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CHAPTER 7

Medical evaluation and management

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LEARNING POINTS

- For healthy women, the evaluation before induced abortion is quick and simple.
- For women with chronic illness, the preoperative evaluation guides how or where the abortion is provided rather than whether it can be performed.
- Women with important medical conditions, such as a personal history of thrombosis or cardiac valvular disease, may benefit from care coordinated with their regular physician or another physician with appropriate expertise.
- Cervical infection with *C. trachomatis* or *N. gonorrhoeae* (or mucopurulent cervicitis) is a risk factor for post-abortal endometritis. No studies have compared outcomes after immediate preprocedure treatment versus delaying the abortion for a week to complete treatment.
- Women with chronic medical conditions should be encouraged to continue their regular medications around the time of the abortion with occasional modifications as needed (e.g., insulin in the fasting patient).

Introduction

For most healthy women choosing to have an abortion, care is straightforward. Other women decide to have an abortion in the context of a serious medical or psychiatric illness. Hence, abortion providers encounter women with a variety of medical and psychiatric problems. Determining the optimal setting for abortion is important. Safe, prompt abortion care is especially critical when maternal risks increase as the pregnancy advances. However, for most conditions, delays of a week or two are offset by achieving appropriate diagnosis, management, and referral to the safest environment.

Most women choose abortion for reasons other than threat to maternal health. One large, recent survey found that only 12% of women included a physical problem with their health among reasons for having an abortion [1]. Hospital-based abortion providers who receive referrals care for more women with medical problems than do providers in freestanding clinics.

This chapter reviews the preabortion assessment relevant to the care of healthy women as well as those with medical problems. For all women, appropriate assessment will include a targeted history, physical examination, and limited laboratory testing. We present additional relevant preabortion and management considerations for selected acute and chronic medical problems. We focus primarily on women having surgical abortions; few midtrimester abortions in the USA currently involve labor induction. Other chapters provide more information about management in the context of medical methods of abortion (Chapters 9 and 12), anesthesia (Chapter 8), and contraceptive care (Chapter 14).

This chapter also aims to assist providers in choosing the setting for the abortion. In some cases, women with serious illness benefit from additional testing prior to the abortion, referral to a hospital-based ambulatory care setting, or rarely, hospital admission. Unnecessary referrals, however, burden women with delays as well as increase the cost and complexity of care. Additionally, some hospitals lack an experienced abortion provider or may offer only labor-induction abortion in the second trimester. If acceptable for the patient, a discussion with her regular health care provider may clarify which, if any, special considerations require modification of routine abortion care.

Preabortion screening

History

A medical history should precede the abortion; in most cases, this evaluation will be brief. Providers may use a checklist to be self-administered in the waiting area or a standard interview. For women with chronic medical conditions (e.g., severe asthma with a current respiratory infection), a

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discussion with the regular health care provider may help determine what, if any, modifications to care warrant consideration, such as the need for antibiotics or alteration in steroid therapy. Providers must obtain the woman's permission prior to such contact. The medical history should include an open-ended question about any medical problems as well as specific questions about common medical conditions affecting women of reproductive age: cardiac (murmurs, valvular disease, arrhythmias), pulmonary (asthma, respiratory infection), hematologic (bleeding or clotting disorders), endocrine (diabetes, thyroid), renal, and hepatic (kidney and liver impairment affect drug clearance and metabolism). Other elements of the history include but are not limited to the following:

- Obstetric history
- Gynecologic history
- Social history
- Family history
- Medications
- Allergies

Obstetric history

Clarify the type of previous abortion or early pregnancy failure management, mode of delivery for births, and any pregnancy or procedure-related complications. Some important risk factors include a history of failed attempted abortion or perforation with a prior surgical abortion (suggestive of a uterine anomaly, such as a bicorruate uterus) or multiple cesarean deliveries. The rate of initial and repeat cesarean delivery has increased in the USA and many other countries. For example, in 2006, 31% of US births were accomplished by cesarean delivery [2], whereas in some private hospitals in Brazil, the proportion is more than 80% [3]. The risk of abnormal placentation (previa, accreta, increta, percreta) increases progressively with the number of previous cesarean deliveries [4]. Additionally, the small risk of uterine rupture must be considered for women having labor-induction abortion after previous cesarean delivery (Chapter 12).

