associated with increased pain during medical abortion (Hamoda et al., 2004). Pain rarely starts after taking mifepristone but becomes more pronounced after misoprostol and typically peaks with expulsion.

Regimens for pain control

All women undergoing medical abortion in the second trimester should be offered pain management, but there is little evidence regarding the optimal regimen. One randomized trial of 74 women undergoing second-trimester medical abortion with mifepristone and misoprostol found that prophylactic treatment with a nonsteroidal anti-inflammatory drug (NSAID) (in this study, diclofenac 100mg orally) at the time of misoprostol administration reduced the need for intravenous opiates when compared to treatment with paracetamol and codeine (Fiala, Swahn, Stephansson, & Gemzell-Danielsson, 2005). In this study, treatment with NSAIDs did not affect abortion outcome.

In the largest cohort study of 1,002 women having second-trimester mifepristone and misoprostol medical abortion, a combination of oral and parenteral narcotic analgesics and NSAIDs was provided at 4-6 hour intervals as required (Ashok et al., 2004). Although it is not evidence based, a combination regimen involving prophylactic NSAIDs given at the time of misoprostol, plus oral and/or parenteral narcotic analgesics, is an effective way of delivering pain management according to a woman's particular needs (Baird, Castleman, Hyman, Gringle, & Blumenthal, 2007). If the personnel, monitoring and equipment are available, regional (epidural) or patient-controlled anesthesia may be offered.

Young women

This recommendation is the same for young women.

References

Ashok, P., Templeton, A., Wagaarachchi, P., & Flett, G. (2004). Midtrimester medical termination of pregnancy: a review of 1002 consecutive cases. *Contraception*, *69*(1), 51-58.

Baird, T. L., Castleman, L. D., Hyman, A. G., Gringle, R. E., & Blumenthal, P. D. (2007). *Clinician's guide for second-trimester abortion* (2nd ed.). Chapel Hill, NC: Ipas.

Fiala, C., Swahn, M., Stephansson, O., & Gemzell-Danielsson, K. (2005). The effect of non-steroidal anti-inflammatory drugs on medical abortion with mifepristone and misoprostol at 13–22 weeks gestation. *Human Reproduction*, *20*(11), 3072-3077.

Gemzell-Danielsson, K., & Östlund, E. (2000). Termination of second trimester pregnancy with mifepristone and gemeprost. *Acta obstetricia et gynecologica Scandinavica*, *79*(8), 702-706.

Goh, S. E., & Thong, K. J. (2006). Induction of second trimester abortion (12–20 weeks) with mifepristone and misoprostol: a review of 386 consecutive cases. *Contraception*, *73*(5), 516-519.

Hamoda, H., Ashok, P., Flett, G., & Templeton, A. (2004). Analgesia requirements and predictors of analgesia use for women undergoing medical abortion up to 22 weeks of gestation. *BJOG: An International Journal of Obstetrics & Gynaecology*, *111*(9), 996-1000.

Rose, S. B., Shand, C., & Simmons, A. (2006). Mifepristone- and misoprostol-induced mid-trimester termination of pregnancy: a review of 272 cases. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, *46*(6), 479-485.

World Health Organization. (2012). *Safe abortion: technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Second-trimester medical abortion with mifepristone and misoprostol: Safety and efficacy

Key information:

A combined regimen with mifepristone and misoprostol is recommended over a misoprostol-only regimen for second-trimester medical abortion (WHO, 2012). The combined regimen is safe and effective, with expulsion rates of over 99%, induction-to-abortion time of around six hours and major complication rates of less than 1%.

Quality of evidence: High

Last reviewed: October28, 2015

Expulsion rates

In the largest cohort study of 1,002 women having second-trimester medical abortion using the recommended mifepristone and misoprostol regimen, the complete expulsion rate was 98.3% at 24 hours and 99.2% at 36 hours (Ashok, Templeton, Wagaarachchi, & Flett, 2004).

Induction-to-abortion interval

In the cohort study mentioned above, the median time to fetal expulsion was 6.25 hours, with a range of 0-67.5 hours. The induction-to-abortion interval was longer in nulliparous women, older women and women at a later gestational age (Ashok et al., 2004). The addition of mifepristone to the medical abortion regimen consistently reduces the induction-to-abortion interval (Dabash et al., 2015; Kapp, Borgatta, Stubblefield, Vragovic, & Moreno, 2007; Ngoc et al., 2011).

Complication rates

The rate of major complications from mifepristone and misoprostol medical abortion in the second trimester is low, although minor complications—such as needing a procedure for bleeding or retained products of conception—are more frequent than for dilatation and evacuation (Autry, Hayes, Jacobson, & Kirby, 2002). In the cohort study of 1,002 women, 81 women (8.1%) needed surgery for uterine evacuation, the majority for retained placenta. Only two out of the 1,002 women needed a surgical evacuation to terminate the pregnancy (Ashok et al., 2004). In this study, serious complications such as hemorrhage, blood transfusion or unanticipated surgery occurred in eight women (<1%).

In a meta-analysis of studies of medical abortion, the overall rate of uterine rupture is 0.08%, with a rate of 0.28% in women with a previous cesarean section (Goyal, 2009). A Finnish register-based study of women who had a medical abortion in either the first (3,427 women) or second (416 women) trimester compared incidence of several factors—preterm birth, low birth weight, small-for-gestational-age infants and placental complications—in subsequent pregnancies (Mannisto et al., 2014). No differences were observed between the two groups, suggesting second-trimester medical abortion does not increase risk of these outcomes in subsequent pregnancies compared to first-trimester medical abortion.

References

Ashok, P., Templeton, A., Wagaarachchi, P., & Flett, G. (2004). Midtrimester medical termination of pregnancy: a review of 1002 consecutive cases. *Contraception*, 69(1), 51-58.

Autry, A. M., Hayes, E. C., Jacobson, G. F., & Kirby, R. S. (2002). A comparison of medical induction and dilation and evacuation for second-trimester abortion. *American Journal of Obstetrics & Gynecology*, 187(2), 393-397.

Dabash, R., Chelli, H., Hajri, S., Shochet, T., Raghavan, S., & Winikoff, B. (2015). A double-blind randomized controlled trial of mifepristone or placebo before buccal misoprostol for abortion at 14-21 weeks of pregnancy. *International Journal of Gynecology and Obstetrics*, 130(1), 40-4.

Goyal, V. (2009). Uterine rupture in second-trimester misoprostol-induced abortion after cesarean delivery: a systematic review. *Obstetrics & Gynecology*, 113(5), 1117-1123.

Kapp, N., Borgatta, L., Stubblefield, P., Vragovic, O., & Moreno, N. (2007). Mifepristone in second-trimester medical abortion: a randomized controlled trial. *Obstetrics & Gynecology*, 110(6), 1304.

