



The American College of  
Obstetricians and Gynecologists  
WOMEN'S HEALTH CARE PHYSICIANS

# PRACTICE BULLETIN

CLINICAL MANAGEMENT GUIDELINES FOR OBSTETRICIAN—GYNECOLOGISTS

NUMBER 135, JUNE 2013

## Second-Trimester Abortion

*In the United States, more than one half of pregnancies are unintended, with 3 in 10 women having an abortion by age 45 years (1). In 2008, 1.2 million abortions occurred in the United States, of which 6.2% took place between 13 weeks of gestation and 15 weeks of gestation, and 4.0% took place at 16 weeks of gestation or later (2, 3). Only 1.3% of abortions are performed at 21 weeks of gestation or later (4). The proportion of abortions performed in the second trimester, usually defined as between 13 weeks of gestation and 26 weeks of gestation (as calculated from the last menstrual period), has remained stable during the past two decades (4). The purpose of this document is to provide evidence-based guidelines for the medical and surgical methods of second-trimester termination as well as for the management of associated complications.*

### Background

#### **Indications for Second-Trimester Abortion**

Second-trimester abortion is an important component of comprehensive women's health care, and women seek termination later in pregnancy for a variety of medical and social reasons. Circumstances that can lead to second-trimester abortion include delays in suspecting and testing for pregnancy, delay in obtaining insurance or other funding, and delay in obtaining referral, as well as difficulties in locating and traveling to a provider (5). Poverty, lower education level, and having multiple disruptive life events, have been associated with higher rates of seeking second-trimester abortion (3). In addition, major anatomic or genetic anomalies may be detected in the fetus in the second trimester and women may choose to terminate their pregnancies (47–95%) (6–8). The identification of major anatomic or genetic anomalies in the fetus through screening and diagnostic testing most commonly occurs in the second trimester,

although first-trimester screening and chorionic villus sampling can enable first-trimester diagnosis of aneuploidy. Some obstetric and medical indications for second-trimester termination include preeclampsia and preterm premature rupture of membranes, among other conditions. Additional indications for uterine evacuation in the second trimester are pregnancy failure before 20 weeks of gestation and fetal demise. In 2005, the U.S. fetal mortality rate was 6.22 fetal deaths at 20 weeks of gestation or more per 1,000 live births and fetal deaths, and this rate was higher for teenagers; women aged 35 years and older; and among non-Hispanic black, Hispanic, and American Indian or Alaska Native women (9).

#### **Methods of Second-Trimester Abortion**

Both surgical and medical methods of pregnancy termination can be used in the second trimester. Limited evidence suggests that the vast majority (95%) of second-trimester abortions in the United States are performed by dilation and evacuation (D&E); however, terminations by medical abortion may be underreported (10, 11).

**Committee on Practice Bulletins—Gynecology.** This Practice Bulletin was developed by the Committee on Practice Bulletins—Gynecology with the assistance of Jody Steinauer, MD, Andrea Jackson, MD, and Daniel Grossman, MD. The Society of Family Planning and the Society of Maternal-Fetal Medicine endorse this document. The information is designed to aid practitioners in making decisions about appropriate obstetric and gynecologic care. These guidelines should not be construed as dictating an exclusive course of treatment or procedure. Variations in practice may be warranted based on the needs of the individual patient, resources, and limitations unique to the institution or type of practice.



In many areas of the United States, women have limited access to second-trimester abortion, in general, and may not have the option to choose between D&E and medical abortion. In a census of abortion providers, 64% reported offering some services after 12 weeks of gestation, and only 23% reported providing abortions at 20 weeks of gestation and later (2). In another survey of clinics providing second-trimester abortion, only 33% offered medical abortion in addition to D&E (11). Some women with fetal anomalies or medical complications of pregnancy are directed toward medical abortion because of a lack of skilled D&E providers nearby (12). Dilation and evacuation training is not available in all residency programs, and many residents trained in D&E have not performed a sufficient number of procedures to achieve competency in the technique (13–15). In order to help ensure access to D&E, residency training programs should offer integrated abortion training that includes second-trimester D&E, and practicing obstetrician–gynecologists should establish referral relationships with skilled D&E providers.

### **Legal Issues**

Induced abortion remains one of the most regulated medical procedures in the United States. Although the U.S. Supreme Court has determined that state bans on abortion are unconstitutional, it has upheld many state laws that make abortion services less accessible. These laws include specific physician and hospital requirements, gestational age limits, restrictions on use of state funds and private insurance, waiting periods, required parental involvement, specialized facility requirements, and mandatory information requirements (16). The federal Partial-Birth Abortion Ban Act of 2003 was upheld by the U.S. Supreme Court in 2007 and imposes a nationwide prohibition on what the act calls “partial-birth abortions.” Although “partial-birth abortion” is not a medical term and is vaguely defined in the law, physicians and lawyers have interpreted the banned procedures as including intact D&E unless fetal demise occurs before surgery. The act does not provide guidance about how physicians should comply with the act or document compliance.

Physicians should be aware of relevant federal and state abortion regulations so they can provide appropriate treatment for their patients. In 2011, 24 states passed a total of 92 provisions restricting and regulating abortion (17). By the end of 2011, six states had banned all abortions after 20 weeks of gestation based on concerns related to fetal pain beyond this gestational age (16). Medical evidence, however, suggests that fetal perception of pain may not occur until the third trimester (18, 19).

## **Second-Trimester Abortion Procedures**

Following the 1973 Supreme Court decision in *Roe v. Wade*, which established the legality of abortion in the United States, the techniques of second-trimester abortion changed considerably. Over time, physicians began using first-trimester techniques beyond the 12-week gestational age limit and developed the modern D&E procedure. By the late 1970s, researchers had documented the safety of D&E and concluded that it was safer than the medical abortion techniques used at the time (20).

### **Dilation and Evacuation**

The D&E technique usually requires cervical preparation before the procedure and the use of grasping forceps to remove the fetus. Cervical preparation is recommended before D&E to decrease the risk of cervical trauma (21). Cervical softening and dilation can be achieved by placement of osmotic dilators before the procedure or by the use of prostaglandin analogues, most commonly misoprostol (22, 23). After achieving adequate dilation and administering analgesia and sedation or anesthesia, D&E is accomplished by aspirating the amniotic fluid and removing the fetus with forceps through the cervix and vaginal canal. Usually disarticulation (or dismemberment) occurs as the physician delivers the fetal part grasped in the instrument and pulls it through the cervix. A final suction curettage is often performed to ensure that the uterus is completely evacuated.

Intact D&E is a variation of D&E that requires more advanced cervical dilation, usually achieved over several days. The procedure involves the removal of the intact fetus except for possible decompression of the calvaria (24). The intact D&E procedure is preferable in certain cases, such as when preservation of fetal anatomy is desired. Additionally, compared with D&E, the intact D&E procedure may be associated with lower risks of uterine perforation and infection because it minimizes the use of forceps, and reduces the risk of retained fetal tissue (25).

### **Medical Abortion**

Second-trimester abortion also can be safely accomplished through medical induction or medical abortion. Compared with D&E, termination by induction with misoprostol is less cost-effective, is associated with a greater risk of complications, such as incomplete abortion, and may be prolonged (26–29). Medical abortion may be preferred by some patients and providers for the termination of pregnancies complicated by fetal anomalies, genetic disorders, or maternal health issues (12). Modern medical abortion methods include the use of one or more of the following: prostaglandin analogues, mifepristone,



osmotic cervical dilators, Foley catheters, and oxytocin (30). Misoprostol, either alone or in combination with other agents, is recommended over other instillation agents and uterotonics because of its high efficacy, low cost, and ease of use (Box 1).

Osmotic cervical dilators are sometimes used in conjunction with pharmacologic uterotonic agents; however, osmotic dilators do not provide added benefit to induction with prostaglandin analogues (31, 32).