Gynecologic history

Determine the history of sexually transmitted infections (STI), including human immunodeficiency virus (HIV), and other risk factors that may indicate the need for STI screening, such as symptoms of infection, adolescent age, or recent change in sexual partner. A history of treatment for dysplasia, such as a loop electrosurgical excision procedure (LEEP) or cold-knife conization, may result in cervical stenosis requiring additional cervical preparation.

Social history

Determine recent and chronic use of tobacco, alcohol, and drugs that may influence administration of anesthesia or the ease of intravenous access. Some providers inquire about a history of sexual abuse, which if present, may affect the woman's tolerance of examinations and surgical procedures (Chapter 5).

Family history

A family history of venous thromboembolism (suggestive of an inherited thrombophilia) or problems with anesthesia (such as malignant hyperthermia) may be relevant.

Medications

The provider should query the patient about the name(s) of medication(s), drug regimens, and reasons for use. In most cases, women should continue their regular medications before and after the abortion and be asked to bring their medications with them to the abortion visit. Some medications, such as insulin, may need a regimen adjustment around the time of the abortion. Several online and print resources are available for providers to obtain information about unfamiliar medications [5] (such as www.Epocrates.com).

Allergies

Identify allergies to medications, latex, iodine, and eggs (for those who are to receive the anesthesia agent propofol, because of rare allergic reactions). Many reported "allergies" are normal side effects, such as nausea with narcotics or ampicillin-related rash, which does not represent true penicillin allergy.

Physical examination

A brief, focused physical examination will usually provide all needed information before an abortion. Providers vary in what they include, but may include the following:

- Height and weight
- Vital signs
- Pulmonary and cardiac examinations
- Abdominal examination
- Pelvic examination

Height and weight

Determining height and weight enables calculation of body mass index (BMI). Weight may affect the choice of procedure, setting, or anesthesia. The current epidemic of obesity in the USA is summarized in thirds: one-third of the US population is of normal weight, one-third is overweight, and one-third is obese (BMI $\geq$30) [6]. Obesity is associated with greater technical difficulty, longer operating times, and greater blood loss during surgical abortion [7,8]. Morbid obesity may make surgical abortion risky or impractical; a medical method of abortion may be the better approach for eligible patients.

Vital signs

If the blood pressure (BP) measurement is elevated, repeating the measurement after the patient has been sitting

stationary for several minutes usually gives a lower, more accurate reading. Women with a large arm circumference may need a wider cuff. The correct measurement of BP is important when providers consider referral to a hospital-based setting at a certain threshold. Although tachycardia because of anxiety is common, it may also reflect active thyroid disease or serious anemia.

Pulmonary and cardiac examinations

Pulmonary auscultation is indicated for women with a history of asthma or current respiratory infection. Mild wheezes often respond to inhaled bronchodilators administered a few minutes before the abortion procedure. Local or regional anesthesia may be preferable in the setting of acute or chronic respiratory disease. Most murmurs in asymptomatic women are physiologic and require no change in usual care. A cardiac examination may be helpful in the setting of symptoms such as shortness of breath or exercise intolerance. Radiation of the murmur to the carotid artery may indicate a pathologic murmur.

Abdominal examination

An abdominal examination may reveal factors that increase operative difficulty: cesarean delivery limiting mobility of the uterus because of adhesions, leiomyomas (suggested by size-date discrepancy or an enlarged, irregular uterus), or central obesity.

Pelvic examination

A bimanual examination provides an estimate of gestational age (especially in the absence of ultrasound), uterine and cervical position, mobility of the uterus, cervical consistency, and the possible presence and location of leiomyomas.