Mannisto, J., Mentula, M., Bloigu, A., Gissler, M., Niinimaki, M., Heikinheimo, O. (2014). Medical termination of pregnancy during the second versus the first trimester and its effects on subsequent pregnancy. *Contraception*, 89(2), 109-115.

Ngoc, N. T. N., Shochet, T., Raghavan, S., Blum, J., Nga, N. T. B., Minh, N. T. H., & Winikoff, B. (2011). Mifepristone and misoprostol compared with misoprostol alone for second-trimester abortion: A randomized controlled trial. *Obstetrics & Gynecology*, 118(3), 601-608.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Second-trimester medical abortion with mifepristone and misoprostol: Recommended regimen

Recommendation:

13-24 weeks gestation: Mifepristone 200mg by mouth, followed 24-48 hours later by misoprostol 800mcg vaginally for one dose, then 400mcg vaginally or sublingually every three hours for four more doses (WHO, 2012).

Strength of recommendation: Strong

Quality of evidence:

Up to 20 weeks gestation: Moderate
20-24 weeks gestation: Low

Last reviewed: October 28, 2015

Background

Mifepristone combined with misoprostol is the preferred regimen for medical abortion in the second trimester, as it combines high efficacy, a short induction-to-abortion interval and an excellent safety profile (Dabash et al., 2015; Wildschut et al., 2011).

Mifepristone dose and timing

Mifepristone 200mg given orally is as effective as a 600mg oral dose (Webster, Penney, & Templeton, 1996). When mifepristone is given 12-24 hours instead of 36-48 hours before misoprostol, the induction-to-abortion interval is slightly longer but the abortion rate at 24 hours is similar (Shaw, Topp, Shaw, & Blumenthal, 2013). Simultaneous dosing of mifepristone and misoprostol can be a useful strategy if medical or social issues require an even shorter time interval between the two medications (Chai et al., 2009) because the combined regimen at any timing is more effective than misoprostol alone.

Misoprostol loading dose

Published clinical trials have used a higher loading dose of vaginal misoprostol 600mcg (Chai et al., 2009; el-Refaey & Templeton, 1995) or 800mcg (Hamoda, Ashok, Flett, & Templeton, 2005). The largest case series of 1,002 women undergoing second-trimester abortion with mifepristone and misoprostol used a loading dose of misoprostol 800mcg vaginally with a resulting median induction-to-abortion interval of 6.25 hours and 24-hour efficacy of 97.1% (Ashok, Templeton, Wagaarachchi, & Flett, 2004). When compared to the 800mcg vaginal loading dose, a 600mcg sublingual loading dose has similar efficacy but higher pain medication requirements (Hamoda et al., 2005). A single, small randomized controlled trial assigned 77 women to receive a loading dose of misoprostol vaginally (600mcg, followed by 400mcg every six hours) and 80 to a no-loading dose regimen (400mcg every six hours) (Pongsatha & Tongsong, 2014). Median induction-to-abortion intervals and rates of complete abortion at 24 and 48 hours did not differ between groups; the loading dose group suffered significantly more misoprostol-related side effects.

Misoprostol dosing

Route: Vaginal dosing has superior efficacy when compared to oral dosing (Wildschut et al., 2011). Sublingual dosing has similar efficacy to vaginal, but it is associated with higher pain medication requirements (Hamoda et al., 2005). Oral dosing is inferior to vaginal and sublingual dosing (Ho, Ngai, Liu, Wong, & Lee, 1997; Tang, Chan, Kan, & Ho, 2005). More research is needed to determine the most effective dose and timing for buccal misoprostol (Garg et al., 2015; Ellis, Kapp, Vragpvoc, & Borgata, 2010).

Dose: Misoprostol 400mcg vaginally has higher expulsion rates, shorter induction-to-abortion intervals and similar side effects compared to 200mcg vaginally (Brouns, van Wely, Burger, & van Wijngaarden, 2010). The 400mcg dose is equally effective when given sublingually (Hamoda et al., 2005).

Timing: In studies of misoprostol only, induction-to-abortion intervals were shorter and efficacy at 24 hours was higher when misoprostol was given every three hours compared to every six hours with similar rates of adverse events (Wong, Ngai, Yeo, Tang, & Ho, 2000).

Quality of evidence: The recommendation is based on multiple randomized clinical trials and a Cochrane meta-analysis comparing different mifepristone and misoprostol doses, dosing intervals and routes of administration in the second trimester (Wildschut et al., 2011). Most randomized controlled trials of medical abortion in the second trimester do not include women over 20 weeks gestation.

Young women

This recommendation is the same for young women.

References

Ashok, P. W., Templeton, A., Wagaarachchi, P. T., & Flett, G. M. (2004). Midtrimester medical termination of pregnancy: a review of 1002 consecutive cases. *Contraception, 69*(1), 51-58.

Brouns, J. F., van Wely, M., Burger, M. P., & van Wijngaarden, W. J. (2010). Comparison of two dose regimens of misoprostol for second-trimester pregnancy termination. *Contraception*, *82*(3), 266-275.

Chai, J., Tang, O. S., Hong, Q. Q., Chen, Q. F., Cheng, L. N., Ng, E., & Ho, P. C. (2009). A randomized trial to compare two dosing intervals of misoprostol following mifepristone administration in second trimester medical abortion. *Human Reproduction*, *24*(2), 320-324.

Chaudhuri, P., Mandal, A., Das, C., Mazumdar, A. (2014). Dosing interval of 24 hours versus 48 hours between mifepristone and misprostol administration for mid-trimester terminaiton of pregnancy. *International Journal of Gynecology and Obstetrics*, *1214*, 134-138.

Dabash, R., Chelli, H., Hajri, S., Shochet, T., Raghavan, S., & Winikoff, B. (2015). A double-blind randomized controlled trial of mifepristone or placebo before buccal misoprostol for abortion at 14-21 weeks of pregnancy. *International Journal of Gynecology and Obstetrics*, *130*(1), 40-44.

el-Refaey, H., & Templeton, A. (1995). Induction of abortion in the second trimester by a combination of misoprostol and mifepristone: a randomized comparison between two misoprostol regimens. *Human Reproduction*, *10*(2), 475-478.

Ellis, S. C., Kapp, N., Vragpvoc, O., & Borgata, L. (2010). Randomized trial of buccal versus vaginal misoprostol for induction of second trimester abortion. *Contraception*, *81*(5), 441-445.

Garg, G., Takkar, N., & Sehgal, A. (2015). Buccal versus vaginal misoprostol administration for the induction of first and second trimester abortions. *Journal of Obstetrics and Gynecology of India*, *65*(2), 111-6.

Hamoda, H., Ashok, P. W., Flett, G. M., & Templeton, A. (2005). A randomized trial of mifepristone in combination with misoprostol administered sublingually or vaginally for medical abortion at 13-20 weeks gestation. *Human Reproduction*, *20*(8), 2348-2354.

