Overview of pregnancy termination

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INTRODUCTION

Access to safe abortion care and family planning services is an integral component of health care. This topic will review general issues regarding pregnancy termination, including preprocedure evaluation, choice of method, and complications. Techniques for first- and second-trimester procedures are discussed separately.

- (See "First-trimester pregnancy termination: Uterine aspiration".)
- (See "First-trimester pregnancy termination: Medication abortion".)
- (See "Overview of second-trimester pregnancy termination".)

EPIDEMIOLOGY

Worldwide, the estimated rate for abortion from 2010 to 2014 was 35 per 1000 females ages 15 to 44 [1]. The rate in resource-rich countries was 27 per 1000 and in resource-limited countries was 37 per 1000. The highest rate was in the Caribbean (65 per 1000), and the lowest rate was in North America (17 per 1000) and northern or western Europe (18 per 1000). An estimated 25 percent of pregnancies worldwide ended in induced abortion. Similarly, in the United States, close to one in four females will have an abortion during their reproductive life [2].

Data specific to the United States from the Centers for Disease Control and Prevention (CDC) in 2018 include [3]:

- **Overall abortion rates** – The rate of pregnancy termination was 11.3 per 1000 females ages 15 to 44 years, or 189 per 1000 live births. While there was a 1 percent increase in the rate of abortions from 2017, the overall rate has decreased steadily over the past two decades. The CDC figures are based on data voluntarily reported to state health agencies and may be incomplete.

- **Abortion rates by age group** – Abortion rates were highest for ages 20 to 24 (19.1 per 1000 females) and 25 to 29 (18.5 per 1000 females). The rate of abortion in adolescents was 6 per 1000 females for those ages 15 to 19 compared with 0.4 per 1000 females for those ages <15 years.

- **Impact of specific demographic factors** – Most terminations were in unmarried patients (85 percent) and those who had one or more children (59 percent). Forty percent of abortions were in patients who had had a prior abortion.

- **Racial disparities** – Abortion rates per 1000 females by racial and ethnic groups were 6.3 for non-Hispanic White Americans, 21.2 for non-Hispanic Black Americans, 11.9 for other races, and 10.9 for Hispanic American females.

- **Distribution by age of gestation** – The vast majority of pregnancy terminations were performed in the first trimester: 78 percent at ≤9 weeks and 92 percent at ≤13 weeks of gestation. For later gestational ages, 6.9 percent of abortions were performed at 14 to 20 weeks and 1 percent at ≥21 weeks.

  Potential barriers to early abortion include delay in recognition and confirmation of pregnancy, maternal or fetal complications that are diagnosed or develop after the first trimester, expense, parental involvement laws (see 'Legal issues' below), and lack of access to an abortion provider [4]. Among all United States counties in 2014, 90 percent had no abortion provider [2].

- **Distribution of procedure type** – For procedures occurring at 9 weeks of gestation or less, medication abortion accounted for approximately 39 percent of patients. For gestational ages of ≥14 weeks, most abortions were surgical; ≤2.2 percent used other methods.

COUNSELING AND INFORMED CONSENT

Counseling should include a nondirective discussion of alternatives (ie, continuing pregnancy with parenting or adoption) and a thorough discussion of the medical and surgical options for

pregnancy termination, including the risks, benefits, and expected outcome of each. (See "Counseling in abortion care".)

Legal issues — Abortion providers should be aware of relevant federal and state abortion regulations so they can provide appropriate treatment for their patients. In the United States, for example, some states have instituted a variety of policies that create barriers to abortion access and impact clinical care. Some states have mandatory waiting times between when the patient is counseled and the actual procedure, require parental notification or consent for abortions in minors (minors have the right to seek a court order authorizing the procedure) [5], or mandate that specific topics (some of which are medically inaccurate) be covered in the counseling session. States with these legal restrictions, in addition to areas with limited access to available services, are associated with decreased rates of abortion and higher rates of abortion-related maternal mortality than states without these restrictions [4,6]. These restrictions may also disproportionately affect vulnerable populations (eg, patients of lower socioeconomic status who may not be able to travel, pregnant minors, patients with mental disorders or cognitive disabilities, underrepresented groups) [7]. A summary of United States abortion laws can be found through the Guttmacher Institute.

Furthermore, in the United States, mifepristone (a progesterone receptor antagonist used for medical and second trimester surgical abortions) is available only with Risk Evaluation and Mitigation Strategy (REMS) restrictions [8]. However, such restrictions may not reduce adverse events or abortion rates. In a retrospective study including over 300,000 abortions performed in Canada, those performed before and after mifepristone was available and with and without REMS-like restrictions had similarly low rates of severe adverse events (eg, blood transfusion, abdominal surgery, admission to an intensive care unit, sepsis) and other complications [9]. In addition, while the rate of medication abortion increased after REMS-like restrictions were lifted, the overall rate of abortion remained stable.

DETERMINING GESTATIONAL AGE

Determining the correct gestational age is a critical part of preabortion care and can be obtained by menstrual dating or pelvic ultrasound examination.

Menstrual dating — Menstrual dating can be used in patients in whom the first day of the last menstrual period (LMP) is known with certainty and in those with regular menstrual cycles. When menstrual dating is used, the gestational age is estimated based on the interval from the LMP and, prior to surgical abortion, is confirmed by bimanual examination and/or ultrasound.

Evidence shows that in patients with regular menstrual cycles and a known LMP, gestational age as predicted by menstrual dating compared with ultrasound dating are similar [10,11]. In a systematic review including three studies comparing determination of gestational age by LMP or ultrasound, 2.5 to 11 percent of patients who were eligible for medication abortion by LMP became ineligible after ultrasound evaluation [10]; lower rates were reported when gestation was <63 days (63 of 4008 [1.6 percent] patients; one study) [12]. (See "Prenatal assessment of gestational age, date of delivery, and fetal weight", section on 'Clinical assessment of gestational age'.)