### Box 1: Regimens for Second-Trimester Medical Abortion ◀

- Mifepristone, 200 mg, administered orally, followed in 24–48 hours by
  - Misoprostol, 800 micrograms, administered vaginally, followed by 400 micrograms administered vaginally or sublingually every 3 hours for up to a maximum of five doses.\*
  - Misoprostol, 400 micrograms, administered buccally every 3 hours for up to a maximum of five doses also may be used.
- If mifepristone is not available:
  - Misoprostol, 400 micrograms, administered vaginally or sublingually every 3 hours for up to five doses.\* Vaginal dosage is superior to sublingual dosage for nulliparous women.
  - A vaginal loading dose of 600–800 micrograms of misoprostol followed by 400 micrograms administered vaginally or sublingually every 3 hours may be more effective.
- If misoprostol is not available:
  - Oxytocin, 20–100 units, infused intravenously over 3 hours, followed by 1 hour without oxytocin to allow diuresis. Oxytocin dosage may be slowly increased to a maximum of 300 units over 3 hours.†

\*If the abortion is not complete after five doses, the woman may be allowed to rest for 12 hours before starting the cycle again.

†High-dose oxytocin is not commonly used in the second-trimester because of the inefficient response of the uterus to oxytocin during this gestational period.

Data from Borgatta L, Kapp N. Clinical guidelines. Labor induction abortion in the second trimester. *Society of Family Planning. Contraception* 2011;84:4–18; Ashok PW, Templeton A, Wagaarachchi PT, Flett GM. Midtrimester medical termination of pregnancy: a review of 1002 consecutive cases. *Contraception* 2004;69:51–8; Kapp N, Borgatta L, Stubblefield P, Vragovic O, Moreno N. Mifepristone in second-trimester medical abortion: a randomized controlled trial. *Obstet Gynecol* 2007;110:1304–10; and Ngoc NT, Shochet T, Raghavan S, Blum J, Nga NT, Minh NT, et al. Mifepristone and misoprostol compared with misoprostol alone for second-trimester abortion: a randomized controlled trial. *Obstet Gynecol* 2011;118:601–8.

Mifepristone followed in 24–48 hours by misoprostol is the most effective regimen for second-trimester medical abortion, with up to 91% efficacy within 24 hours of initiation of misoprostol and with a significantly shorter induction interval and fewer adverse effects than misoprostol alone (30, 33, 34). However, mifepristone may not be available in all settings, and misoprostol as a single agent is effective for medical abortion (Box 1).

### Abdominal Surgery

In rare instances, second-trimester abortion may be performed by hysterectomy or hysterotomy. These procedures are associated with a much higher risk of complication than D&E or medical abortion and should only be performed when the latter two procedures have failed or are contraindicated (35).

### Effecting Fetal Demise

No evidence currently supports the use of induced fetal demise to increase the safety of second-trimester medical or surgical abortion. Techniques used to cause fetal demise include division of the umbilical cord, intra-amniotic or intrafetal digoxin injection, or fetal intracardiac potassium chloride injection. Some providers of second-trimester surgical abortion use these methods to ensure fetal demise before the procedure or because they believe it facilitates D&E by causing maceration. A randomized, placebo-controlled clinical trial found that injection of 1 mg of intra-amniotic digoxin did not decrease procedure time or provider-reported technical difficulty or complications, but did increase vomiting (15). A retrospective cohort study found an increased complication rate after digoxin use, including increased odds of infection (odds ratio [OR], 5.9; 95% confidence interval [CI], 1.7–20.1), spontaneous abortion (OR, 6.9; 95% CI, 4.2–9.7), and hospitalization (OR, 6.9; 95% CI, 4.2–9.7) compared with controls that did not receive digoxin (36). However, another study reporting on a large case series (37) found a much lower rate of complications, including spontaneous abortion (0.3%; 95% CI, 0.2–0.5%, compared with 1.9% [36]) and infection (0.04%; 95% CI, 0–0.2%, compared with 3.4% [36]). In its 2010 *Clinical Guidelines* on the topic, the Society of Family Planning concluded that current evidence does not support the use of induced fetal demise to improve the safety of D&E (38). With medical abortion after 20 weeks of gestation, induced fetal demise may be preferable to the woman or provider in order to avoid transient fetal survival after expulsion. Based on limited evidence, induced fetal demise before medical abortion may shorten induction time (30).



## Complications

The mortality rate associated with abortion is low (0.6 per 100,000 legal, induced abortions), and the risk of death associated with childbirth is approximately 14 times higher than that with abortion (39, 40). Abortion-related mortality increases with each week of gestation, with a rate of 0.1 per 100,000 procedures at 8 weeks of gestation or less, and 8.9 per 100,000 procedures at 21 weeks of gestation or greater (41).

Rare complications associated with both D&E and medical abortion include hemorrhage, cervical laceration, retained products of conception, and infection (42–44). Uterine perforation can occur with D&E, whereas uterine rupture can occur with medical abortion (42–44).

### Postabortion Hemorrhage

Although uncommon, postabortion hemorrhage is a serious complication that must be promptly recognized and managed. Because postabortion hemorrhage has been defined differently in different studies, the Society of Family Planning recently proposed a definition that includes “both a clinical response to excessive bleeding, such as transfusion or admission, and/or bleeding in excess of 500 mL” (45). Hemorrhage requiring transfusion occurs in 0.1–0.6% of D&E procedures and in 0.7% of second-trimester medical abortions (21, 46–50). Risk factors for hemorrhage include advanced maternal age, insufficient cervical dilation, use of general anesthesia, and a medical history of more than one cesarean delivery (21, 51, 52). Reported etiologies of postabortion hemorrhage include retained products of conception, uterine atony, cervical laceration, uterine perforation or rupture, abnormal placentation, and disseminated intravascular coagulopathy (DIC). One case series of postabortion uterine artery embolization for refractory hemorrhage identified the following etiologies: uterine atony (52%), abnormal placentation (17%), cervical laceration (12%), uterine perforation (7%), lower uterine segment bleeding without atony (5%), and DIC (5%) (53).

**Retained products of conception.** Retained tissue or incomplete abortion has been reported in less than 1% of cases of D&E, but occurs in at least 8% of cases of medical abortion that involve use of the mifepristone regimen (21, 46–50). In several cohort studies, incomplete abortion was significantly more common after medical abortion with misoprostol compared with D&E (26–28, 54).

**Uterine atony.** *Uterine atony*, defined as hypocontractility of the uterine body and fundus, is a common cause of hemorrhage. In a review of 3,000 D&E procedures, uterine atony occurred in 2.6% of cases, and increased

patient age and increased gestational age were independent predictors of this complication (51). It also may be increased in cases of prior cesarean delivery.

**Cervical laceration.** Cervical lacerations occur in up to 3.3% of second-trimester abortion cases and have been reported after both D&E and medical abortion (26, 51, 55). Risk factors for cervical lacerations include mechanical dilation, nulliparity, advanced gestational age, and provider inexperience.

**Uterine perforation.** The frequency of uterine perforation in second-trimester surgical abortion has been reported to be 0.2–0.5% (21, 46, 48, 49, 56, 57). Perforations are associated with advanced gestational age, multiparity, and provider inexperience, and are less likely to occur with adequate cervical preparation (58). Severe pain or visualization of extrauterine tissue in the vaginal field can alert the surgeon to a perforation. Brisk bleeding is not common unless an artery is lacerated. It always is important to consider bowel and bladder injuries when perforation is suspected in the second trimester. When a perforation is diagnosed before the termination is complete, it may be necessary to finish the abortion under direct visualization by laparotomy or laparoscopy if the patient becomes hemodynamically unstable. If the patient is stable, it may be possible to complete the procedure under ultrasonographic guidance or later, after initial management of the perforation.