Ho, P. C., Ngai, S. W., Liu, K. L., Wong, G. C., & Lee, S. W. (1997). Vaginal misoprostol compared with oral misoprostol in termination of second-trimester pregnancy. *Obstetrics & Gynecology*, *90*(5), 735-738.

Pongsatha, S., & Tongsong, T. (2014). Randomized controlled trial comparing efficacy between a vaginal misoprostol loading and non-loading dose regimen for second-trimester pregnancy termination. *The Journal of Obstetrics and Gynaecology Research*, *40*(1), 155-160.

Shaw, K., Topp, N. J., Shaw, J. G., Blumenthal, P. D. (2013). Mifepristone-misoprostol dosing interval and effect on induction abortion times: a systematic review. *Obstetrics & Gynecology*, *121*(6), 1335-1347.

Tang, O. S., Chan, C. C., Kan, A. S., & Ho, P. C. (2005). A prospective randomized comparison of sublingual and oral misoprostol when combined with mifepristone for medical abortion at 12-20 weeks gestation. *Human Reproduction*, *20*(11), 3062-3066.

Webster, D., Penney, G. C., & Templeton, A. (1996). A comparison of 600 and 200 mg mifepristone prior to second trimester abortion with the prostaglandin misoprostol. *BJOG: An International Journal of Obstetrics & Gynecology*, *103*(7), 706-709.

Wildschut, H., Both, M. I., Medema, S., Thomee, E., Wildhagen, M. F., & Kapp, N. (2011). Medical methods for mid-trimester termination of pregnancy. *The Cochrane Database of Systematic Reviews*, Issue 1, CD005216.

Wong, K. S., Ngai, C. S., Yeo, E. L., Tang, L. C., & Ho, P. C. (2000). A comparison of two regimens of intravaginal misoprostol for termination of second trimester pregnancy: a randomized comparative trial. *Human Reproduction*, *15*(3), 709-712.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Second-trimester medical abortion with misoprostol only: Safety and efficacy

Key information:

A combined regimen with mifepristone and misoprostol is recommended for second-trimester medical abortion (WHO, 2012). Where mifepristone is not available, misoprostol only is safe and effective with expulsion rates of over 90% at 48 hours, average induction-to-abortion time of around 12 hours and major complication rates of less than 1%.

Quality of evidence: Moderate

Last reviewed: October 31, 2015

Expulsion rates

In the largest international randomized controlled trial of 681 women having second-trimester medical abortion using the recommended misoprostol-only regimen, the complete expulsion rate was 84.8% at 24 hours and 94.3% at 48 hours (Von Hertzen et al., 2009). Other randomized trials using vaginal or sublingual misoprostol every three hours show similar expulsion rates of 90-95% at 48 hours (Bhattacharjee, Saha, Ghoshroy, Bhowmik, & Barui, 2008; Tang, Lau, Chan, & Ho, 2004). In nulliparous women, vaginal misoprostol has higher expulsion rates than sublingual misoprostol (Von Hertzen et al., 2009).

Induction-to-abortion interval

In the trial cited above, the median time to fetal expulsion was 12 hours with a range of 4.1-61.8 hours, with parous women having faster induction-to-abortion times than nulliparous women (Von Hertzen et al., 2009). Increasing the dosing interval of misoprostol increases the induction-to-abortion time (Wong, Ngai, Yeo, Tang, & Ho, 2000).

Complication rates

The rate of major complications from misoprostol-only abortion in the second trimester is low. In the trial cited above, 12 adverse events (0.02%) were reported, with none of them being serious (Von Hertzen et al., 2009); 10 women required blood transfusions.

References

Bhattacharjee, N., Saha, S. P., Ghoshroy, S. C., Bhowmik, S., & Barui, G. (2008). A randomised comparative study on sublingual versus vaginal administration of misoprostol for termination of pregnancy between 13 to 20 weeks. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, *48*(2), 165-171.

Tang, O. S., Lau, W. N. T., Chan, C. C. W., & Ho, P. C. (2004). A prospective randomised comparison of sublingual and vaginal misoprostol in second trimester termination of pregnancy. *BJOG: An International Journal of Obstetrics & Gynaecology*, *111*(9), 1001-1005.

Von Hertzen, H., Piaggio, G., Wojdyla, D., Huong, N. T. M., Marions, L., Okoev, G., Nair, R. (2009). Comparison of vaginal and sublingual misoprostol for second trimester abortion: randomized controlled equivalence trial. *Human Reproduction*, *24*(1), 106-112.

Wong, K., Ngai, C., Yeo, E., Tang, L., & Ho, P. (2000). A comparison of two regimens of intravaginal misoprostol for termination of second trimester pregnancy: a randomized comparative trial. *Human Reproduction*, *15*(3), 709-712.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Second-trimester medical abortion with misoprostol only: Recommended regimen

Recommendation:

13-24 weeks gestation: Misoprostol 400mcg vaginally or sublingually every three hours for up to five doses. Vaginal dosing is more effective than sublingual dosing for nulliparous women (WHO, 2012).

Strength of recommendation: Strong

Quality of evidence:

Up to 20 weeks gestation: Moderate
20-24 weeks gestation: Low

Last reviewed: October 31, 2015

Background

In the second trimester, a combination regimen with mifepristone and misoprostol has shorter induction-to-abortion intervals and higher success rates than misoprostol only (Wildschut et al., 2011). If mifepristone is not available, a misoprostol-only regimen with dosing every three hours is an acceptable alternative (Wildschut et al., 2011; World Health Organization [WHO], 2012).

Vaginal route

In randomized controlled clinical trials, misoprostol 400mcg vaginally every three hours is associated with a median induction-to-abortion interval of 10-15 hours and a 48-hour successful abortion rate of 90-95% (Bhattacharjee, Saha, Ghoshroy, Bhowmik, & Barui, 2008; Tang, Lau, Chan, & Ho, 2004; von Hertzen et al., 2009). Increasing the dosing interval decreases the efficacy of medical abortion (Wong, Ngai, Yeo, Tang, & Ho, 2000).

Sublingual route

In a meta-analysis of 1,178 women from three randomized controlled trials, misoprostol 400mcg sublingually is similar (Bhattacharjee et al., 2008) or slightly inferior to vaginal dosing when given every three hours (Tang et al., 2004; von Hertzen et al., 2009; Wildschut et al., 2011). In the trials that showed reduced efficacy, the difference was driven by an inferior response to sublingual misoprostol in nulliparous women only. Of note, all of these studies found women prefer the sublingual route to the vaginal route.

Other routes

Buccal route: One trial randomized 130 women to misoprostol 400mcg every three hours either vaginally or buccally; women in the vaginal group had a shorter induction-to-abortion interval and completion rate at both 24 and 48 hours (Al & Yapca, 2015). A smaller trial of 64 women showed buccal misoprostol was as effective as vaginal misoprostol, however all of the women in this trial received a loading dose of misoprostol 400mcg vaginally and were randomized to 200mcg buccally or vaginally every six hours (Ellis, Kapp, Vragpvoc, & Borgatta, 2010). More studies are needed before recommending buccal misoprostol for this purpose.