Role of pelvic ultrasound examination — While pelvic ultrasound examination may be helpful and is commonly used by abortion providers in the United States, it is **not** a requirement for first-trimester abortion, and most abortion care outside of the United States is without ultrasound. The clinical policy guidelines of the National Abortion Federation (NAF), a professional organization of abortion providers in the United States, Canada, Mexico, and Colombia, as well as the American College of Obstetrics and Gynecology (ACOG) and World Health Organization (WHO), do not mandate ultrasound preceding abortion in the first trimester since doing so is not always necessary or even helpful and might impede access to abortion in underserved regions where ultrasound is unavailable [13-15].

Ultrasound examination is useful if patients are uncertain of their dates, have irregular periods, their uterine size is inconsistent with menstrual dates, or their uterine size cannot be adequately assessed. Ultrasound is also used to diagnose ectopic and nonviable pregnancies. (See "Prenatal assessment of gestational age, date of delivery, and fetal weight", section on 'Sonographic assessment of gestational age' and 'Ectopic pregnancy' below.)

We perform a preprocedural ultrasound prior to all second-trimester abortions.

CHOICE OF PROCEDURE

The choice of procedure type (ie, medication, surgery) depends on gestation, patient preferences, clinician experience, availability of services, and legislative barriers. All options are safe and effective for appropriately selected patients.

First trimester

How to choose — Ideally, patients seeking first-trimester abortion care should have access to both medication and surgical abortion and be counseled about the benefits and limitations of each. Factors that contribute to this choice include:

- **Gestational age** – The US Food and Drug Administration (FDA) approves mifepristone in combination with misoprostol for medication abortion up to 70 days (≤10 weeks) of gestation [16]. The National Abortion Federation (NAF) and Planned Parenthood Federation of America support its use up to 77 days (11 weeks) [17]. Patients >11 weeks are not currently eligible for first-trimester medication abortion with mifepristone. Misoprostol-only regimens may be used in settings in which mifepristone is not available or is too costly. This is discussed in detail separately. (See "First-trimester pregnancy termination: Medication abortion" and "Misoprostol as a single agent for medical termination of pregnancy".)

  Aspiration abortion is most common through 14 weeks of gestation; more advanced gestations usually require initial use of vacuum aspiration followed by use of forceps after cervical dilation (ie, dilation and evacuation [D&E]). (See "First-trimester pregnancy termination: Uterine aspiration".)

- **Are there contraindications to either approach?** – Contraindications to medication (eg, hemoglobin ≤9 g/dL, hemorrhagic disorders) and surgical abortion (eg, fibroid restricting access to the uterine cavity) are discussed separately. (See 'Laboratory testing' below and "First-trimester pregnancy termination: Uterine aspiration", section on 'Contraindications' and "First-trimester pregnancy termination: Medication abortion", section on 'Contraindications'.)

- **Patient preference** – The main factor affecting choice of procedure is patient experience.

  - **Factors favoring medication** – Medication abortion allows the patient to avoid a surgical procedure and anesthesia, and some patients feel that the process seems more "natural." Some patients prefer medication abortion because they feel they have a greater degree of control over the process as they manage the procedure privately within their own home [18].

    In addition, patients may feel more empowered with telemedicine rather than in-person medication abortion, allowing for increased convenience and privacy [19-25]. Patients with specific socioeconomic or personal concerns (eg, privacy, convenience, limited access to in-person care) may also prefer telemedicine rather in-person medication abortion [17,26].

  - **Factors favoring uterine aspiration** – The uterine aspiration procedure takes place at a health care facility, is typically completed in less than 15 minutes, is performed under local anesthesia and/or sedation, and, greater than 99 percent of the time, allows patients to leave the visit knowing that the abortion is complete (see 'Relative

outcomes' below). By contrast, medication abortion takes longer, has a slightly lower efficacy, and patients may have a greater awareness of blood loss and passage of pregnancy tissue, particularly at later gestations [27]; for some patients, awareness of these aspects of the process may lead them to choose aspiration abortion.

Some socioeconomic or personal concerns (eg, housing instability, poor social support, upcoming travel) may make uterine aspiration a favored choice due to shorter and more predictable vaginal bleeding compared with medication abortion.

Patients place significant value on the option to choose between medication and aspiration abortion [28]. In studies where patients are allowed a choice between abortion methods, 35 to 84 percent chose medication abortion. Most patients who select medication abortion report they would opt for medication abortion again (63 to 96 percent) if they had another abortion in the future [29]. When looking at choices between in-person and telemedicine abortion, patients who choose a telemedicine medication abortion are more likely to choose telemedicine again [20] or recommend the service to a friend [19] compared with those who had in-person visits [19].

Procedure setting — While medication abortion was traditionally an in-person, clinic-based service, more patients are accessing telemedicine or hybrid services, or are self-managing their abortion.

In-person

- **Medication abortion** – In-person medication abortion is used for patients who have access to or desire in-person care, or those not eligible for an abortion facilitated outside of a clinic setting (ie, telehealth, self-managed abortion [SMA]). (See 'Telemedicine' below and 'Self-managed' below and "First-trimester pregnancy termination: Medication abortion", section on 'In-person'.)

- **Aspiration abortion** – Aspiration abortion is typically performed in an outpatient setting, such as in a clinic, a clinician's office equipped with a procedure room, or an ambulatory surgery center, but sometimes occurs in a hospital-based procedure or operating room. (See "First-trimester pregnancy termination: Uterine aspiration", section on 'Procedure setting'.)