**Uterine rupture.** Although uterine rupture associated with medical abortion has been reported among women with both scarred and unscarred uteri, the magnitude of the risk of this complication is unknown (30). Uterine rupture was reported in 1 patient in a series of 1,002 consecutive cases of second-trimester medical abortion (50). In a systematic review of studies of second-trimester induction abortion that included misoprostol, the risk of uterine rupture in women with prior cesarean delivery was 0.28% (95% CI, 0.08–1.00%), whereas the risk of uterine rupture in women without prior cesarean delivery was 0.04% (95% CI, 0.01–0.20%) (59). Because the risk of uterine rupture associated with prior cesarean delivery is similar to the risk among women without a prior cesarean delivery, guidelines support the safety of misoprostol specifically and medical abortion generally in women with one prior cesarean delivery (30, 60).

**Abnormal placentation.** Women with prior cesarean deliveries are at an increased risk of placenta accreta and warrant special attention (61), particularly if ultrasonography indicates a low-lying placenta or placenta previa. When there is a suspicion of abnormal placentation, D&E is the preferred abortion method, and preparations should be made for possible hemorrhage by ensuring



the procedure is performed at an appropriate facility with accessibility to blood products, interventional radiology, and the capability to perform a hysterectomy if necessary. Because the positive predictive value of ultrasonography to diagnose placenta accreta may be as low as 65%, preoperative uterine artery embolization is not generally recommended (53, 62, 63). Although the diagnostic accuracy of magnetic resonance imaging is similar to ultrasonography for placenta accreta (63), magnetic resonance imaging may be useful to confirm accreta and identify patients who should be referred to a tertiary care center that has interventional radiology and surgical services immediately available.

**Disseminated intravascular coagulation.** Copious hemorrhage may result in coagulopathy, so the provider must be prepared to manage DIC. In addition, when a patient presents with a fetal demise in the second trimester, she is at an increased risk of DIC (64). In the event of persistent postabortion hemorrhage, blood should be drawn and evaluated for hemoglobin, hematocrit, and coagulation parameters. When the international normalized ratio is elevated or there is clinical suspicion for coagulopathy, there should be a low threshold for the administration of fresh frozen plasma or cryoprecipitate.

**Infection.** The prevalence of postabortion infection in the second trimester has been reported to be 0.1–4%, although this outcome has not been clearly defined in all studies (21, 46–48, 50). Symptoms and signs usually arise within the first few days after the abortion, and patients presenting with postabortion infection should be evaluated for retained products of conception. Ascending genital tract infections are polymicrobial and should be treated with a broad-spectrum antibiotic regimen (65). Administration of prophylactic antibiotics decreases the risk of infection after surgical abortion by 40% and, therefore, should be provided to all patients undergoing D&E (66). Both tetracyclines and metronidazole provide significant and comparable protection against postabortal pelvic inflammatory disease. One of the most effective and inexpensive regimens is 100 mg of doxycycline taken orally 1 hour before the abortion followed by 200 mg after the procedure (67). Although mild infection has been reported after medical abortion (50), prophylactic antibiotics for second-trimester medical abortion currently are not recommended (68).

**Embolism.** The incidence of fatal and nonfatal pulmonary embolism is 10–20/100,000 abortions (69, 70). Amniotic fluid embolism occurs in between 1 in 10,000 and 1 in 80,000 pregnancies, and when it occurs after second-trimester abortion, it has a mortality rate of 80% (70, 71).

## Clinical Considerations and Recommendations

### ► *What is the preferred procedure for second-trimester abortion?*

When comparing methods for second-trimester abortion, providers should consider safety, effectiveness, cost, logistics, patient preference, and indication. Dilation and evacuation is safe and effective and has advantages over termination by medical abortion. The timing of D&E is predictable, and although it may require preoperative outpatient visits for cervical preparation, the procedure usually is faster and may be more cost-effective than medical abortion (72). Medical abortion or intact D&E may be preferable when autopsy is desired. Intact D&E also may be the preferred method when uterine instrumentation should be minimized, such as in the case of chorioamnionitis, or with certain fetal anomalies, such as severe hydrocephalus, that may make extraction or delivery difficult.

Dilation and evacuation is associated with fewer complications (up to 4%) than medical abortion involving misoprostol regimens (up to 29%), with the most common complication of medical abortion being retained placenta (21%) (26–28, 54). However, these results may not be applicable to medical abortions involving mifepristone combined with misoprostol because randomized trials demonstrate that this regimen has faster times to completion, decreased hospital time, and a lower risk of retained placenta, compared with regimens with misoprostol used alone (33, 34). A pilot randomized controlled trial comparing outcomes of women undergoing midtrimester abortion by D&E versus medical abortion with mifepristone and misoprostol, reported fewer adverse events, specifically less pain and gastrointestinal adverse effects, in women undergoing D&E (29). This trial failed to recruit its target sample size because most potential study participants strongly preferred D&E and declined to be randomized (29). Another randomized controlled trial from the United Kingdom found that women assigned to D&E reported less pain and were more likely to say they would opt for the same procedure again compared with those who underwent induction with mifepristone and misoprostol; overall complications were similar between the two groups (73). Regardless, medical abortion is the preferred method of second-trimester abortion if a trained D&E provider is not available.

Patient preference also should be taken into account. Although some women may prefer medical abortion, research has shown that many patients prefer D&E and



consider it less emotionally challenging than induction (12, 74). Indirect evidence suggests that women seek out D&E services even when it causes significant delays in abortion (5, 12).

► ***What is the appropriate management of post-abortion hemorrhage?***

Management of postabortion hemorrhage consists of developing a primary, secondary, and tertiary treatment plan (45).

**Primary Treatment**

Primary treatment begins with an immediate visual and digital cervical examination to assess for cervical lacerations, bimanual examination to assess uterine tone, and ultrasonography to identify reaccumulation of blood or retained tissue. Some clinicians use a cannula test, in which an 8–10-mm cannula is inserted into the fundus and slowly withdrawn, to distinguish lower uterine segment or high cervical bleeding from fundal bleeding due to uterine atony.

If atony is suspected, management includes prompt uterine massage and administration of uterotonic agents. Methylergonovine maleate is an appropriate first-line uterotonic agent unless contraindicated, as in patients with hypertension. Misoprostol is an effective agent in the setting of postabortion hemorrhage, and doses of 800–1,000 micrograms are recommended. Although studies of misoprostol pharmacokinetics suggest that vaginal administration achieves the highest peak concentration, it is usually not feasible in the setting of hemorrhage (75). Rectal administration is often used (especially if the patient is intubated), but the Society of Family Planning's guidelines suggest that buccal or sublingual routes of 800–1,000 micrograms of misoprostol may be preferable to rectal administration based on pharmacokinetic data (45). Although often used, oxytocin may not be effective because there are few oxytocin receptors in a uterus during the second trimester.

**Secondary Treatment**

If refractory or excessive bleeding occurs, secondary treatment includes obtaining additional intravenous access and administering fluid resuscitation. Further assessment may include assessment of hemoglobin, hematocrit, coagulation parameters, creatinine (in anticipation of possible uterine artery embolization), and blood type and crossmatch for possible transfusion (if not previously obtained). Blood and coagulation factors should be available in the setting of hemorrhage because DIC is possible.

If refractory bleeding is thought to be due to atony or lower uterine segment bleeding, a Foley catheter or

intrauterine balloon should be inserted to tamponade the endometrial cavity. Both the Foley catheter (inflated using 30 mL or 60 mL of saline) and the intrauterine balloon (inflated using 120–250 mL of saline) have been successfully used for postabortion hemorrhage (51, 76–78). Once the bleeding has stopped after tamponade by the balloon and treatment with uterotonic agents, the balloon can be removed.

**Tertiary Treatment**

For persistent refractory bleeding, tertiary treatment methods include uterine artery embolization, laparoscopy, laparotomy, or hysterectomy. Uterine artery embolization for refractory hemorrhage has been described in case series (53, 79, 80). In the largest series, intervention with uterine artery embolization was 100% successful in avoiding hysterectomy in cases due to atony, cervical laceration, DIC, and lower uterine segment bleeding (53). With suspected placenta accreta, uterine artery embolization was successful in 43% of cases (53). In general, in a clinically stable patient, hysterectomy should only be considered after other treatments have failed. Overall, hysterectomies occur following 1.4/10,000 abortions in the United States, with uterine perforation as the most common cause (81).