Laboratory testing

Current recommendations for women undergoing abortion in the USA include determination of Rh(D) antigen status [9]. Because the earliest gestational age at which sensitization is possible is unknown, both the American College of Obstetricians and Gynecologists [10] and the Royal College of Obstetricians and Gynaecologists [11] recommend immunoprophylaxis in nonsensitized D negative women having abortions at any gestational age. An exception occurs if the father of the pregnancy is known to be D negative.

Many providers determine the hemoglobin or hematocrit. Although no evidence exists regarding the need for this practice before abortion [11], it provides a baseline in the event of hemorrhage and alerts providers to anemia requiring treatment afterwards. In rare cases, very low hemoglobin prompts preparation for transfusion. However, in most cases, women with anemia may safely undergo surgical or medical abortion, given the modest blood loss involved. Blood loss is greater during second-trimester abortion but is usually well tolerated; the need for transfusion is rare even at advanced gestational ages.

Thrombocytopenia rarely poses a problem. Unfortunately, no published data specific to abortion can guide practice. Provided the platelet count exceeds 100,000 per microliter, management for first or second-trimester abortion can be routine. First-trimester surgical abortions with counts less than 100,000 are probably safe as well; more caution is prudent in the midtrimester when greater blood loss is expected. When lower counts occur as part of a disease process (e.g., immunological thrombocytopenic purpura), platelet function as well as the platelet count should be considered. Severe thrombocytopenia (e.g., less than 20,000 per microliter) may require platelet transfusion, especially in the second trimester. When concerns arise about increased bleeding because of platelet dysfunction or thrombocytopenia, a hospital setting is preferable so that platelets and other blood products are available if needed.

Many providers screen for chlamydial infection or gonorrhea at the time of abortion, whereas others provide universal treatment regimens without screening. The latter strategy has been found to be more cost effective, at least in European countries with national health services, but it lacks the advantage of partner tracing and treatment [12]. Screening can be accomplished with a vaginal swab, cervical sample, or urine test. The prevalence of chlamydial infection is related to the number of sexual partners and inversely related to age, years of education, and household income [13]. One representative survey in the USA found that 6% of sexually experienced adolescents screened positive for *C. trachomatis* [13]. The Centers for Disease Control and Prevention (CDC) and the US Preventive Services Task Force (USPSTF) recommend universal screening of all sexually active women aged 25 years or younger and screening of older women with risk factors (e.g., those who have a new sex partner or multiple sex partners) [14]. Positive results must be communicated to the patient with a plan for treatment for her and her partner(s).

HIV counseling and testing should be offered as appropriate. Recommendations regarding screening are inconsistent: starting in 2006, the CDC advised screening all persons between 13 and 64 years of age [15]. Prompted by this policy change, the USPSTF reviewed the available evidence and confirmed its assessment that insufficient evidence exists to argue for or against screening those not at increased risk [16]. The USPSTF guidelines regarding screening of pregnant women are not germane for abortion practice, however, because they implicitly assume that all pregnant women choose to continue their pregnancies.

Physiological changes of pregnancy

The physiological changes of pregnancy are generally well tolerated by healthy women and most of those with medical

conditions. Some women with more severe and complex medical problems may require special attention. By midpregnancy many of the changes are complete, such that treatment of some conditions at 22 to 24 weeks' gestation may be as potentially complicated as those in late pregnancy. More detailed information can be obtained from textbooks of obstetrics [17,18].

Cardiovascular

During pregnancy, cardiac output increases by approximately 40% because of volume expansion, increased stroke volume, and increased heart rate. Vascular resistance falls beginning early in the first trimester. The net effect is decreased BP in the first trimester. However, women with chronic hypertension may have an exacerbation of hypertension in the first trimester.