Telemedicine — During the coronavirus disease 2019 (COVID-19) pandemic, when access to medical care was limited, clinicians increased efforts to expand access to medication abortion without requiring in-person visits. In these settings, an eligible patient (eg, known last menstrual period [LMP], no risk factors for ectopic pregnancy (table 1), no contraindications

to medication abortion) can receive a medication abortion without receiving in-person care. Such patients do not receive a pre- or posttreatment ultrasound, laboratory testing, or physical examination; this is termed a "no-test", or "history-based", abortion. Counseling and assessment occur online, or by video or phone, and medications are dispensed by curbside pickup or mail. Hybrid models, where components of the medication abortion visit are completed via telemedicine and other components (eg, picking up medications) in the clinic, also occur. (See "First-trimester pregnancy termination: Medication abortion", section on 'Telemedicine and hybrid models'.)

These models have been shown to be equally safe and effective as the traditional clinic medication abortion model. (See 'Relative outcomes' below.)

Self-managed — With increasing restrictions on abortion access in the United States, more patients are choosing self-managed abortion (SMA; when accessing medication abortion it is also referred to as self-managed medication abortion [SMMA]). In a SMA, a patient accesses abortion and abortion medications outside of a clinical interaction, often through the internet, without interacting with or supervision from a clinician. This model has also been shown to be safe and effective [30-32]. (See "First-trimester pregnancy termination: Medication abortion", section on 'Self-managed'.)

Unsafe means to self-induce abortions (eg, usage of herbs, vaginal insertion of objects, abdominal trauma [33-36]) are discussed in detail separately. (See "Unsafe abortion".)

Relative outcomes

- **According to procedure type** – Aspiration abortion is slightly more effective than medication abortion as it results in termination of pregnancy in over 99 percent of procedures [37,38]. The success rate of medication abortion with mifepristone and misoprostol is 95 to 98 percent, with 2 to 5 percent of cases requiring further intervention with repeat misoprostol or suction dilation and curettage for retained tissue or continuing pregnancy [39,40]. (See "First-trimester pregnancy termination: Medication abortion", section on 'Follow-up'.)

  Overall, complications are more common in medication abortion than in aspiration abortion, driven largely by the need for aspiration to treat retained tissue or ongoing pregnancy [38,41-43]. Representative studies include the following:

  - In a state-level, insurance claims-based study that captured all emergency department visits following 50,000 abortion procedures, complication rates were higher following medication compared with aspiration abortion [43].

- In a retrospective study including 30,146 patients undergoing first-trimester pregnancy termination at a large abortion clinic, the efficacy of pregnancy termination was 99.6 percent for medication abortion (which included cases that required repeat misoprostol or uterine aspiration for initially incomplete procedures) and 99.8 percent for the aspiration abortion group. Patients in the medication abortion group were more likely to undergo an unanticipated aspiration for ongoing pregnancy or persistent pain, bleeding, or both (2.1 compared with 0.6 percent, respectively) [38].

- **According to procedure setting** – Outcomes according to procedure setting (eg, telemedicine, ambulatory surgery center, office-based setting) are similar.

  - In a study including over 50,000 abortions (all types) from a United States private insurance database, the incidence of adverse events was comparable for procedures performed in either an ambulatory surgery center or office-based setting [44].

  - Large observational studies have also shown that no-test (ie, history-based) abortion is equally effective and safe as clinic-based medication abortion [19,30,45-54]. In the largest retrospective study including over 52,000 patients undergoing pregnancy termination in the United Kingdom, patients undergoing telemedicine compared with traditional clinic-based medication abortion had similar rates of treatment success (98 percent) and adverse outcomes, which were rare [51]. In a subsequent multicenter, retrospective study in the United States including almost 2400 patients undergoing history-based medication abortion in whom follow-up data were available, initial treatment success occurred in 95 percent of patients; 125 patients (5 percent) required either an additional procedure (eg, uterine aspiration, additional medication, treatment for ectopic pregnancy) or had a continuing pregnancy at the last point of study-contact [55]. Abortion-related adverse events were rare.

    A more detailed discussion of potential complications associated with medication and surgical abortion is provided below. (See 'Complications' below.)

Second trimester — Similar to first-trimester abortion, second-trimester procedures can be performed with induction (medication) or surgery (D&E). How to choose between procedure types, procedure setting (eg, outpatient facility, labor and delivery unit), and the relative outcomes of each are discussed in detail separately. (See "Overview of second-trimester pregnancy termination".)

PREPARATION FOR PROCEDURE

Laboratory testing — The World Health Organization (WHO) does **not** require any laboratory testing be performed for an abortion [15]. Laboratory testing that may be performed in selected patients includes the following:

- **Urine or serum human chorionic gonadotropin (hCG) measurement** – Urine hCG is often used to confirm pregnancy; if there is concern for an abnormal pregnancy (eg, ectopic), serum hCG should be determined. A patient's own positive home urine pregnancy test may be used as pregnancy confirmation and does not require repetition.

  The various types of urine or serum hCG tests are discussed in detail elsewhere. (See "Clinical manifestations and diagnosis of early pregnancy", section on 'Types of pregnancy tests'.)

- **Hemoglobin or hematocrit** – In our practice:

  - For patients at ≤9 weeks, we only check hemoglobin or hematocrit if the patient has a history of anemia (and no result is available from the past 6 to 12 months) or if we are drawing blood for another indication (hCG or Rh typing). If drawn for a patient with a history of anemia, there is no definitive cutoff value at which we prefer a surgical, rather than medication, abortion, and the decision is left to the discretion of the provider. If the patient has a hemoglobin drawn because other laboratory tests are indicated, we do not wait for the result before providing the medication abortion or discharging the patient from clinic.

  - For patients ≥10 weeks, we test routinely and wait for the results; hemoglobin values ≤9 g/dL are considered a relative contraindication to a medication abortion (given the increased risk for a clinically significant drop in hemoglobin at this gestation), and a surgical abortion is recommended.