If a cervical laceration is found, its extent should be evaluated, and temporary measures of hemostasis, such as application of direct pressure by ring forceps, should be attempted. Minor abrasions can be treated with basic ferric subsulfate solution or silver nitrate. Significant lacerations of the cervix may require repair with absorbable sutures. High cervical tears can be sutured or treated by applying pressure with an intrauterine Foley catheter; sutures also may be placed at the 3-o'clock position and the 9-o'clock position on the cervix. If bleeding continues after repair of a high cervical tear, a uterine artery laceration should be considered as a possible etiology of hemorrhage. Targeted uterine artery embolization can be attempted in such a case (53, 79, 80), but if embolization is not possible, laparotomy may be required for stabilization.

► ***How can complications associated with second-trimester abortion be prevented or minimized?***

Several measures can prevent and minimize complications from second-trimester abortion, including obtaining a thorough medical history and performing a physical examination to identify and manage risk factors for complications, accurately dating pregnancy by ultrasonography, localizing the placenta (especially in women with prior uterine surgery), and assessing preoperative hemoglobin level and blood type. The use of vasopressin in the paracervical block may decrease blood loss from



D&E as reported in one randomized controlled trial (82). For women with medical complications, consultations with appropriate specialists can minimize risk. Women with prior cesarean deliveries are at an increased risk of abnormal placentation. Patients with placenta previa and prior cesarean delivery who are past 14 weeks of gestation should have focused imaging and counseling, and if placenta accreta is suspected, they should be cared for in a setting with access to resuscitative equipment and personnel (45). Given that provider inexperience is associated with a higher risk of complications with D&E, training in the procedure is an important way to prevent complications.

Insufficient cervical dilation has been associated with an increased risk of hemorrhage and cervical laceration with D&E, and studies support routine cervical preparation to decrease these risks (21, 23, 51). Cervical dilation protocols for D&E vary according to gestational age and include same-day preparation with misoprostol or a hygroscopic cervical dilator, osmotic dilators placed 1 or more days before the procedure, or a combination of misoprostol and osmotic dilators (11, 22, 23). Limited data indicate mifepristone also can be used for cervical preparation before D&E at 14–16 weeks of gestation, although more research is needed (83).

► ***Is intraoperative ultrasonography necessary in second-trimester abortion?***

Real-time ultrasonographic guidance during D&E is not used universally, and its utility depends on the training level of the provider. A study comparing the rate of uterine perforation before and after the adoption of intraoperative ultrasonography for second-trimester abortion showed that its use in a training program significantly decreased the risk of this complication (84). Although intraoperative ultrasonography may be helpful, especially during training, its use is not required.

► ***Are there special considerations in the management of second-trimester fetal demise and termination for fetal anomalies?***

Options for the management of second-trimester pregnancy termination for fetal anomalies and fetal demise are similar to those for other indications and include D&E and medical abortion. Dilation and evacuation is the preferred method because it is associated with a lower risk of complications than medical induction (26, 27, 85); however, patient preference, the need for fetal autopsy, and the availability of a skilled provider may influence this decision (86). Although many obstetric providers believe that women terminating a pregnancy for fetal anomalies and fetal demise prefer induction of labor to D&E, this

may not be the case (12, 87). When allowed to undergo the procedure of their choice, grief resolution appears to be similar between women that choose D&E and those that choose medical abortion for pregnancy termination (88). Although autopsy for further diagnosis usually is not needed in cases of a fetus with an abnormal karyotype, an autopsy of an intact fetus may alter the final diagnosis and patient counseling in some cases of structural malformations identified by ultrasound (89–92).

► ***What can be done to reduce delays that contribute to second-trimester abortion?***

A cross-sectional study of women presenting for abortion in the second trimester at a large urban abortion clinic found that it took these women an average of 3 weeks longer to suspect they were pregnant than women who presented in the first trimester, and more than one half were already past the second trimester when they underwent pregnancy tests. In addition, logistic delays, including receiving inappropriate or delayed referrals and difficulty in finding a provider, contributed to patients presenting for second-trimester abortion, thus linking the paucity of second-trimester providers to delay (5). Poor women, African American women, and teenagers are more likely to report delays in accessing abortion care (5, 93, 94).

Interventions to improve and facilitate early identification of pregnancy should be encouraged, including efforts to educate women about the signs and symptoms of pregnancy. Strategies to increase access to early abortion services, such as increasing the number of clinicians who provide either early aspiration or medical abortion and expanding the use of telemedicine to provide early medical abortion, might help reduce second-trimester abortion (95). All physicians should facilitate timely referrals for abortion care to reduce delays in accessing services. In addition, state and federal abortion policies that restrict access to abortion services should be repealed because they can contribute to delays in accessing care and higher morbidity rates (17).

► ***What contraceptive methods can be provided after second-trimester abortion?***

Approximately one half of the women seeking abortion have had prior abortions and thus are at high risk of repeat, unintended pregnancy (96). Women should initiate contraception immediately after an abortion because ovulation can resume as early as 21 days after the procedure. Except for hysteroscopic sterilization, diaphragm, or cervical cap, all forms of contraception can be considered after second-trimester abortion and initiated on the day of the procedure (97–99).



Intrauterine devices (IUDs) are highly effective reversible forms of contraception that can be safely placed immediately after abortion and decrease the rate of repeat abortion (100–102). Immediate insertion of IUDs after second-trimester D&E is associated with higher adherence, lower pregnancy rates, and high patient satisfaction compared with delayed insertion at the time of a follow-up visit (103–105). Few trials examine expulsion rates of modern, T-shaped IUDs when placed immediately after D&E; however, the expulsion rate may be slightly higher than after interval placement. One study that examined post-D&E insertion of the levonorgestrel IUD randomized women to either immediate or delayed (3–6-week) insertion (104). All women in the immediate-insertion group received IUDs, compared with only 46% in the delayed-insertion group, primarily because a sizeable proportion of women in the delayed-insertion group did not return for the insertion. At 6 months, the expulsion rate was not statistically different between the immediate-insertion group (6.8%; 95% CI, 1.4%–18.7%) and the delayed-insertion group (5.0%; 95% CI, 0.1–24.9%). Another study that examined insertion of copper IUDs after D&E randomized women to either immediate placement or delayed (2–4 weeks) placement (103). Although there was a trend toward increased expulsion in the immediate-placement group (3.1%; 95% CI, 0–8.0%) compared with the delayed-placement (0%) group, this difference was not statistically significant. In this study, women randomized to immediate placement were significantly more likely to have an IUD at 6 months compared with women randomized to delayed placement (relative risk, 11.2; 95% CI, 5–26) (103). Other reported complications, including pelvic inflammatory disease and perforation, are rare and do not appear to occur at higher rates with immediate postabortion insertion versus delayed postabortion insertion of IUDs (100, 105). No published studies report on IUD insertion immediately after second-trimester medical induction, but the Royal College of Obstetricians and Gynaecologists endorses this practice (106).

## Summary of Recommendations and Conclusions

*The following recommendations and conclusions are based on good and consistent scientific evidence (Level A):*

- ▶ Cervical preparation is recommended before D&E to decrease risk of cervical trauma.

- ▶ Mifepristone followed in 24–48 hours by misoprostol is the most effective regimen for second-trimester medical abortion.
- ▶ Misoprostol as a single agent is effective for medical abortion.
- ▶ Administration of prophylactic antibiotics decreases the risk of infection after surgical abortion and, therefore, should be provided to all patients undergoing D&E.
- ▶ Except for hysteroscopic sterilization, diaphragm, or cervical cap, all forms of contraception can be considered after second-trimester abortion and initiated on the day of the procedure.