Oral route: In multiple randomized clinical trials, oral dosing has been shown to be less effective with longer induction-to-abortion intervals than vaginal or sublingual dosing (Nautiyal et al., 2015; Akoury et al., 2004; Bebbington et al., 2002; Behrashi & Mahdian, 2008).

Quality of evidence: The recommendation is based on multiple randomized clinical trials and a Cochrane meta-analysis comparing different misoprostol doses, dosing intervals and routes of administration in the second trimester (Wildschut et al., 2011). Most randomized controlled trials of medical abortion in the second trimester do not include women over 20 week's gestation.

Young women

This recommendation is the same for young women.

References

Akoury, H. A., Hannah, M. E., Chitayat, D., Thomas, M., Winsor, E., Ferris, L. E., Windrim, R. (2004). Randomized controlled trial of misoprostol for second-trimester pregnancy termination associated with fetal malformation. *American Journal of Obstetrics & Gynecology*, *190*(3), 755-762.

Al, R. A., & Yapca, O. E. (2015). Vaginal misoprostol compared with buccal misoprostol for termination of second-trimester pregnancy: a randomized controlled trial. *Obstetrics & Gynecology*, 126(3), 593-8.

Bebbington, M. W., Kent, N., Lim, K., Gagnon, A., Delisle, M. F., Tessier, F., & Wilson, R. D. (2002). A randomized controlled trial comparing two protocols for the use of misoprostol in midtrimester pregnancy termination. *American Journal of Obstetrics & Gynecology*, *187*(4), 853-857.

Behrashi, M., & Mahdian, M. (2008). Vaginal versus oral misoprostol for second-trimester pregnancy termination: a randomized trial. *Pakistan Journal of Biological Sciences, 11*(21), 2505-2508.

Bhattacharjee, N., Saha, S. P., Ghoshroy, S. C., Bhowmik, S., & Barui, G. (2008). A randomised comparative study on sublingual versus vaginal administration of misoprostol for termination of pregnancy between 13 to 20 weeks. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, *48*(2), 165-171.

Ellis, S. C., Kapp, N., Vragovic, O., & Borgatta, L. (2010). Randomized trial of buccal versus vaginal misoprostol for induction of second trimester abortion. *Contraception*, *81*(5), 441-445.

Nautiyal, D., Mukherjee, K., Perhar, I., & Banerjee, N. (2015). Comparative study of misoprostol in first and second trimester abortions by oral, sublingual and vaginal routes. *Journal of Obstetrics and Gynecology of India*, *65*(4), 246-50.

Tang, O. S., Lau, W. N., Chan, C. C., & Ho, P. C. (2004). A prospective randomised comparison of sublingual and vaginal misoprostol in second trimester termination of pregnancy. *BJOG: An International Journal of Obstetrics & Gynecology*, *111*(9), 1001-1005.

von Hertzen, H., Piaggio, G., Wojdyla, D., Nguyen, T. M., Marions, L., Okoev, G.,Peregoudov, A. (2009). Comparison of vaginal and sublingual misoprostol for second trimester abortion: randomized controlled equivalence trial. *Human Reproduction*, *24*(1), 106-112.

Wildschut, H., Both, M. I., Medema, S., Thomee, E., Wildhagen, M. F., & Kapp, N. (2011). Medical methods for mid-trimester termination of pregnancy. *The Cochrane Database of Systematic Reviews* (1), CD005216.

Wong, K. S., Ngai, C. S., Yeo, E. L., Tang, L. C., & Ho, P. C. (2000). A comparison of two regimens of intravaginal misoprostol for termination of second trimester pregnancy: a randomized comparative trial. *Human Reproduction*, *15*(3), 709-712.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Misoprostol for treatment of incomplete and missed abortion (postabortion care) for less than 13-week uterine size: Recommended regimen

Recommendation:

Incomplete abortion: Misoprostol 600mcg orally in a single dose or 400mcg sublingually in a single dose (WHO, 2012)

Missed abortion: Misoprostol 800mcg vaginally in a single dose or 600mcg sublingually every three hours for a maximum of three doses (1,800mcg)

Strength of recommendation: Strong

Quality of evidence: Moderate

Last reviewed: October 31, 2015

Definitions

Incomplete abortion: An abortion—whether spontaneous or induced—in which some pregnancy tissue passes out of the uterus but some remains.

Missed abortion: A kind of miscarriage; the pregnancy ends, but the tissue remains in the uterus.

Incomplete abortion

In a Cochrane review of 12 studies of 2,894 women presenting with incomplete abortion under 13 weeks, management with misoprostol showed a slightly lower incidence of completion compared to vacuum aspiration, but success rates were high for both methods (Neilson, Gyte, Hickey, Vazquez, & Dou, 2013). In the analysis, oral and sublingual misoprostol showed similar efficacy and side effect profiles. Lengthening the time to provider follow-up increases the success of misoprostol treatment.

Missed abortion

A single dose of misoprostol 800mcg vaginally results in successful uterine evacuation in more than 80% of women (Ngoc, Blum, Westheimer, Quan, & Winikoff, 2004). Some studies have used repeat doses of misoprostol 800mcg vaginally after 24 hours (Barcelo et al., 2012; Graziosi, Mol, Ankum, & Bruinse, 2004; Muffley, Stitely, & Gherman, 2002) or 72 hours (Gilles et al., 2004; Zhang et al., 2005) with a resulting increase in the complete abortion rates. However, it is unclear whether the increase in complete abortion is due to the additional prostaglandin dose or the increased time to evaluation.

When women are managed expectantly after a single dose of misoprostol, their complete abortion rates increase over time (Ngoc et al., 2004). Misoprostol 600mcg sublingually repeated every three hours for a maximum of two more doses achieves similar success rates (Tang, Ong, Tse, Ng, Lee, & Ho, 2003; Tang et al., 2006). A 2013 trial randomized 310 women, 91% of whom had early missed abortion, to receive either 400mcg or 800mcg of misoprostol vaginally as a single dose with a second dose 24 hours later if the products of

conception had not yet passed (Petersen et al., 2013). Both doses were equally effective in completing the abortion, although more women in the 400mcg group received a second dose of misoprostol.

Young women

This recommendation is the same for young women. In a secondary analysis of 485 misoprostol users (Creinin et al., 2006) nulliparity was associated with twice the likelihood of successful treatment with a single dose of 800mcg vaginal misoprostol.

References

Barcelo, F., De Paco, C., Lopez-Espin, J. J., Silva, Y., Abad, L., & Parrilla, J. J. (2012). The management of missed miscarriage in an outpatient setting: 800 versus 600 µg of vaginal misoprostol. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, *52*(1), 39-43.

Creinin, M. D., Huang, X., Westhoff, C., Barnhart, K., Gilles, J. M., & Zhang, J. (2006). Factors related to successful misoprostol treatment for early pregnancy failure. *Obstetrics & Gynecology*, *107*(4), 901.