- **Rh typing** – While RhD status was historically performed on all patients, evidence shows risk of alloimmunization of D-negative patients to be negligible for gestations <12 weeks [56-59]. This is discussed in detail separately. (See "RhD alloimmunization: Prevention in pregnant and postpartum patients", section on 'Selective prophylaxis for pregnancy complications associated with fetomaternal bleeding'.)

  Our practice regarding Rh typing varies. Two of our contributors follow the WHO guidelines and do not perform Rh testing for patients <12 weeks gestation [15,60]. By contrast, one of our contributors follows the National Abortion Federation (NAF) guidelines and does not perform Rh testing for patients <8 weeks gestation [56]. (See 'Alloimmunization prevention' below.)

- **Chlamydia and/or gonorrhea** – Screening for chlamydia and gonorrhea should be based on the United States Preventive Services Task Force and Centers for Disease Control and Prevention (CDC) guidelines, which recommend screening of all sexually active patients <25 years old and patients at increased risk of infection, regardless of age. (See "Screening for sexually transmitted infections", section on 'Females'.)

  However, we do not routinely perform chlamydia and gonorrhea testing for patients without symptoms in whom medication abortion is planned.

Alloimmunization prevention — RhD-negative patients undergoing pregnancy termination have traditionally received Rh(D) immune globulin to prevent alloimmunization. While this concurs with the approach taken by United States and Canadian guidelines [61,62], not all experts agree, and some organizations recommend **against** Rh(D) globulin administration for gestations that are <12 weeks of gestation (WHO [15]) or <8 weeks of gestation (Planned Parenthood Federation of American and the National Abortion Federation [56]). This is because the risk for alloimmunization has been shown to be negligible in such patients [56-59]. However, studies of unsensitized Rh-negative patients undergoing first-trimester abortion are sparse and data are presented elsewhere. (See "RhD alloimmunization: Prevention in pregnant and postpartum patients", section on 'Indications'.)

In other countries, guidelines vary regarding whether Rh(D) immune globulin is required for first-trimester spontaneous abortion. (See 'Laboratory testing' above and "RhD alloimmunization: Prevention in pregnant and postpartum patients".)

When Rh(D) globin is given, a dose of 50 mcg is effective through the 12th week of gestation due to the small volume of red cells in the fetoplacental circulation (mean red cell volume at 8 and 12 weeks is 0.33 and 1.5 mL, respectively), although there is no harm in giving the standard 300 mcg dose, which is more readily available [61,62]. (See "RhD alloimmunization: Prevention in pregnant and postpartum patients", section on 'Anti-D immune globulin'.)

Cervical dilation and preparation — Mechanical dilation of the cervix at the time of surgical aspiration, to allow insertion of instruments and removal of the products of conception, is usually necessary after 8 weeks of gestation and sometimes for earlier gestations. Cervical preparation with osmotic dilators and/or prostaglandins is typically used prior to surgical abortions performed after 12 weeks of gestation. This is discussed in detail separately. (See "Pregnancy termination: Cervical preparation for surgical procedures" and "Second-trimester pregnancy termination: Induction (medication) termination", section on 'Cervical preparation'.)

Cervical dilation and/or preparation is not used prior to medication abortion.

Antibiotic prophylaxis — Use of antibiotic prophylaxis varies by procedure type and other factors; this is discussed in detail separately.

- (See "First-trimester pregnancy termination: Medication abortion", section on 'Limited role of prophylactic antibiotics'.)
- (See "First-trimester pregnancy termination: Uterine aspiration", section on 'Antibiotic prophylaxis'.)
- (See "Second-trimester pregnancy termination: Dilation and evacuation", section on 'Prophylactic antibiotics'.)
- (See "Second-trimester pregnancy termination: Induction (medication) termination", section on 'Prophylactic antibiotics'.)

Pain management — Pain management varies by procedure type. For example, nonsteroidal antiinflammatory drugs, with or without oral narcotics, are often used for first-trimester medication abortions, while patients undergoing a second-trimester abortion may receive a paracervical block and intravenous conscious sedation prior to a dilation and evacuation (D&E) or an epidural prior to a medication induction. This is discussed in detail separately.

- (See "Second-trimester pregnancy termination: Dilation and evacuation", section on 'Anesthesia'.)
- (See "Second-trimester pregnancy termination: Induction (medication) termination", section on 'Anesthesia'.)

Guidelines for staff and equipment — The National Abortion Federation (NAF) has issued clinical policy guidelines regarding medical personnel and facilities that provide pregnancy termination care [63]. These stipulate, for example, that abortions should be provided by a licensed practitioner. The minimum requirements for a facility include on-site presence of a medical staff member with updated basic life support certification; an oxygen delivery system, oral airways, self-inflating respirator bags, and bronchodilators; and uterotonics and vasopressors, including epinephrine. In settings in which opioids or benzodiazepines are used, appropriate antagonists must be available.

It is useful for outpatient clinics to have written protocols to address emergencies, particularly indications for emergency transport to a hospital and contact information for personnel who are immediately available to facilitate transport.

Plan for contraception — Ovulation can occur soon after an abortion and before the onset of menses; thus, we recommend that contraception counseling is offered prior to the abortion procedure. Contraception can usually be initiated the day of the procedure, with the exception

of IUD placement before a medication abortion is complete. (See "Contraception: Postabortion", section on 'Initiation of contraception'.)