*The following recommendations and conclusions are based on limited or inconsistent scientific evidence (Level B):*

- ▶ Dilation and evacuation is associated with fewer complications than medical abortion involving misoprostol regimens.
- ▶ When there is a suspicion of abnormal placentation, D&E is the preferred abortion method, and preparations should be made for possible hemorrhage by ensuring the procedure is performed at an appropriate facility with accessibility to blood products, interventional radiology, and the capability to perform a hysterectomy if necessary.
- ▶ The use of vasopressin in the paracervical block may decrease blood loss from D&E.
- ▶ Methylergonovine maleate is an appropriate first-line uterotonic agent unless contraindicated, as in patients with hypertension. Misoprostol is an effective agent in the setting of postabortion hemorrhage, and doses of 800–1,000 micrograms are recommended.
- ▶ If refractory bleeding is thought to be due to atony or lower uterine segment bleeding, a Foley catheter or intrauterine balloon should be inserted to tamponade the endometrial cavity.
- ▶ Because the risk of uterine rupture associated with prior cesarean delivery is similar to the risk among women without a prior cesarean delivery, guidelines support the safety of misoprostol specifically and medical abortion generally in women with one prior cesarean delivery.

*The following recommendations are based primarily on consensus and expert opinion (Level C):*

- ▶ In order to ensure access to D&E, residency training programs should offer integrated abortion training that includes second-trimester D&E.





- ▶ All physicians should facilitate timely referrals for abortion care to reduce delays in accessing services.
- ▶ Interventions to improve and facilitate early identification of pregnancy should be encouraged, including efforts to educate women about the signs and symptoms of pregnancy.

## References

1. Finer LB, Zolna MR. Unintended pregnancy in the United States: incidence and disparities, 2006. *Contraception* 2011;84:478–85. (Level III) [PubMed] [Full Text] ⇐
2. Jones RK, Kooistra K. Abortion incidence and access to services in the United States, 2008. *Perspect Sex Reprod Health* 2011;43:41–50. (Level III) [PubMed] [Full Text] ⇐
3. Jones RK, Finer LB. Who has second-trimester abortions in the United States? *Contraception* 2012;85:544–51. (Level III) [PubMed] [Full Text] ⇐
4. Pazol K, Creanga AA, Zane SB, Burley KD, Jamieson DJ. Abortion surveillance—United States, 2009. *MMWR Surveill Summ* 2012;61(SS-8):1–44. (Level II-3) [PubMed] [Full Text] ⇐
5. Drey EA, Foster DG, Jackson RA, Lee SJ, Cardenas LH, Darney PD. Risk factors associated with presenting for abortion in the second trimester. *Obstet Gynecol* 2006; 107:128–35. (Level II-3) [PubMed] [*Obstetrics & Gynecology*] ⇐
6. Anderson N, Boswell O, Duff G. Prenatal sonography for the detection of fetal anomalies: results of a prospective study and comparison with prior series. *AJR Am J Roentgenol* 1995;165:943–50. (Level III) [PubMed] [Full Text] ⇐
7. Boyd PA, Devigan C, Khoshnood B, Loane M, Garne E, Dolk H. Survey of prenatal screening policies in Europe for structural malformations and chromosome anomalies, and their impact on detection and termination rates for neural tube defects and Down's syndrome. EUROCAT Working Group. *BJOG* 2008;115:689–96. (Level III) [PubMed] [Full Text] ⇐
8. Shaffer BL, Caughey AB, Norton ME. Variation in the decision to terminate pregnancy in the setting of fetal aneuploidy. *Prenat Diagn* 2006;26:667–71. (Level III) [PubMed] ⇐
9. MacDorman MF, Kirmeyer SE, Wilson EC. Fetal and perinatal mortality, United States, 2006. *Natl Vital Stat Rep* 2012;60(8):1–22. (Level II-3) ⇐
10. Stubblefield PG, Carr-Ellis S, Borgatta L. Methods for induced abortion. *Obstet Gynecol* 2004;104:174–85. (Level III) [PubMed] [*Obstetrics & Gynecology*] ⇐
11. O'Connell K, Jones HE, Lichtenberg ES, Paul M. Second-trimester surgical abortion practices: a survey of National Abortion Federation members. *Contraception* 2008;78: 492–9. (Level III) [PubMed] [Full Text] ⇐
12. Kerns J, Vanjani R, Freedman L, Meckstroth K, Drey EA, Steinauer J. Women's decision making regarding choice of second trimester termination method for pregnancy complications. *Int J Gynaecol Obstet* 2012;116:244–8. (Level III) [PubMed] [Full Text] ⇐
13. Eastwood KL, Kacmar JE, Steinauer J, Weitzen S, Boardman LA. Abortion training in United States obstetrics and gynecology residency programs. *Obstet Gynecol* 2006;108:303–8. (Level III) [PubMed] [*Obstetrics & Gynecology*] ⇐
14. Steinauer J, Silveira M, Lewis R, Preskill F, Landy U. Impact of formal family planning residency training on clinical competence in uterine evacuation techniques. *Contraception* 2007;76:372–6. (Level III) [PubMed] [Full Text] ⇐
15. Jackson RA, Teplin VL, Drey EA, Thomas LJ, Darney PD. Digoxin to facilitate late second-trimester abortion: a randomized, masked, placebo-controlled trial. *Obstet Gynecol* 2001;97:471–6. (Level I) [PubMed] [*Obstetrics & Gynecology*] ⇐
16. Guttmacher Institute. An overview of abortion laws. State Policies in Brief. New York (NY): GI; 2012. Available at: [http://www.guttmacher.org/statecenter/spibs/spib\\_OAL.pdf](http://www.guttmacher.org/statecenter/spibs/spib_OAL.pdf). Retrieved November 26, 2012. (Level III) ⇐
17. Guttmacher Institute. States enact record number of abortion restrictions in first half of 2011. New York (NY): GI; 2011. Available at: <http://www.guttmacher.org/media/inthenews/2011/07/13/index.html>. Retrieved November 26, 2012. (Level III) ⇐
18. Lee SJ, Ralston HJ, Drey EA, Partridge JC, Rosen MA. Fetal pain: a systematic multidisciplinary review of the evidence. *JAMA* 2005;294:947–54. (Level III) [PubMed] [Full Text] ⇐
19. Royal College of Obstetricians and Gynaecologists. Fetal awareness: review of research and recommendations for practice. Report of a working party. London: RCOG; 2010. Available at: <http://www.rcog.org.uk/files/rcog-corp/RCOGFetalAwarenessWPR0610.pdf>. Retrieved November 26, 2012. (Level III) ⇐
20. Grimes DA, Schulz KF, Cates W Jr, Tyler CW Jr. Mid-trimester abortion by dilatation and evacuation: a safe and practical alternative. *N Engl J Med* 1977;296: 1141–5. (Level II-2) [PubMed] ⇐
21. Peterson WF, Berry FN, Grace MR, Gulbranson CL. Second-trimester abortion by dilatation and evacuation: an analysis of 11,747 cases. *Obstet Gynecol* 1983; 62:185–90. (Level II-3) [PubMed] [*Obstetrics & Gynecology*] ⇐
22. Fox MC, Hayes JL. Cervical preparation for second-trimester surgical abortion prior to 20 weeks of gestation. Society of Family Planning. *Contraception* 2007;76: 486–95. (Level III) [PubMed] [Full Text] ⇐
23. Newmann S, Dalve-Endres A, Drey EA. Clinical guidelines. Cervical preparation for surgical abortion from 20 to 24 weeks' gestation. Society of Family Planning. *Contraception* 2008;77:308–14. (Level III) [PubMed] [Full Text] ⇐
24. Hammond C, Chasen S. Dilatation and evacuation. In: Paul M, Lichtenberg ES, Borgatta L, Grimes DA, Stubblefield PG, Creinin MD, editors. Management of