Serum albumin levels fall in pregnancy resulting in decreased serum oncotic pressure and increased leakage of fluid from capillaries into interstitial spaces. Endothelial integrity is also compromised in some pregnancies, again increasing the flux of fluid into interstitial spaces. Therefore, pregnant woman are more susceptible to cardiogenic or noncardiogenic pulmonary edema.

These hemodynamic changes resolve rapidly after pregnancy ends. Immediately after uterine evacuation, blood is returned from the uterus to the central circulation; at term, this volume may reach 500 mL. Edema fluid is mobilized more gradually. These volume challenges to the cardiovascular system pose increased risks in women with mitral stenosis, dilated cardiomyopathy, or hypertrophic cardiomyopathy.

Renal

Because of augmented renal blood flow, the glomerular filtration rate (GFR) increases by approximately 40% very early in the first trimester, which manifests as a fall in serum creatinine from 0.9 to 0.6 mg/dL on average. Simultaneously, more avid sodium retention expands blood volume. The rise in GFR is associated with a proportionate increase in renal clearance of some drugs. Because of progesterone-mediated smooth muscle relaxation, the renal collecting system and ureters dilate, which increases urinary dead space and the risk for urinary tract infection.

Pulmonary

Progesterone induces a rise in minute ventilation so that pCO_2 falls from a normal value of 40 mmHg to approximately 30 mmHg. Renal compensation to the progesterone-induced hyperventilation results in a decline in bicarbonate (HCO_3) to approximately 22mEq/L. Oxygen consumption increases early in pregnancy because of the metabolic demand of cardiovascular and renal changes. Late in pregnancy, the fetus contributes to an increase in oxygen demand. The rise in cardiac output more than compensates for the increased demand for oxygen delivery, resulting in higher mixed venous pO_2 concentrations during pregnancy. The reduced HCO_3 in pregnancy can be mistakenly attributed to metabolic acidosis rather than to renal compensation to respiratory alkalosis.

Hematologic

The pregnant woman's blood volume expands more rapidly than her capacity to produce red blood cells, resulting in a physiologic anemia. Iron deficiency will exacerbate the anemia. During pregnancy a dramatic increase in the risk of deep venous thrombosis and pulmonary embolism occurs that peaks in the immediate postpartum period [19]. Women with hereditary or acquired thrombophilia may require prophylaxis.

Metabolic

Pregnancy increases insulin resistance and hyperglycemia. In the second trimester, women may develop gestational diabetes or an increased need for treatment with insulin or oral hypoglycemics. During the first trimester, prior to the development of insulin resistance, type I diabetes may become more brittle.

Management of selected medical conditions

Providers must ensure that they have sufficient medical expertise, supplies, and equipment to provide the necessary care. If not, referral is indicated.

In general, women should be encouraged to continue their regular medications (such as antihypertensive agents) unless specifically advised not to (such as discontinuing anticoagulants). Women may mistakenly fear that taking medications while pregnant is harmful; for example, a woman may arrive for abortion with hypertension out of control because she decided to stop her angiotensin-converting enzyme (ACE) inhibitor upon discovery of the pregnancy. With the patient's consent, a plan should be coordinated with the woman's regular health care provider whenever possible.

Vaginitis

Women with vaginitis can usually have the abortion proceed as planned. Candidiasis can be treated with either oral fluconazole 150 mg as a single dose or a topical nitroimidazole; oral therapy may be preferred, because uterine bleeding can dilute or wash out vaginal medication. Occasionally, a patient's vulva and vagina are so tender that she may require treatment before a procedure using only local anesthesia. Trichomoniasis likewise can be treated with metronidazole as usual. The CDC suggests either metronidazole 2.0 g or tinidazole 2.0 g orally in a single dose, with the same treatment for the male partner [14]. Metronidazole gel is less effective than oral metronidazole. Although many clinicians

advise against any medication in the vagina in the days after an abortion, no evidence supports this recommendation.