FOLLOW-UP

After pregnancy termination, patients may experience vaginal bleeding that is comparable to a menstrual period and that decreases over time; passage of small clots of blood from the vagina may also occur. Patients may experience mild lower abdominal cramping, which can be treated with nonsteroidal antiinflammatory drugs. The provider should be called for bleeding heavier than a normal period, fever ≥38°C (≥100.4°F), or if more severe abdominal pain develops. Postprocedure care and instructions are provided in writing and reviewed verbally (table 2). Historically, patients have been counseled to avoid vaginal intercourse and use of tampons for two weeks after the procedure to reduce the risk of infection. However, these instructions are not evidence-based and are no longer advised by the authors.

For patients in whom posttermination human chorionic gonadotropin (hCG) levels are followed (eg, products of conception not visible after first-trimester uterine aspiration, patients in whom ectopic pregnancy is a concern), an elevated level of hCG is expected for a short period of time. Return of the serum hCG concentration to undetectable following pregnancy termination varies widely from 7 to 60 days [64]. The duration depends primarily on the hCG concentration at the time of termination. The decline in serum hCG is rapid for the first several days (half-life 9 to 31 hours) and then proceeds more slowly (half-life 55 to 64 hours) [65-67]. (See 'Ectopic pregnancy' below and "Human chorionic gonadotropin: Biochemistry and measurement in pregnancy and disease".)

Specific follow-up details, as they relate to trimester and procedure type, are discussed separately.

- (See "First-trimester pregnancy termination: Medication abortion", section on 'Follow-up'.)
- (See "First-trimester pregnancy termination: Uterine aspiration", section on 'Recovery and follow-up'.)
- (See "Overview of second-trimester pregnancy termination", section on 'Follow-up'.)

COMPLICATIONS

Overall — The rate of complications associated with pregnancy termination depends on the procedure type, gestation, patient characteristics, and clinician experience. In general, the risk of a major complication is low. In a retrospective study of California Medicaid data from 54,911

abortion procedures, the overall complication rate was 2.1 percent [43]. Rates of major (ie, hospital admission, surgery, transfusion) and minor complications were:

- First-trimester aspiration – Major 0.16 percent; minor 1.1 percent
- Medication abortion – Major 0.31 percent; minor 4.88 percent

Complication rates may be higher in patients with medical conditions. In a study based on national United States inpatient data from 2000 to 2011 including over 38,000,000 patients who underwent a medically necessary abortion (defined as needed to protect a patient's health), the rate of severe maternal morbidity was 62.4 per 10,000 hospitalizations [68].

Hemorrhage — Postabortion hemorrhage occurs in less than 1 percent of abortions [69]. Hemorrhage may result from uterine atony, cervical laceration, uterine perforation, or retained tissue. Other causes of postabortion hemorrhage include infection, enhanced myometrial vascularity, placenta accreta spectrum, vaginal laceration, and coagulopathy (secondary to release of tissue thromboplastin into the maternal venous system). Treatment of postabortion hemorrhage is similar to postpartum hemorrhage following vaginal birth. (See "Postpartum hemorrhage: Medical and minimally invasive management".)

The Society of Family Planning guidelines advise the following general approach to postabortion hemorrhage [69]:

- Assessment and examination, including repair of bleeding cervical or vaginal lacerations and exploration (and evacuation) of the uterus for retained products of conception.
- Treatment of uterine atony with:
  - Uterine massage and compression. (See "Postpartum hemorrhage: Medical and minimally invasive management", section on 'Perform uterine massage and compression'.)
  - Uterotonic drugs (ie, oxytocin, methylergonovine maleate, carboprost tromethamine injection [commercial name Hemabate], misoprostol) are discussed in detail separately. (See "Postpartum hemorrhage: Medical and minimally invasive management", section on 'Administer additional uterotonic medications'.)
  - Intrauterine tamponade – When intrauterine tamponade is used, one method is to insert a Foley catheter into the uterine cavity and expand the 30 mL balloon with 50 to 60 mL saline or water. Other types of intrauterine tamponade are discussed in detail separately. (See "Postpartum hemorrhage: Use of intrauterine tamponade to control bleeding", section on 'Types and efficacy of intrauterine tamponade'.)

- Laboratory evaluation, including complete blood count and coagulation studies, and resuscitative measures (eg, fluid replacement, oxygenation, transfusion with blood products). (See "Overview of postpartum hemorrhage".)

- Pelvic embolization may be used for treatment of hemorrhage if other measures are not successful and the patient is stable [70,71]. Bleeding that continues despite all other measures may require uterine artery ligation or hysterectomy, but this is rare after abortion.

Uterine perforation — Uterine perforation is rare, occurring in fewer than 0.3 percent of first- and second-trimester procedural abortions [69]. Suspected uterine perforation requires further evaluation. The specific location of a uterine perforation determines the symptoms and degree of hemorrhage.

Two factors associated with an increased risk of perforation during pregnancy termination are surgeon inexperience (residents have a 5.5-fold increase in perforations as compared with attending staff) and lack of adequate preoperative cervical dilation [72].

Uterine perforation is discussed in detail separately. (See "Uterine perforation during gynecologic procedures".)

Ongoing pregnancy — Ongoing pregnancy is more likely to be a complication of early rather than late abortion and is more common in patients undergoing medication rather than surgical abortion. It occurs in approximately 0.5 percent of medication (ie, mifepristone plus misoprostol) abortions [42]. (See 'Relative outcomes' above.)

When surgical abortion is performed, products of conception should be closely examined by an experienced clinician to verify successful completion. Although rare, ongoing pregnancy may result from a multiple gestation in which only one of the sacs was removed. (See "First-trimester pregnancy termination: Uterine aspiration", section on 'Tissue evaluation'.)

The type and risk of possible damage to the ongoing pregnancy from an attempted abortion is unclear. Direct or indirect injury to the developing embryo may occur. (See "Misoprostol as a single agent for medical termination of pregnancy", section on 'Teratogenicity' and "First-trimester pregnancy termination: Uterine aspiration", section on 'Ongoing pregnancy' and "First-trimester pregnancy termination: Medication abortion", section on 'Teratogenicity'.)