- unintended and abnormal pregnancy: comprehensive abortion care. Hoboken (NJ): Wiley-Blackwell; 2009. p. 157–77. (Level III) ⇐
25. Chasen ST, Kalish RB, Gupta M, Kaufman JE, Rashbaum WK, Chervenak FA. Dilatation and evacuation at  $\geq 20$  weeks: comparison of operative techniques. *Am J Obstet Gynecol* 2004;190:1180–3. (Level II-3) [PubMed] [Full Text] ⇐
  26. Autry AM, Hayes EC, Jacobson GF, Kirby RS. A comparison of medical induction and dilation and evacuation for second-trimester abortion. *Am J Obstet Gynecol* 2002;187:393–7. (Level II-3) [PubMed] [Full Text] ⇐
  27. Bryant AG, Grimes DA, Garrett JM, Stuart GS. Second-trimester abortion for fetal anomalies or fetal death: labor induction compared with dilation and evacuation. *Obstet Gynecol* 2011;117:788–92. (Level II-3) [PubMed] [*Obstetrics & Gynecology*] ⇐
  28. Grossman D, Constant D, Lince N, Alblas M, Blanchard K, Harries J. Surgical and medical second trimester abortion in South Africa: a cross-sectional study. *BMC Health Serv Res* 2011;11:224. (Level II-3) [PubMed] [Full Text] ⇐
  29. Grimes DA, Smith MS, Witham AD. Mifepristone and misoprostol versus dilation and evacuation for midtrimester abortion: a pilot randomised controlled trial. *BJOG* 2004;111:148–53. (Level I) [PubMed] [Full Text] ⇐
  30. Borgatta L, Kapp N. Clinical guidelines. Labor induction abortion in the second trimester. Society of Family Planning. *Contraception* 2011;84:4–18. (Level III) [PubMed] [Full Text] ⇐
  31. Jain JK, Mishell DR Jr. A comparison of misoprostol with and without laminaria tents for induction of second-trimester abortion. *Am J Obstet Gynecol* 1996;175:173–7. (Level I) [PubMed] [Full Text] ⇐
  32. Borgatta L, Chen AY, Vragovic O, Stubblefield PG, Magloire CA. A randomized clinical trial of the addition of laminaria to misoprostol and hypertonic saline for second-trimester induction abortion. *Contraception* 2005;72:358–61. (Level I) [PubMed] [Full Text] ⇐
  33. Kapp N, Borgatta L, Stubblefield P, Vragovic O, Moreno N. Mifepristone in second-trimester medical abortion: a randomized controlled trial. *Obstet Gynecol* 2007;110:1304–10. (Level I) [PubMed] [*Obstetrics & Gynecology*] ⇐
  34. Ngoc NT, Shochet T, Raghavan S, Blum J, Nga NT, Minh NT, et al. Mifepristone and misoprostol compared with misoprostol alone for second-trimester abortion: a randomized controlled trial. *Obstet Gynecol* 2011;118:601–8. (Level I) [PubMed] [*Obstetrics & Gynecology*] ⇐
  35. Grimes DA, Schulz KF. Morbidity and mortality from second-trimester abortions. *J Reprod Med* 1985;30:505–14. (Level III) [PubMed] ⇐
  36. Dean G, Colarossi L, Lunde B, Jacobs AR, Porsch LM, Paul ME. Safety of digoxin for fetal demise before second-trimester abortion by dilation and evacuation. *Contraception* 2012;85:144–9. (Level II-3) [PubMed] [Full Text] ⇐
  37. Steward R, Melamed A, Kim R, Nucatola D, Gatter M. Infection and extramural delivery with use of digoxin as a feticidal agent. *Contraception* 2012;85:150–4. (Level III) [PubMed] [Full Text] ⇐
  38. Diedrich J, Drey E. Induction of fetal demise before abortion. Society of Family Planning. *Contraception* 2010;81:462–73. (Level III) [PubMed] [Full Text] ⇐
  39. Raymond EG, Grimes DA. The comparative safety of legal induced abortion and childbirth in the United States. *Obstet Gynecol* 2012;119:215–9. (Level III) [PubMed] [*Obstetrics & Gynecology*] ⇐
  40. Grimes DA. Risks of mifepristone abortion in context. *Contraception* 2005;71:161. (Level III) [PubMed] [Full Text] ⇐
  41. Bartlett LA, Berg CJ, Shulman HB, Zane SB, Green CA, Whitehead S, et al. Risk factors for legal induced abortion-related mortality in the United States. *Obstet Gynecol* 2004;103:729–37. (Level II-3) [PubMed] [*Obstetrics & Gynecology*] ⇐
  42. Kapp N, von Hertzen H. Medical methods to induce abortion in the second trimester. In: Paul M, Lichtenberg ES, Borgatta L, Grimes DA, Stubblefield PG, Creinin MD, editors. Management of unintended and abnormal pregnancy: comprehensive abortion care. Hoboken (NJ): Wiley-Blackwell; 2009. p. 178–92. (Level III) ⇐
  43. Diedrich J, Steinauer J. Complications of surgical abortion. *Clin Obstet Gynecol* 2009;52:205–12. (Level III) [PubMed] ⇐
  44. Grossman D, Blanchard K, Blumenthal P. Complications after second trimester surgical and medical abortion. *Reprod Health Matters* 2008;16:173–82. (Level III) [PubMed] [Full Text] ⇐
  45. Kerns J, Steinauer J. Management of postabortion hemorrhage: release date November 2012 SFP Guideline #20131. *Contraception* 2013;87:331–42. (Level III) [PubMed] [Full Text] ⇐
  46. Jacot FR, Poulin C, Bilodeau AP, Morin M, Moreau S, Gendron F, et al. A five-year experience with second-trimester induced abortions: no increase in complication rate as compared to the first trimester. *Am J Obstet Gynecol* 1993;168:633–7. (Level II-3) [PubMed] ⇐
  47. Altman AM, Stubblefield PG, Schlam JF, Loberfeld R, Osathanondh R. Midtrimester abortion with Laminaria and vacuum evacuation on a teaching service. *J Reprod Med* 1985;30:601–6. (Level III) [PubMed] ⇐
  48. Patel A, Talmont E, Morfesis J, Pelta M, Gatter M, Momtaz MR, et al. Adequacy and safety of buccal misoprostol for cervical preparation prior to termination of second-trimester pregnancy. Planned Parenthood Federation of America Buccal Misoprostol Waiver Group. *Contraception* 2006;73:420–30. (Level II-3) [PubMed] [Full Text] ⇐
  49. Castleman LD, Oanh KT, Hyman AG, Thuy le T, Blumenthal PD. Introduction of the dilation and evacuation procedure for second-trimester abortion in Vietnam using manual vacuum aspiration and buccal misoprostol. *Contraception* 2006;74:272–6. (Level II-3) [PubMed] [Full Text] ⇐