Gilles, J. M., Creinin, M. D., Barnhart, K., Westhoff, C., Frederick, M. M., & Zhang, J. (2004). A randomized trial of saline solution-moistened misoprostol versus dry misoprostol for first-trimester pregnancy failure. *American Journal of Obstetrics & Gynecology*, *190*(2), 389-394.

Graziosi, G. C., Mol, B. W., Ankum, W. M., & Bruinse, H. W. (2004). Management of early pregnancy loss. *International Journal of Gynecology and Obstetrics*, *86*(3), 337-346.

Muffley, P. E., Stitely, M. L., & Gherman, R. B. (2002). Early intrauterine pregnancy failure: a randomized trial of medical versus surgical treatment. *American Journal of Obstetrics & Gynecology*, *187*(2), 321-325.

Neilson, J. P., Gyte, G. M., Hickey, M., Vazquez, J. C., & Dou, L. (2013). Medical treatments for incomplete miscarriage. *The Cochrane Database of Systematic Reviews*, Issue 1, CD007223.

Ngoc, N. T., Blum, J., Westheimer, E., Quan, T. T., & Winikoff, B. (2004). Medical treatment of missed abortion using misoprostol. *International Journal of Gynecology and Obstetrics*, *87*(2), 138-142.

Petersen, S.G., Perkins, A., Gibbons, K., Bertolone, J., Devenish-Meares, P., Cave, D., Mahomed, K. (2013). Can we use a lower intravaginal dose of misoprostol in the medical management of miscarriage? A randomized controlled study. *Australian and New Zealand Journal of Obstetrics and Gynecology*, *53*, 64-73.

Tang, O. S., Lau, W. N., Ng, E. H., Lee, S. W., & Ho, P. C. (2003). A prospective randomized study to compare the use of repeated doses of vaginal with sublingual misoprostol in the management of first trimester silent miscarriages. *Human Reproduction*, *18*(1), 176-181.

Tang, O. S., Ong, C. Y., Tse, K. Y., Ng, E. H., Lee, S. W., & Ho, P. C. (2006). A randomized trial to compare the use of sublingual misoprostol with or without an additional 1 week course for the management of first trimester silent miscarriage. *Human Reproduction*, *21*(1), 189-192.

World Health Organization. (2012). *Safe abortion: technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Zhang, J., Gilles, J. M., Barnhart, K., Creinin, M. D., Westhoff, C., & Frederick, M. M. (2005). A comparison of medical management with misoprostol and surgical management for early pregnancy failure. *The New England Journal of Medicine*, *353*(8), 761-769.

Misoprostol for treatment of incomplete and missed abortion (postabortion care) for more than 13-week uterine size (second trimester): Recommended regimen

Recommendation:

- Misoprostol in a dose of at least 200mcg vaginally, sublingually or buccally may be given every six hours.
- Pretreatment with mifepristone 200mg orally 1-2 days before misoprostol may decrease the time from induction to expulsion.
- The misoprostol-only or mifepristone-misoprostol regimen for induced abortion in the second trimester can be used.
- Where skilled providers and supportive facilities exist, dilation and evacuation may be offered.

Strength of recommendation: Strong

Quality of evidence: Low

Last reviewed: October 31, 2015

Background

The majority of postabortion care research and programs focus on women in the first trimester with uterine size less than 13 weeks (Ipas, 2013). However, where unsafe abortion is prevalent, as many as 40% of women needing postabortion care present in the second trimester (Ministry of Health of Kenya, Ipas and Guttmacher Institute, 2013). Women may present with incomplete abortion, retained placenta, fetal demise or ruptured membranes, all of which require uterine evacuation. Currently, no widely recognized guidance exists regarding how to manage postabortion care at later gestations or larger uterine size (World Health Organization [WHO], 2012).

Medical regimens

Evidence is limited to suggest the optimal medical regimen for second-trimester postabortion care, but a systematic review of the literature suggests that at least 200mcg vaginally, sublingually or buccally given every six hours is an effective regimen (Bracken, 2014; Mark, Borgatta, & Edelman, 2015). Pretreatment with mifepristone 1-2 days prior to misoprostol may reduce the time to expulsion (Stibbe, 2012). Expert opinion supports using regimens similar to second-trimester medical abortion until further evidence is generated (Mark, Borgatta, & Edelman, 2015).

Dilatation and evacuation (D&E)

No studies have compared medical management versus vacuum aspiration or D&E for postabortion care in the second trimester. However, D&E is recommended for induced abortions in the second trimester and can be offered to women for postabortion care where skilled providers and supportive facilities exist (WHO, 2012).

Young women

This recommendation is the same for young women.

References

Bracken, H., et al., (2013). Buccal misoprostol for treatment of fetal death at 14-28 weeks of pregnancy: A double-blind randomized controlled trial. *Contraception*, *89*(3), 187-192.

Ipas. (2013). *Woman-centered postabortion care: Reference manual* (2nd ed.). K.L. Turner & A.B. Huber (Eds.). Chapel Hill, NC: Ipas.

Mark, A., Borgatta, L., & Edelman, A. (2015). Second trimester postabortion care for ruptured membranes, fetal demise, and incomplete abortion. *International Journal of Obstetrics and Gynaecology*, *129*(2), 98-103.

Ministry of Health of Kenya, Ipas, and Guttmacher Institute. (2013). *Incidence and complications of unsafe abortion In Kenya: Key findings of a national study.* African Population and Health Research Center: Nairobi.

Stibbe, K.J. and S. de Weerd. (2012). Induction of delivery by mifepristone and misoprostol in termination of pregnancy and intrauterine fetal death: 2nd and 3rd trimester induction of labour. *Archives of Gynecology and Obstetrics*, *286*(3), 795-796.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Vacuum aspiration for treatment of incomplete and missed abortion (postabortion care): Prophylactic antibiotics

Recommendation:

Routine prophylactic antibiotics are recommended for treatment of incomplete or missed abortion with vacuum aspiration (commonly referred to as postabortion care). Where antibiotics are unavailable, uterine aspiration may still be offered. Women with signs or symptoms of infection should be given therapeutic antibiotics.

Strength of recommendation: Weak

Quality of evidence: Very low

Last reviewed: October 23, 2015

Background

Scant literature exists supporting routine antibiotics during vacuum aspiration for incomplete or missed abortion (commonly referred to as postabortion care) (May, Gülmezoglu, & Ba-Thike, 2007). However, routine prophylactic antibiotics are recommended before vacuum aspiration for induced abortion (World Health Organization [WHO], 2012), and therefore in the absence of evidence, it seems prudent to administer prophylactic antibiotics for vacuum aspiration when used for postabortion care, especially in areas where unsafe abortion is prevalent (Achilles & Reeves, 2011). The inability to provide antibiotics should not limit access to vacuum aspiration (WHO, 2012), as the overall risk of infection is low.