Infection/retained products of conception — Sepsis after pregnancy termination is rare and is suggested by generalized abdominal tenderness, guarding, tachycardia, and high fever. These patients require aggressive therapy with broad-spectrum intravenous antibiotics, prompt

assessment for retained products of conception and removal if present, evaluation for uterine perforation, and monitoring and support in an intensive care unit. (See "Septic abortion: Clinical presentation and management".)

Postabortion endometritis is also uncommon and occurs in <1 percent of patients [73]; this can occur either with or without retained gestational tissue. Signs and symptoms are similar for isolated endometritis and endometritis with retained products of conception and include fever, uterine tenderness, lower abdominal pain, and greater than expected uterine bleeding. Ultrasonography can evaluate for retained products in the uterine cavity. Any physical or sonographic evidence of retained products of conception should prompt consideration of suction curettage to complete evacuation of the uterus. (See "Retained products of conception in the first half of pregnancy".)

In the absence of detectable retained material, a presumptive diagnosis of endometritis may be made and treated with a trial of broad-spectrum antibiotic therapy, with coverage of anaerobes (eg, cefotetan [2 grams intravenously] plus doxycycline [100 mg intravenously or orally] every 12 hours). This regimen can be completed as an outpatient oral regimen for a 14-day course. An alternative outpatient regimen is ceftriaxone 250 mg intramuscularly in a single dose plus doxycycline 100 mg orally twice a day for 14 days with or without metronidazole 500 mg orally twice a day for 14 days.

Maternal mortality — The overall death rate from all legal abortions is far less than the maternal mortality ratio among live births in the United States (table 3) [74-76]. Maternal mortality is lowest before 9 weeks of gestation and increases rapidly after 18 weeks of gestation (<0.3 per 100,000 induced abortions at <9 weeks versus 7 per 100,000 at 16 to 20 weeks and 11 per 100,000 at ≥21 weeks) [75]. For counseling purposes, this risk of first-trimester pregnancy termination can be compared with other procedures, such as plastic surgery procedures (0.8 to 1.7 deaths per 100,000) or dental procedures (0 to 1.7 deaths per 100,000) [74].

Aspiration abortion has the lowest maternal mortality rate of any surgical pregnancy termination method. One study reported no maternal deaths in 170,000 consecutive first-trimester suction curettage procedures [77].

Countries with better training of and access to abortion providers have lower maternal mortality rates [78]. This relationship is also true in the United States; states that have restricted abortion access have increasing maternal mortality while it is declining in states with improved access to abortion services [6].

SPECIAL CONSIDERATIONS

Unsafe abortion — Access to safe abortion care is an essential component of health care. Unfortunately, a large portion of abortions are considered "unsafe," and these abortions are a major contributor to both maternal morbidity and mortality. The risk of complications and death from unsafe abortion is inversely related to the provider's training [79], skill, conditions for performing the procedure, and availability of appropriate equipment. Some unsafe abortions are self-induced; the consequences in these cases also depend on whether the patient has access to, or can seek, medical care. (See "Unsafe abortion".)

Ectopic pregnancy — Ectopic pregnancy occurs in less than 1 percent of patients presenting for pregnancy termination [80,81]; in the United States, this is approximately three times lower than the national rate of ectopic pregnancy [82]. However, when it does occur, ectopic pregnancy can cause significant maternal morbidity and mortality. For any abortion performed with a pregnancy of unknown location (ie, no yolk sac or fetal pole noted on a pretreatment ultrasound), it is important to evaluate for risk of ectopic pregnancy (table 1). Ectopic pregnancy can be ruled out postabortion by either identifying products of conception after aspiration or by a postabortion serum human chorionic gonadotropin (hCG) level with a sharp decline from a baseline preabortion value. (See 'Follow-up' above and "Ectopic pregnancy: Clinical manifestations and diagnosis".)

Future pregnancies — Data regarding the association of pregnancy termination and subsequent adverse pregnancy outcomes (eg, preterm birth, low birth weight) are conflicting [15,59,83-91]. Variables that may affect outcomes include study design, gestational age at time of termination, time period of the included studies (which may reflect changes in postabortion or pregnancy care), and procedure type.

Future obstetric outcomes by procedure type are as follows:

- **Surgical abortion** – Surgical abortion may be associated with adverse pregnancy outcomes. In a meta-analysis including 31 studies (>900,000 patients) with a history of surgical termination of pregnancy compared with patients without uterus instrumentation, prior surgical abortion was associated with an increased risk of preterm birth, low birth weight, and small for gestational age (SGA) infants, although the absolute risk remained small [87]. The reported outcomes were: preterm birth, 5.4 versus 4.4 percent, odds ratio (OR) 1.52, 95% CI 1.08-2.16; low birth weight, 7.3 versus 5.9 percent, OR 1.41, 95% CI 1.22-1.62; and SGA, 10.2 versus 9 percent, OR 1.19, 95% CI 1.01-1.42. (See

"Preterm birth: Risk factors, interventions for risk reduction, and maternal prognosis", section on 'History of abortion'.)

By contrast, other series addressing future pregnancy in patients who underwent a prior surgical abortion do not show this association [83,88,89,92]. In a retrospective review including 600 patients undergoing dilation and evacuation (D&E) between 14 and 24 weeks, the overall rate of preterm birth in subsequent pregnancies was less than the overall rate of preterm birth for the general United States population (6.5 versus 12.5 percent) [88]. Similarly, in a study that compared subsequent pregnancy outcomes among 317 patients with a history of second-trimester D&E and 170 matched controls, patients with a history of prior D&E delivered slightly earlier in gestation than controls (38.9 versus 39.5 weeks of gestation), but birth weight, spontaneous preterm birth, abnormal placentation, and overall rates of perinatal complications were similar between groups [92].