Chlamydial and gonococcal cervicitis

Infection of the cervix with either of these pathogens increases several-fold the risk of endometritis after abortion. Hence, treatment and partner management should be initiated promptly. Some providers delay the abortion to complete treatment, whereas others initiate treatment on the day of cervical preparation or the abortion procedure; no randomized trials have compared outcomes. A single dose of oral azithromycin 1.0 g is the preferred treatment for chlamydial infection, although a 7-day course of oral doxycycline 100 mg twice daily is an alternative [14]. Because of the emergence of fluoroquinolone-resistant strains of gonorrhea, the CDC now recommends intramuscular ceftriaxone 125 mg or oral suspension of cefixime 400 mg for uncomplicated gonorrhea [14].

Bacterial vaginosis

Bacterial vaginosis is a common cause of vaginal discharge. Based on laboratory criteria and not symptoms, more than a quarter of abortion patients may have this condition [20,21]. Whether screening and treatment of asymptomatic bacterial vaginosis reduce post-abortal infection remains unclear. Randomized controlled trials have compared treatment with metronidazole versus placebo or metronidazole and doxycycline versus doxycycline alone [20–22]. Losses to follow up after randomization in these trials were so large that the validity of the results is suspect [23]. Hence, the evidence is insufficient to make a recommendation.

Women presenting for abortion with symptomatic bacterial vaginosis can receive usual therapy without delay. The CDC suggests metronidazole 500 mg by mouth twice daily for 7 days, which may be preferable to the vaginal medications metronidazole gel or clindamycin cream [14].

Human immunodeficiency virus infection

The advent of highly active antiretroviral therapy (HAART) has reduced the abortion ratio among HIV-infected women. Before HAART, seropositive women who became pregnant disproportionately chose induced abortion compared with seronegative women [24]. Since the introduction of HAART, higher proportions of infected women are electing to continue their pregnancies [25,26]. Nevertheless, underuse of highly effective contraceptives leaves many infected women at risk of unintended pregnancy [27].

Little is known about the potential interactions between HIV infection and abortion. One small cohort study found no increase in the risk of infectious morbidity after curettage abortion among HIV-infected women compared to those uninfected. The overall complication rate was higher among the infected women, but these events included retained placenta and anesthesia problems unlikely to be related to HIV [28]. Women taking antiretroviral drugs should continue them without interruption. Those with profound immunosuppression or overt acquired immune deficiency syndrome (AIDS) may need their abortion care to be coordinated with their patient's regular treating physician.

Cardiovascular disease

Hypertension

Hypertension is common among young women, often clinically silent and undertreated. In the absence of a history of hypertension, providers should confirm excessively high measurements before delaying the abortion for treatment or referring the woman to a hospital-based setting. Outpatient procedures are appropriate for women with mild to moderate hypertension. Poorly controlled hypertension (systolic BP >160 mmHg; diastolic BP >105 mmHg) probably warrants treatment before the procedure. Treatment is usually easily accomplished with a combination of drugs such as a beta-blocker and a vasodilator. Providers should probably avoid ergot drugs in women with hypertension; oxytocin or misoprostol is an acceptable uterotonic agent for such patients.

Heart disease

Most women presenting for an abortion with serious cardiac disease will be aware of their condition. Some may not know their specific diagnosis, however, particularly if the problem was identified and treated during childhood. Medical records represent an important source of information if they are obtainable. The woman's parents or guardian may also be helpful, provided the patient gives permission to contact them.

Impaired functional status [29,30] may suggest undiagnosed heart disease. Questions such as: "Can you walk up a flight of stairs?", "Do you wake up at night short of breath?", "Does your heart race from time to time?", "Do you have chest pain or discomfort with exercise?" may be helpful. New flow murmurs commonly occur during pregnancy because of increased cardiac output. A harsh murmur radiating to the carotid suggests aortic stenosis and is usually pathological. Low oxygen saturation also suggests underlying cardiac or pulmonary disease.