Regimen

Many antibiotic regimens for abortion prophylaxis have been studied, but the ideal antibiotic, dose and timing has not yet been established (Achilles & Reeves, 2011). Tetracyclines (doxycycline) and nitroimidazoles (metronidazole and tinidizole) are commonly used because of their clinical efficacy, oral availability, low cost and low risk of allergic reactions (Achilles & Reeves, 2011). A short pre-operative course of oral doxycycline or metronidazole may be used in clinical practice.

Therapeutic antibiotics

Women who present with signs and symptoms of infection should be treated with broad spectrum oral or intravenous antibiotics according to the severity of the infection.

Quality of evidence

A Cochrane review of antibiotics for incomplete abortion found only one randomized controlled trial from Zimbabwe with 140 women that showed no benefit from a course of oral tetracycline after uterine evacuation (May, Gülmezoglu, & Ba-Thike, 2007; Seeras, 1989). United States trials of prophylactic oral (Ramin et al., 1995) or intravenous (Prieto, Eriksen & Blanco, 1995) doxycycline and a Thai trial of intramuscular cefoxitin (Titipant & Cherdchoogieat, 2012) before evacuation for incomplete abortion have shown no reduction in postoperative infection with antibiotics.

Young women

This recommendation is the same for young women.

References

Achilles, S. L., & Reeves, M. F. (2011). Prevention of infection after induced abortion: Release date October 2010 SFP Guideline 20102. *Contraception*, *83*(4), 295-309.

May, W., Gülmezoglu, A., & Ba-Thike, K. (2007). Antibiotics for incomplete abortion. *The Cochrane Database of Systematic Reviews,* Issue 4, CD000491.

Prieto, J. A., Eriksen, N. L., & Blanco, J. D. (1995). A randomized trial of prophylactic doxycycline for curettage in incomplete abortion. *Obstetrics & Gynecology*, *85*(5), 692-696.

Ramin, K. D., Ramin, S. M., Hemsell, P. G., Nobles, B. J., Heard, M. C., Johnson, V. B., & Hemsell, D. L. (1995). Prophylactic antibiotics for suction curettage in incomplete abortion. *Infectious Diseases in Obstetrics and Gynecology*, *2*(5), 213-217.

Seeras, R. (1989). Evaluation of prophylactic use of tetracycline after evacuation in abortion in Harare Central Hospital. *East African Medical Journal*, *66*(9), 607-610.

Titapant, V., & Cherdchoogieat, P. (2012). Effectiveness of cefoxitin on preventing endometritis after uterine curettage for spontaneous incomplete abortion: a randomized controlled trial study. *Journal of the Medical Association of Thailand, 95*(11), 1372-1377.

World Health Organization. (2012). *Safe abortion: technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

Postabortion hemorrhage

Recommendation:

When hemorrhage occurs, providers need to perform rapid diagnosis and management. Hemorrhage caused by atony may be treated with uterine massage, uterotonic medications, reaspiration, tamponade or surgery as a last resort. Women need close monitoring and treatment for shock.

Strength of recommendation: Strong

Quality of evidence: Low

Last reviewed: October 28, 201

Background

Hemorrhage after abortion is rare, occurring in 0-3 per 1,000 cases following first-trimester vacuum aspiration, and 0.9-10 per 1,000 cases following second-trimester uterine evacuation (Kerns & Steinauer, 2013). Definitions of postabortion hemorrhage vary, making comparisons of incidence, risk factors and treatments across studies difficult. A definition proposed by the Society for Family Planning is excessive bleeding that requires a clinical response such as transfusion or hospital admission, and/or bleeding in excess of 500mL (Kerns & Steinauer, 2013).

Diagnosis

When postabortion hemorrhage is suspected, clinicians should take a rapid, systematic approach to assessing and treating women. Initial assessment includes an inspection of the cervix for laceration, a bimanual examination to assess for uterine atony, and ultrasound examination or repeat aspiration to evaluate for retained pregnancy-related material or blood.

Management

Cervical lacerations may be treated with direct pressure with gauze or a sponge-holding forcep, application of topical clotting agents like Monsel's solution and silver nitrate, or absorbable sutures.

Uterine atony requires a rapid, sequential response starting with uterine massage, to uterotonics, reaspiration, uterine tamponade and finally to surgical measures. Providers should move quickly to the next step if bleeding is not controlled. When uterotonic medications are used, additional or repeat doses may be used if bleeding does not improve after the first dose.

Uterotonic medications and dosages (Lichtenberg & Grimes, 2009)

Medication	Dosage
Methylergonovine	0.2mg intramuscularly or intracervically; repeat after 15 minutes for a maximum of 5 doses. Avoid in women with hypertension
Misoprostol	200-800mcg orally, rectally or sublingually (World Health Organization, 2012)
Oxytocin	20 units in 1L of intravenous fluid at a rate of 60 drops/minute; maximum of 3L of fluid

Intrauterine tamponade	Sterile gauze, 30-75mL Foley catheter balloon or inflated condom placed in uterus.

Reaspiration is appropriate if there is evidence of retained tissue or accumulation of blood in the uterus on ultrasound.

If tamponade successfully stops the bleeding, the Foley balloon, gauze or inflated condom should be left in place for several hours while the patient is observed. If she remains stable after the balloon or gauze is removed, she may be discharged.

Surgical measures like hysterectomy, uterine compression sutures, uterine artery ligation or uterine artery embolization can be performed for bleeding that cannot be controlled by other measures. Providers at health centers without available operating rooms or expertise should have clear protocols for resuscitation and transfer to a higher level of care.

All women who experience postabortal bleeding should be managed appropriately for potential shock with IV line placement, supplemental oxygen, fluid resuscitation, and replacement of blood products as indicated.

Young women

This recommendation is the same for young women.

References

Kerns, J. & Steinauer, J. (2013). Management of postabortion hemorrhage. *Contraception*, *87*, 331-42.

Lichtenberg, E.S. & Grimes, D.A. (2009). Surgical complications: Prevention and management. In Paul, M., Lichtenberg, E.S., Borgatta, L., Grimes, D.A., Stubblefield, P.G., Creinin, M.D. (Eds.). *Management of unintended and abnormal pregnancy: Comprehensive abortion care (224-251).* Chichester, West Sussex, UK: John Wiley & Sons, Ltd.

World Health Organization. (2012). *WHO recommendations for the prevention and treatment of postpartum hemorrhage*. Geneva: World Health Organization.

Pain medication table

Though the medications shown below are commonly used for pain management during vacuum aspiration and dilatation and evacuation, many other options exist. This table does not cover general anesthetic agents.

Both anxiolytics and narcotics may cause respiratory depression, especially when they are used together. Accordingly, lower doses should be used when they are together than when they are separate. When medications are given intravenously immediately before a procedure they should be given slowly and intermittently by a specially trained provider. Problematic side effects can be avoided by repeated small intravenous doses that are titrated to a woman's level of pain and sedation. The peak analgesic effect should occur during the procedure to avoid excessive postprocedure sedation.