- **Medication abortion** – Several studies have reported similar risk of adverse obstetric outcomes among patients with medication abortion compared with no uterus instrumentation or surgical abortion [87,90].

  Rates of complications were also similar among patients undergoing medication or surgical abortion in a retrospective study including over 8000 primigravid patients [90]. In this study, patients who had previously undergone either medication or surgical abortion had similar rates of preterm birth, low birth weight, SGA infants, or placental complications in subsequent singleton pregnancies. By contrast, in a retrospective including 173 patients undergoing second-trimester termination for fetal indications, patients with a prior medication termination (43 patients) compared with D&E (130 patients) had higher rates of subsequent preterm birth (30.2 versus 6.9 percent), but the overall number of events was low [93].

  Patients undergoing medication termination in the first compared with second trimester appear to have similar risk pregnancy outcomes. In a retrospective study including 88,000 primigravid patients undergoing medication termination of pregnancy followed by a subsequent live birth, patients who had the procedure in the first compared with second trimester had similar risks of preterm birth, low birth weight, SGA infants, and placental complications [91].

The association between induced abortion and subsequent placental problems has also been studied. A report of all primigravid patients delivering in Denmark from 1980 to 1982 used data from the Danish Birth, Hospital Discharge, and Induced Abortion Registries to compare the risk

of placental complications in subsequent pregnancy among 15,727 patients who underwent first-trimester termination and 46,026 patients who did not have a termination [94]; patients were followed for 12 years. There was no difference in the risk of placenta previa, but patients with a previous termination had a slightly higher rate of retained placenta (OR 1.17, 95% CI 1.02-1.35).

Breast cancer — Pregnancy termination does not appear to be associated with an increased risk of breast cancer, although data are conflicting. A United States National Cancer Institute meta-analysis included individual data from 53 studies (83,000 females) in 16 countries and reported that the risk of breast cancer was not increased in those with a history of induced abortion (relative risk [RR] 0.93, 95% CI 0.89-0.96) [95]. Other published studies have confirmed this conclusion [96-99]. By contrast, a meta-analysis of 36 comparative studies in China found that a history of induced abortion was associated with an increase in the risk of breast cancer (OR 1.44, 95% CI 1.29-1.59) [100].

Ongoing health — Pregnancy termination does not appear be associated with ongoing health issues. In a prospective study including 874 patients with undesired pregnancy, more patients who continued the pregnancy to birth reported fair to poor health compared with patients who underwent first- or second-trimester termination (27 versus 20 and 21 percent, respectively) [101]. Self-rated health and chronic pain outcomes were similar between the first- and second-trimester abortion groups at five years.

In addition, while patients may experience a variety of short- and long-term emotions, the predominant feeling reported is relief [102]. A detailed discussion about the effects of abortion on mental health are discussed elsewhere. (See "Pregnancy termination and potential psychiatric outcomes".)

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "Society guideline links: Pregnancy termination".)

INFORMATION FOR PATIENTS

UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given

condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topic (see "Patient education: Abortion (The Basics)")
- Beyond the Basics topic (see "Patient education: Abortion (pregnancy termination) (Beyond the Basics)")

SUMMARY AND RECOMMENDATIONS

- **General issues pertaining to pregnancy termination**
  - **Counseling** – Counseling should include a nondirective discussion of alternatives (ie, continuing pregnancy with parenting or adoption) and a thorough discussion of the medical and surgical options for pregnancy termination, including the risks, benefits, and expected outcome of each. (See 'Counseling and informed consent' above.)
  - **Determining gestational age** – Determining the correct gestational age with menstrual dating or ultrasound evaluation is a critical part of preabortion care. Menstrual dating can be used in patients in whom the date of the last menstrual period (LMP) is known with certainty and in those with regular menstrual cycles. We perform a preprocedural ultrasound prior to all second-trimester abortions.
  - **Rh testing and alloimmunization prevention** – While RhD status was historically performed on all patients, evidence shows risk of alloimmunization of D-negative patients to be negligible for gestations <12 weeks, and the World Health Organization does **not** consider Rh testing a prerequisite for such patients. However, expert opinions vary, and other organizations (ie, Planned Parenthood Federation of American, National Abortion Federation [NAF]) recommend **against** Rh testing and Rh(D) globulin administration for gestations that are <8 weeks of gestation. (See 'Laboratory testing' above and 'Alloimmunization prevention' above.)

- **Cervical dilation and preparation** – Mechanical cervical dilation before uterine aspiration is generally required after 8 weeks of gestation (and sometimes before). Cervical preparation with osmotic dilators and/or prostaglandins is generally necessary after 12 weeks of gestation to dilate the cervix more slowly before dilation and evacuation (D&E). (See 'Cervical dilation and preparation' above.)

- **Contraception** – Ovulation can occur soon after an abortion and before the onset of menses; thus, offering immediate contraception is important and can be generally initiated the day of the procedure, if desired. (See 'Plan for contraception' above.)

- **Follow-up** – Follow-up depends on the gestational age at which the termination is performed and procedure type. An example of postprocedure care instructions is shown in the table (table 2).

- **Complications** – Potential complications include hemorrhage, uterine perforation, infection, missed ectopic pregnancy, ongoing pregnancy, and retained products of conception. The overall risk of major complication (ie, hospital admission, surgery, transfusion) is low. (See 'Complications' above and 'Ectopic pregnancy' above.)