50. Ashok PW, Templeton A, Wagaarachchi PT, Flett GM. Midtrimester medical termination of pregnancy: a review of 1002 consecutive cases. *Contraception* 2004;69:51–8. (Level II-3) [PubMed] [Full Text] ⇐
51. Frick AC, Drey EA, Diedrich JT, Steinauer JE. Effect of prior cesarean delivery on risk of second-trimester surgical abortion complications. *Obstet Gynecol* 2010;115:760–4. (Level II-3) [PubMed] [*Obstetrics & Gynecology*] ⇐
52. Grimes DA, Kafrissen ME, O'Reilly KR, Binkin NJ. Fatal hemorrhage from legal abortion in the United States. *Surg Gynecol Obstet* 1983;157:461–6. (Level II-3) [PubMed] ⇐
53. Steinauer JE, Diedrich JT, Wilson MW, Darney PD, Vargas JE, Drey EA. Uterine artery embolization in post-abortion hemorrhage. *Obstet Gynecol* 2008;111:881–9. (Level III) [PubMed] [*Obstetrics & Gynecology*] ⇐
54. Whitley KA, Trinchere K, Prutsman W, Quinones JN, Rochon ML. Midtrimester dilation and evacuation versus prostaglandin induction: a comparison of composite outcomes. *Am J Obstet Gynecol* 2011;205:386.e1–386.e7. (Level II-3) [PubMed] [Full Text] ⇐
55. Ben-Ami I, Schneider D, Svirsky R, Smorgick N, Pansky M, Halperin R. Safety of late second-trimester pregnancy termination by laminaria dilatation and evacuation in patients with previous multiple cesarean sections. *Am J Obstet Gynecol* 2009;201:154.e1–154.e5. (Level II-3) [PubMed] [Full Text] ⇐
56. Pridmore BR, Chambers DG. Uterine perforation during surgical abortion: a review of diagnosis, management and prevention. *Aust N Z J Obstet Gynaecol* 1999;39:349–53. (Level III) [PubMed] ⇐
57. Lindell G, Flam F. Management of uterine perforations in connection with legal abortions. *Acta Obstet Gynecol Scand* 1995;74:373–5. (Level II-3) [PubMed] ⇐
58. Grimes DA, Schulz KF, Cates WJ Jr. Prevention of uterine perforation during curettage abortion. *JAMA* 1984;251:2108–11. (Level II-2) [PubMed] ⇐
59. Goyal V. Uterine rupture in second-trimester misoprostol-induced abortion after cesarean delivery: a systematic review. *Obstet Gynecol* 2009;113:1117–23. (Level III) [PubMed] [*Obstetrics & Gynecology*] ⇐
60. Berghella V, Airolidi J, O'Neill AM, Einhorn K, Hoffman M. Misoprostol for second trimester pregnancy termination in women with prior cesarean: a systematic review. *BJOG* 2009;116:1151–7. (Level III) [PubMed] [Full Text] ⇐
61. Grobman WA, Gersnoviez R, Landon MB, Spong CY, Leveno KJ, Rouse DJ, et al. Pregnancy outcomes for women with placenta previa in relation to the number of prior cesarean deliveries. National Institute of Child Health and Human Development (NICHD) Maternal-Fetal Medicine Units (MFMU) Network. *Obstet Gynecol* 2007;110:1249–55. (Level II-3) [PubMed] [*Obstetrics & Gynecology*] ⇐
62. Warshak CR, Eskander R, Hull AD, Scioscia AL, Mattrey RF, Benirschke K, et al. Accuracy of ultrasonography and magnetic resonance imaging in the diagnosis of placenta accreta. *Obstet Gynecol* 2006;108:573–81. (Level II-3) [PubMed] [*Obstetrics & Gynecology*] ⇐
63. Placenta accreta. Committee Opinion No. 529. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2012;120:207–11. (Level III) [PubMed] [*Obstetrics & Gynecology*] ⇐
64. Lurie S, Feinstein M, Mamet Y. Disseminated intravascular coagulopathy in pregnancy: thorough comprehension of etiology and management reduces obstetricians' stress. *Arch Gynecol Obstet* 2000;263:126–30. (Level III) [PubMed] ⇐
65. Workowski KA, Berman S. Sexually transmitted diseases treatment guidelines, 2010. Centers for Disease Control and Prevention (CDC) [published erratum appears in *MMWR Morb Mortal Wkly Rep* 2011;60:18]. *MMWR Recomm Rep* 2010;59(RR-12):1–110. (Level III) [PubMed] [Full Text] ⇐
66. Sawaya GF, Grady D, Kerlikowske K, Grimes DA. Antibiotics at the time of induced abortion: the case for universal prophylaxis based on a meta-analysis. *Obstet Gynecol* 1996;87:884–90. (Meta-analysis) [PubMed] [*Obstetrics & Gynecology*] ⇐
67. Antibiotic prophylaxis for gynecologic procedures. ACOG Practice Bulletin No. 104. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2009;113:1180–9. (Level III) [PubMed] [*Obstetrics & Gynecology*] ⇐
68. Achilles SL, Reeves MF. Prevention of infection after induced abortion: release date October 2010: SFP guideline 20102. Society of Family Planning. *Contraception* 2011;83:295–309. (Level III) [PubMed] [Full Text] ⇐
69. Kimball AM, Hallum AV, Cates W Jr. Deaths caused by pulmonary thromboembolism after legally induced abortion. *Am J Obstet Gynecol* 1978;132:169–74. (Case series) [PubMed] ⇐
70. Lawson HW, Atrash HK, Franks AL. Fatal pulmonary embolism during legal induced abortion in the United States from 1972 to 1985. *Am J Obstet Gynecol* 1990;162:986–90. (Level II-3) [PubMed] ⇐
71. Clark SL, Hankins GD, Dudley DA, Dildy GA, Porter TF. Amniotic fluid embolism: analysis of the national registry. *Am J Obstet Gynecol* 1995;172:1158–67; discussion 1167–9. (Level III) [PubMed] [Full Text] ⇐
72. Cowett AA, Golub RM, Grobman WA. Cost-effectiveness of dilation and evacuation versus the induction of labor for second-trimester pregnancy termination. *Am J Obstet Gynecol* 2006;194:768–73. (Cost-benefit) [PubMed] [Full Text] ⇐
73. Kelly T, Suddes J, Howel D, Hewison J, Robson S. Comparing medical versus surgical termination of pregnancy at 13–20 weeks of gestation: a randomised controlled trial. *BJOG* 2010;117:1512–20. (Level I) [PubMed] [Full Text] ⇐
74. Kaltreider NB, Goldsmith S, Margolis AJ. The impact of midtrimester abortion techniques on patients and staff. *Am J Obstet Gynecol* 1979;135:235–8. (Level III) [PubMed] ⇐