Even clinicians using lighter sedation analgesia must be able to manage respiratory arrest, in the unlikely event that an unintentional overdose should occur. Providers should be trained in airway management and cardiopulmonary resuscitation, and resuscitative equipment and appropriate antagonist drugs (naloxone and flumazenil) should be available.

Disclaimer: This resource is designed to be a supplemental resource for clinicians and is NOT intended to serve as a replacement for drug label information or clinical judgment that accounts for patients' and facilities' unique circumstances.

Last reviewed: November 4, 2015

Drug type	Generic drug name	Dose and timing	Half-life	Side effects	Comments
Local anesthetic	Xylocaine	15-20ml of 0.5-1% solution in a paracervical block not to exceed 4.5mg/kg	60-90 minutes	Buzzing in ears; dizziness; numbness in lips, mouth and tongue; metallic taste; seizures (rare)	• Pull back plunger before injecting to avoid intravascular injection. Wait 3 minutes for medication to take effect • Mild reaction (itching, rash, and hives) can be treated with 25-50mg diphenhydramine IM or IV • For intense reaction or respiratory distress, obtain IV access immediately. Give epinephrine 0.4mg subcutaneously and diazepam 5mg slow IV push • Support respiration. If wheezing is present, inhaler may be helpful

					• Allergic reaction is very rare. Reactions that do occur may be due to preservatives in multi-dose vials. Preservative-free lidocaine allergy is extremely rare
Nonsteroidal anti-inflammatory drug (NSAID)	Ibuprofen	Oral: 400-800mg 1 hour before the procedure	4-6 hours	Possible gastrointestinal upset	Do not use in women with active peptic ulcer disease or renal failure
	Naproxen	Oral: 550mg 1 hour before the procedure	4-6 hours	Possible gastrointestinal upset	Do not use in women with active peptic ulcer disease or renal failure
	Ketorolac	Oral: 20mg 1 hour before procedure IV: 30mg over at least 15 seconds 30-60 minutes before procedure IM: 60mg 30-60 minutes before procedure For women less than 50kg, all doses should be halved	4-6 hours		• Single dose IM ketorolac prior to surgery may reduce opioid use and postoperative pain (de Oliveira, 2012; Roche, 2011) • Do not use in women with active peptic ulcer disease, renal failure, breastfeeding or sensitivity to other NSAIDs • Breakthrough pain should be managed with narcotics rather than increasing ketorolac beyond the recommended doses
Analgesic	Acetaminophen	Oral: 500-1,000mg 30-60 minutes before procedure	3-6 hours		• Not a first-line pain medication for vacuum aspiration or medical abortion. May be used as an antipyretic • Liver toxicity from overdose (maximum dose = 4,000mg/day) is a risk
Narcotic/analgesic combination	Acetaminophen 300mg + codeine 30mg	Oral: 1-2 tablets 1 hour before procedure	3-6 hours	Drowsiness, light-headedness, nausea and vomiting, decreased breathing	• If respiration is compromised, assist with breathing (airway management, oxygen and ambu bag) and reverse with naloxone (see end of chart) • Be aware of combining with other acetaminophen containing products. Liver toxicity from overdose

				rate, loss of consciousness	of acetaminophen (maximum dose = 4,000 mg/day) is a risk.
	Acetaminophen 500mg + hydrocodone 5mg	Oral: 1-2 tablets 1 hour before procedure	4-6 hours	Drowsiness, light-headedness, nausea and vomiting, decreased breathing rate, loss of consciousness	• If respiration is compromised, assist with breathing (airway management, oxygen and ambu bag) and reverse with naloxone (see end of chart) • Be aware of combining with other acetaminophen-containing products. Liver toxicity from overdose of acetaminophen (maximum dose = 4,000 mg/day) is a risk
Narcotic	Meperidine	Oral: 100-150mg 30-60 minutes before procedure IV: 25-50mg 5-15 minutes prior to procedure IM/SC: 50-100mg 30-90 minutes prior to procedure	4-6 hours	Drowsiness, light-headedness, nausea and vomiting, decreased breathing rate, loss of consciousness,, hypotension, seizures	• If respiration is compromised, assist with breathing (airway management, oxygen and ambu bag) and reverse with naloxone (see end of chart) • More rapid onset and shorter duration of action than morphine • Meperidine 60-80mg = morphine 10mg
	Fentanyl	IV: 50-100mcg immediately before procedure (may repeat every 10-15 minutes, not to exceed 250mcg) IM: 50-100mcg 30-60 minutes before procedure	30-60 minutes	Drowsiness, light-headedness, weakness, bradycardia, decreased breathing rate, loss of consciousness,, hypotension, seizures	• If respiration is compromised, assist with breathing (airway management, oxygen and ambu bag) and reverse with naloxone (see end of chart) • More rapid onset and shorter duration of action than meperidine • Fentanyl 100mcg = meperidine 75mg = morphine 10mg • Onset of action is 2-7 minutes when given IV
	Tramadol	IV/IM: 50-100mg 15-30 minutes before the procedure	4-6 hours	Drowsiness, light-headedness, sweating, weakness, fatigue, seizures	• If respiration is compromised, assist with breathing (airway management, oxygen and ambu bag) and reverse with diazepam

		Oral/suppository: 50-100mg 60-90 minutes prior to the procedure			• Less respiratory depression than morphine or meperidine • Tramadol 100mcg = morphine 10mg
Anxiolytic (Benzodiazepine)	Diazepam	Oral: 10mg 1 hour before procedure IV: 2-5mg IV 20 minutes before procedure	21-37 hours	Blurred vision, dizziness, disorientation, pain and redness on injection, decreased breathing rate, loss of consciousness	• If respiration is compromised, assist with breathing (airway management, oxygen and ambu bag) and reverse with flumazenil (see end of chart) • Has a mild amnestic effect • Onset of action is 2-10 minutes when given IV
	Midazolam	IV: 1-2mg immediately before the procedure, then 0.5-1mg IV every 5 minutes as needed, not to exceed 5mg IM: 0.07-0.08mg/kg or about 5mg up to 1 hour before procedure	1-4 hours	Blurred vision, dizziness, disorientation, CNS and respiratory depression	• If respiration is compromised, assist with breathing (airway management, oxygen and ambu bag) and reverse with flumazenil (see end of chart) • Midazolam 2.5mg = diazepam 10mg • Stronger amnestic effect than diazepam • Onset of action is 1-5 minutes when given IV and 15-30 minutes when given IM
	Lorazepam	Oral: 1-2mg 30-60 minutes before procedure IV: 2mg given over 1 minute immediately before the procedure IM: 0.05mg/kg up to a maximum of 4mg within 2 hours before the procedure	14 hours	Blurred vision, dizziness, disorientation, decreased breathing rate, loss of consciousness	• If respiration is compromised, assist with breathing (airway management, oxygen and ambu bag) and reverse with flumazenil (see end of chart) • Amnestic effect • Occasionally may increase patient anxiety