- **Choice of procedure**

  - **First-trimester termination** – For patients undergoing termination at <77 days (11 weeks) of gestation, either medication or surgical abortion are appropriate options. The choice between traditional clinic-based medication abortion, no-test (ie, history-based) medication abortion, and aspiration is based on gestational age, eligibility, availability, and patient preference. Patients who place value on avoiding surgery or anesthesia and who are willing to accept more discomfort and awareness of blood and tissue loss may opt for a medication abortion. Patients who place a high value on completing the procedure in one visit are more likely to choose aspiration abortion. Eligible patients (eg, known LMP, no risk factors for ectopic pregnancy (table 1), no history of hemorrhagic disorders) who desire medication abortion may opt for telemedicine or self-managed abortion. (See 'First trimester' above.)

  - **Second-trimester termination** – Similar to first-trimester abortion, second-trimester procedures can be performed with induction (medication) or surgery (D&E). How to choose between procedure types, procedure setting (eg, outpatient facility, labor and delivery unit), and the relative outcomes of medication and surgical termination in the second trimester are discussed in detail separately. (See 'Second trimester' above and "Overview of second-trimester pregnancy termination", section on 'Choosing dilation and evacuation versus induction termination'.)

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Topic 3313 Version 52.0

GRAPHICS

Risk factors for ectopic pregnancy compared with pregnant controls

Degree of risk	Risk factors	Odds ratio
High	Previous ectopic pregnancy	2.7 to 8.3
	Previous tubal surgery	2.1 to 21
	Tubal pathology	3.5 to 25
	Sterilization	5.2 to 19
	IUD	
	- Past use	1.7
	- Current use	4.2 to 16.4
	- Levonorgestrel IUD	4.9
	In vitro fertilization in current pregnancy	4 to 9.3
Moderate	Current use of estrogen/progestin oral contraceptives	1.7 to 4.5
	Previous sexually transmitted infections (gonorrhea, chlamydia)	2.8 to 3.7
	Previous pelvic inflammatory disease	2.5 to 3.4
	In utero DES exposure	3.7
	Smoking	
	- Past smoker	1.5 to 2.5
	- Current smoker	1.7 to 3.9
	Previous pelvic/abdominal surgery	4
	Previous spontaneous abortion	3
Low	Previous medically induced abortion	2.8
	Infertility	2.1 to 2.7
	Age ≥40 years	2.9
	Vaginal douching	1.1 to 3.1

	Age at first intercourse <18 years	1.6
	Previous appendectomy	1.6

IUD: intrauterine device; DES: diethylstilbestrol.

Data from:

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Graphic 82282 Version 9.0

Example of postabortion care instructions in English

Taking care of yourself after a uterine aspiration or D&E

What problems should I watch out for?

Contact your clinician if you:

- Have a fever higher than 100.4°F (38°C) or have chills
- Have too much bleeding (soaking 2 maxi-pads an hour for 2 hours straight)
- Have bad cramps that don't get better over time or with ibuprofen (Advil, Motrin) or Norco
- Have green, yellow, or bad-smelling vaginal discharge
- Your period hasn't come after 2 months (and you're not using a hormonal birth control method)

How should I take care of myself?

You may return to usual activities, but it may be a good idea to avoid vigorous exercise for a few days. Avoid an activity if it causes pain or if you notice that your bleeding is increasing.

During the 24 hours after receiving sedation or **at any time** while taking narcotic pain medicines (such as Norco or Tylenol with codeine), do not drive or operate machinery, drink alcohol, or make any important decisions. Follow the instructions on your prescription bottle(s).

What should I expect?

It is normal to have bleeding.
Bleeding is different for every person. You may bleed only 1 day, or off and on for up to a month. The flow may be anything from just spotting or brown discharge to fairly heavy. You may bleed more when you exercise or lift heavy objects. You should bleed less when you rest.

It is normal to have cramps for a few days.
Take ibuprofen (Advil, Motrin). If you need something stronger (or have an allergy to ibuprofen), take Norco. You may want to put a hot water bottle or heating pad on your belly or back to help you feel better.

It is normal to have swollen breasts and have milk letdown.
Do not touch or squeeze your breasts or nipples. You will feel more comfortable if you wear a tight bra or sports bra even at night. If you have pain, apply cold ice packs to your breasts and/or take ibuprofen. The pain and fluid will go away more quickly the less your breasts or nipples move or are touched.

It is normal to have a range of emotions.

It is normal not to have another period for 1 to 2 months.
Even if your period hasn't come back yet, you can still get pregnant. You can get pregnant as soon as 2 weeks after your procedure.

Should I make a follow-up appointment?

A follow-up appointment is not required unless you are experiencing symptoms that worry you.

However, if you are due for your Pap smear, want to refill or change your birth control method, or ask other questions about your health, please make an appointment with your local health care provider.

D&E: dilation and evacuation.

Courtesy of Jody Steinauer, MD, MAS.

Graphic 126344 Version 1.0

Estimated pregnancy related maternal mortality

Type of pregnancy	Death rate
Legal pregnancy termination	0.567 per 100,000 terminations
Miscarriage	1.19 per 100,000 miscarriages
Live birth	7.06 per 100,000 live births
Ectopic pregnancy	31.9 per 100,000 ectopic pregnancies

Estimates based on data from over 57 million pregnancies in the United States from 1991 to 1999.

Adapted from Grimes D. Am J Obstet Gynecol 2006; 194:92.

Graphic 63961 Version 2.0

Contributor Disclosures

Jody Steinauer, MD, MAS, PhD Consultant/Advisory Boards: Modern Fertility[Contraceptive decision-making, education and support for patients and clinicians. This includes unbiased information about all methods of contraception.]. All of the relevant financial relationships listed have been mitigated. **Rajita Patil, MD, FACOG** No relevant financial relationship(s) with ineligible companies to disclose. **Robert L Barbieri, MD** No relevant financial relationship(s) with ineligible companies to disclose. **Alana Chakrabarti, MD** No relevant financial relationship(s) with ineligible companies to disclose.

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