75. Tang OS, Schweer H, Seyberth HW, Lee SW, Ho PC. Pharmacokinetics of different routes of administration of misoprostol. *Hum Reprod* 2002;17:332–6. (Level I) [PubMed] [Full Text] ⇐
76. Kauff ND, Chelmow D, Kawada CY. Intractable bleeding managed with Foley catheter tamponade after dilation and evacuation. *Am J Obstet Gynecol* 1995;173:957–8. (Level III) [PubMed] [Full Text] ⇐
77. Madden T, Burke AE. Successful management of second-trimester postabortion hemorrhage with an intrauterine tamponade balloon. *Obstet Gynecol* 2009;113:501–3. (Level III) [PubMed] [*Obstetrics & Gynecology*] ⇐
78. Olamijulo JA, Doufekas K. Intrauterine balloon tamponade for uncontrollable bleeding during first trimester surgical termination of pregnancy. *J Obstet Gynaecol* 2007;27:440–1. (Level III) [PubMed] [Full Text] ⇐
79. Borgatta L, Chen AY, Reid SK, Stubblefield PG, Christensen DD, Rashbaum WK. Pelvic embolization for treatment of hemorrhage related to spontaneous and induced abortion. *Am J Obstet Gynecol* 2001;185:530–6. (Level III) [PubMed] [Full Text] ⇐
80. Haddad L, Delli-Bovi L. Uterine artery embolization to treat hemorrhage following second-trimester abortion by dilatation and surgical evacuation. *Contraception* 2009;79:452–5. (Level III) [PubMed] [Full Text] ⇐
81. Grimes DA, Flock ML, Schulz KF, Cates W Jr. Hysterectomy as treatment for complications of legal abortion. *Obstet Gynecol* 1984;63:457–62. (Level II-3) [PubMed] [*Obstetrics & Gynecology*] ⇐
82. Schulz KF, Grimes DA, Christensen DD. Vasopressin reduces blood loss from second-trimester dilatation and evacuation abortion. *Lancet* 1985;2:353–6. (Level I) [PubMed] ⇐
83. Borgatta L, Roncari D, Sonalkar S, Mark A, Hou MY, Finneseth M, et al. Mifepristone vs. osmotic dilator insertion for cervical preparation prior to surgical abortion at 14–16 weeks: a randomized trial. *Contraception* 2012;86:567–71. (Level I) [PubMed] [Full Text] ⇐
84. Darney PD, Sweet RL. Routine intraoperative ultrasonography for second trimester abortion reduces incidence of uterine perforation. *J Ultrasound Med* 1989;8:71–5. (Level III) [PubMed] ⇐
85. Edlow AG, Hou MY, Maurer R, Benson C, Delli-Bovi L, Goldberg AB. Uterine evacuation for second-trimester fetal death and maternal morbidity. *Obstet Gynecol* 2011;117:307–16. (Level II-3) [PubMed] [*Obstetrics & Gynecology*] ⇐
86. Management of stillbirth. ACOG Practice Bulletin No. 102. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2009;113:748–61. (Level III) [PubMed] [*Obstetrics & Gynecology*] ⇐
87. Sloan EP, Kirsh S, Mowbray M. Viewing the fetus following termination of pregnancy for fetal anomaly. *J Obstet Gynecol Neonatal Nurs* 2008;37:395–404. (Level III) [PubMed] ⇐
88. Burgoine GA, Van Kirk SD, Romm J, Edelman AB, Jacobson SL, Jensen JT. Comparison of perinatal grief after dilation and evacuation or labor induction in second trimester terminations for fetal anomalies. *Am J Obstet Gynecol* 2005;192:1928–32. (Level II-3) [PubMed] [Full Text] ⇐
89. Isaksen CV, Eik-Nes SH, Blaas HG, Torp SH, van der Hagen CB, Ormerod E. A correlative study of prenatal ultrasound and post-mortem findings in fetuses and infants with an abnormal karyotype. *Ultrasound Obstet Gynecol* 2000;16:37–45. (Level II-2) [PubMed] [Full Text] ⇐
90. Boyd PA, Tondi F, Hicks NR, Chamberlain PF. Autopsy after termination of pregnancy for fetal anomaly: retrospective cohort study. *BMJ* 2004;328:137. (Level III) [PubMed] [Full Text] ⇐
91. Dickinson JE, Prime DK, Charles AK. The role of autopsy following pregnancy termination for fetal abnormality. *Aust N Z J Obstet Gynaecol* 2007;47:445–9. (Level II-2) [PubMed] [Full Text] ⇐
92. Picone O, Levallant JM, Hirt R, Frydman R, Boulvain M, Senat MV. Correlation between referral ultrasound with suspected foetal anomalies and autopsy examination in two prenatal diagnosis centres. Impact of the routine use of 3D/4D scan. *Prenat Diagn* 2008;28:191–6. (Level II-2) [PubMed] ⇐
93. Dehlendorf C, Weitz T. Access to abortion services: a neglected health disparity. *J Health Care Poor Underserved* 2011;22:415–21. (Level III) [PubMed] ⇐
94. Finer LB, Frohwrith LF, Dauphinee LA, Singh S, Moore AM. Timing of steps and reasons for delays in obtaining abortions in the United States. *Contraception* 2006;74:334–44. (Level III) [PubMed] [Full Text] ⇐
95. Grossman DA, Grindlay K, Buchacker T, Potter JE, Schmetmann CP. Changes in service delivery patterns after introduction of telemedicine provision of medical abortion in Iowa. *Am J Public Health* 2013;103:73–8. (Level II-3) [PubMed] [Full Text] ⇐
96. Prager SW, Steinauer JE, Foster DG, Darney PD, Drey EA. Risk factors for repeat elective abortion. *Am J Obstet Gynecol* 2007;197:575.e1–575.e6. (Level II-3) [PubMed] [Full Text] ⇐
97. Stoddard A, Eisenberg DL. Controversies in family planning: timing of ovulation after abortion and the conundrum of postabortion intrauterine device insertion. *Contraception* 2011;84:119–21. (Level III) [PubMed] [Full Text] ⇐
98. Schreiber CA, Sober S, Ratcliffe S, Creinin MD. Ovulation resumption after medical abortion with mifepristone and misoprostol. *Contraception* 2011;84:230–3. (Level III) [PubMed] [Full Text] ⇐
99. U S. Medical Eligibility Criteria for Contraceptive Use, 2010. Centers for Disease Control and Prevention (CDC). *MMWR Recomm Rep* 2010;59(RR-4):1–86. (Level III) [PubMed] [Full Text] ⇐
100. Grimes DA, Lopez LM, Schulz KF, Stanwood NL. Immediate postabortal insertion of intrauterine devices. *Cochrane Database of Systematic Reviews* 2010, Issue 6. Art.No.: CD001777. DOI: 10.1002/14651858.CD001777.pub3. (Meta-analysis) [PubMed] [Full Text] ⇐
101. Goodman S, Hendlish SK, Reeves MF, Foster-Rosales A. Impact of immediate postabortal insertion of intrauterine



- contraception on repeat abortion. *Contraception* 2008;78:143–8. (Level II-2) [PubMed] [Full Text] ⇐
102. Heikinheimo O, Gissler M, Suhonen S. Age, parity, history of abortion and contraceptive choices affect the risk of repeat abortion. *Contraception* 2008;78:149–54. (Level II-3) [PubMed] [Full Text] ⇐
103. Cremer M, Bullard KA, Mosley RM, Weiselberg C, Molaie M, Lerner V, et al. Immediate vs. delayed post-abortion copper T 380A IUD insertion in cases over 12 weeks of gestation. *Contraception* 2011;83:522–7. (Level I) [PubMed] [Full Text] ⇐
104. Hohmann HL, Reeves MF, Chen BA, Perriera LK, Hayes JL, Creinin MD. Immediate versus delayed insertion of the levonorgestrel-releasing intrauterine device following dilation and evacuation: a randomized controlled trial. *Contraception* 2012;85:240–5. (Level I) [PubMed] [Full Text] ⇐
105. Drey EA, Reeves MF, Ogawa DD, Sokoloff A, Darney PD, Steinauer JE. Insertion of intrauterine contraceptives immediately following first- and second-trimester abortions. *Contraception* 2009;79:397–402. (Level II-3) [PubMed] [Full Text] ⇐
106. Royal College of Obstetricians and Gynaecologists. The care of women requesting induced abortion. Evidence-Based Clinical Guideline Number 7. London: RCOG; 2011. Available at: [http://www.rcog.org.uk/files/rcog-corp/Abortion%20guideline\\_web\\_1.pdf](http://www.rcog.org.uk/files/rcog-corp/Abortion%20guideline_web_1.pdf). Retrieved November 26, 2012. (Level III) ⇐

The MEDLINE database, the Cochrane Library, and the American College of Obstetricians and Gynecologists' own internal resources and documents were used to conduct a literature search to locate relevant articles published between January 1990–November 2012. The search was restricted to articles published in the English language. Priority was given to articles reporting results of original research, although review articles and commentaries also were consulted. Abstracts of research presented at symposia and scientific conferences were not considered adequate for inclusion in this document. Guidelines published by organizations or institutions such as the National Institutes of Health and the American College of Obstetricians and Gynecologists were reviewed, and additional studies were located by reviewing bibliographies of identified articles. When reliable research was not available, expert opinions from obstetrician–gynecologists were used.

Studies were reviewed and evaluated for quality according to the method outlined by the U.S. Preventive Services Task Force:

- I Evidence obtained from at least one properly designed randomized controlled trial.
- II-1 Evidence obtained from well-designed controlled trials without randomization.
- II-2 Evidence obtained from well-designed cohort or case–control analytic studies, preferably from more than one center or research group.
- II-3 Evidence obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments also could be regarded as this type of evidence.
- III Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.

Based on the highest level of evidence found in the data, recommendations are provided and graded according to the following categories:

Level A—Recommendations are based on good and consistent scientific evidence.

Level B—Recommendations are based on limited or inconsistent scientific evidence.

Level C—Recommendations are based primarily on consensus and expert opinion.

Copyright June 2013 by the American College of Obstetricians and Gynecologists. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, posted on the Internet, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher.

Requests for authorization to make photocopies should be directed to Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, (978) 750-8400.

**The American College of Obstetricians and Gynecologists**  
**409 12th Street, SW, PO Box 96920, Washington, DC 20090-6920**

Second-trimester abortion. Practice Bulletin No. 135. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2013;121:1394–1406.