Reversal agent for narcotic	Naloxone	IV: 0.4mg vial mixed in 10mL saline. Give 1mL (40mcg/mL) every 2 minutes until reversal is seen			• Naloxone's duration of action is 1 hour and may wear off before the narcotic. Therefore, patients treated with naloxone must be monitored closely for several hours • Maintain airway and respirations while giving naloxone
Reversal agent for benzodiazepine	Flumazenil	IV: 0.2mg every minute until respirations return. Do not exceed 1mg			• Flumazenil's duration of action is 1 hour and may wear off before the benzodiazepine. Therefore, patients treated with flumazenil must be monitored closely for several hours. In the event of overdose with narcotic and benzodiazepine, reverse the narcotic first with naloxone and use flumazenil subsequently if needed • Maintain airway and respirations while giving flumazenil

References

De Oliveira, G. S., Agarwal, D., & Benzon, H. T. (2012). Perioperative single dose ketorolac to prevent postoperative pain: a meta-analysis of randomized trials. *Anesthesia & Analgesia*, *114*(2), 424-433.

Roche, N. E., Li, D., James, D., Fechner, A., & Tilak, V. (2011). The effect of perioperative ketorolac on pain control in pregnancy termination. C*ontraception*, *85*(3), 299-303.

Making Ipas clinical recommendations

When a specific clinical recommendation is made within Ipas's *Clinical Updates in Reproductive Health*, there are two elements included to help put the clinical information in perspective:

1. **Quality of evidence**
2. **Strength of the recommendation**

Quality of evidence reflects the extent to which we can be *confident* that an *estimate of the effect of an intervention* is adequate to support recommendations (Guyatt et al., 2008).

Strength of a recommendation reflects the extent to which we can be *confident* that the desirable effects of an intervention outweigh the undesirable effects (Guyatt, Oxman, Kunz, Falck-Ytter et al., 2008). In other words, adherence to the recommendation will *do more good than harm*.

Last reviewed: November 4, 2015

Quality of evidence

Clinical evidence, and the recommendations based on the evidence, can be of varying quality. Sources of evidence range from small studies or case reports to well-designed large clinical studies that have minimized bias. The quality of evidence is defined as the "extent to which one can be confident that an estimate of effect or association is correct."

When assessing the quality of evidence, the following criteria are considered (Oxman & Group, 2004):

1. the study design
2. the consistency of the results across available studies
3. precision of the results (wide or narrow confidence intervals)
4. the applicability with respect to populations, interventions and settings where the proposed intervention may be used
5. the likelihood of publication bias

Ipas uses the principles of the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system, a four-level system of grading quality of evidence that works as follows:

- A **high** grade is assigned when further research is very unlikely to change our confidence in the estimate of effect.
- A **moderate** grade indicates that further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
- A l**ow** grade indicates that further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
- A **very low** grade is reserved for when any estimate of effect is very uncertain.

Based on these grading criteria, randomized trials are initially given a high grade, observational studies are initially labeled as having a low quality of evidence, and any other evidence is very low. However, the grade could decrease if the evidence is based on poor study quality, inconsistent results, indirect evidence, imprecise

or sparse data, or a high probability of reporting bias. The grade could increase if there is a strong association between the intervention and the outcome.

Strength of a recommendation

Strength of recommendation is determined by the balance between desirable and undesirable consequences of alternative management strategies (for example, manual vacuum aspiration versus dilatation and curettage), quality of evidence, variability in clients' values and preferences, and resource availability and use (Guyatt, Oxman, Kunz, Falck-Ytter et al., 2008). Desirable effects can include improved health outcomes, less burden for providers and health systems, and greater savings. Undesirable effects can include harm to patients, greater burden (for example, the demands of adhering to an onerous recommendation) and increased costs.

Strong recommendations are granted when the desirable effects of an intervention or adherence with a recommendation clearly outweigh the undesirable effects (Guyatt, Oxman, Vist et al., 2008).

Weak recommendations are made when evidence suggests that desirable effects of an intervention and recommendation probably outweigh the undesirable effects but there are small benefits or benefits that may not be worth the costs, and there is an absence of high-quality evidence (Guyatt, Oxman, Vist et al., 2008).

The difficulty in developing guidelines based on quality of evidence is that the studies evaluated may not have comparable patient populations, health-care settings or resources as those contexts to which the recommendations are targeted. Those developing guidelines should take into account the patient population, nature of the intervention, cost-effectiveness and opportunity cost of an alternate intervention, feasibility of intervention in the specified health-care setting, and societal cost (Guyatt, Oxman, Vist et al., 2008; Guyatt, Oxman, Kunz, Jaeschke et al., 2008; World Health Organization [WHO], 2012). Similar to the WHO's approach, Ipas should help countries "localize" recommendations by providing technical assistance when necessary.

Can you have a strong recommendation based on low-quality evidence?

Yes. There are many factors that influence the strength of a recommendation.

For example, although there is limited evidence about the safety and efficacy of providing hormonal contraception during medical abortion, several factors increase the strength of the recommendation that women can be offered hormonal contraception at the time of the first pill of a medical abortion regimen: 1) the value of integrating contraception into abortion care to prevent unintended pregnancy, 2) the low theoretical risk that it interferes with the mechanism of action of mifepristone or misoprostol, and 3) the risk that women who do not get a contraceptive method at the time of abortion will not return for it later.

References

Guyatt, G. H., Oxman, A. D., Kunz, R., Falck-Ytter, Y., Vist, G. E., Liberati, A., & Schünemann, H. J. (2008). Rating quality of evidence and strength of recommendations: Going from evidence to recommendations. *BMJ: British Medical Journal*, *336*(7652), 1049.

Guyatt, G. H., Oxman, A. D., Kunz, R., Jaeschke, R., Helfand, M., Liberati, A., Schünemann, H. J. (2008). Incorporating considerations of resources use into grading recommendations. *BMJ: British Medical Journal*, *336*(7654), 1170-1173.

Guyatt, G. H., Oxman, A. D., Kunz, R., Vist, G. E., Falck-Ytter, Y., & Schünemann, H. J. (2008). What is "quality of evidence" and why is it important to clinicians? *BMJ: British Medical Journal*, *336*(7651), 995-998.

Guyatt, G. H., Oxman, A. D., Vist, G. E., Kunz, R., Falck-Ytter, Y., Alonso-Coello, P., & Schünemann, H. J. (2008). GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ: British Medical Journal*, *336*(7650), 924-926.

Oxman, A., & Group, G. W. (2004). Grading quality of evidence and strength of recommendations. *BMJ: British Medical Journal*, *328*(19), 1490-1494.

World Health Organization. (2012). *Safe abortion: Technical and policy guidance for health systems* (2nd ed.). Geneva: World Health Organization.

CURH-E16January 2016