When a provider identifies the presence of congenital heart disease by history or the presence of a surgical scar, a review of medical records or an echocardiogram may clarify the nature of the condition. In general, the absence of cyanosis, nondilated left and right ventricles with normal contractility, and a normal functional status are reassuring. Congenital cardiac conditions such as ventricular septal defects, atrial septal defects, and surgically corrected tetralogy of Fallot will usually not pose a problem during abortion. Some women with congenital heart disease experience exacerbation of tachyarrhythmia in pregnancy that may require cardiac rate control. Women with uncorrected

left-to-right shunts may have dramatically increased pulmonary blood flow resulting in shortness of breath and impaired functional status.

Valvular heart disease may be acquired or congenital. Acquired disease usually results from rheumatic fever and occurs more commonly in immigrant and disadvantaged populations. Rheumatic mitral stenosis should be considered if shortness of breath and oxygen desaturation develop within 2 weeks of an abortion (particularly a second-trimester abortion). Women with moderate mitral stenosis (valve area <1.5 cm^2) and moderate aortic stenosis (peak gradient >60 mmHg) usually tolerate an abortion procedure without difficulty. Similarly, mitral and aortic regurgitation without evidence of left ventricular dilation should not complicate an abortion.

Women with prosthetic valves usually are fit for abortion. The need for anticoagulation depends on the type of valve and location, the patient's history, and the gestational age of the pregnancy at the time of abortion. Anticoagulation seldom increases bleeding from an uncomplicated first-trimester procedure, because hemostasis occurs primarily through uterine contraction. The effect on bleeding may be more important, however, in the second trimester or in the rare event of a complication such as uterine perforation. When the risk of thrombosis is small, providers may choose to stop warfarin 2 to 3 days before the procedure and restart it immediately afterward. Higher risks of thrombosis warrant transitioning from warfarin to heparin, which can be briefly stopped around the time of the abortion.

Myocardial infarction (MI) is rare in women of reproductive age. Those with a history of MI will usually require management in a hospital environment with attention to cardiac rate control with a beta-blocker and pain management. Ergot drugs should be avoided; aspirin should be continued. Surgery after a recent MI poses extra risks. Data regarding the risk of an abortion shortly after MI are lacking; nevertheless, the potential risk of cardiac death, particularly in the context of advanced gestational age or a complicated procedure, warrants consideration.

Cardiomyopathy with a dilated or compromised left ventricle may lead to hemodynamic decompensation and arrhythmia. Women with a history of cardiomyopathy and a normal echocardiogram should tolerate an abortion procedure, but they may worsen afterwards. Management includes cardiac rate control, diuretics, and afterload reduction. Hypertrophic cardiomyopathy is an autosomal-dominant condition. Patients are at risk for malignant arrhythmia and sudden death; many will have a defibrillator in place. Diastolic dysfunction and a stiff ventricle will decrease tolerance to volume loading, whereas advanced disease with left ventricular outflow obstruction because of septal hypertrophy will lead to poor tolerance of hemorrhage with hypovolemia. Cardiac rate control, usually with a beta-blocker, and volume management are critical.

The American Heart Association [31] no longer recommends antibiotic prophylaxis with genitourinary operations to prevent infective endocarditis. No credible evidence supports a link between procedures on the genitourinary tract and infective endocarditis or establishes that prophylactic antibiotics in this setting lower the remote risk of endocarditis [32]. The revised guidelines emphasize that susceptible individuals with high-risk cardiac conditions are more likely to develop endocarditis from bacteremia associated with daily activities than from any dental procedure [31]. Regarding abortion, the incidence of bacteremia is unknown but probably related to gestational age; the presence of bacteremia at term delivery is well established. Performing first-trimester surgical abortion without antibiotics in women with low-risk conditions, such as mitral valve prolapse, is certainly reasonable. In the absence of clear guidelines related to abortion, providers may differ in their approach to women with high-risk conditions, such as prosthetic valves, where the consequences of infective endocarditis are dramatic. Consultation with cardiologists in the community regarding local practice for prophylaxis may be helpful.

Endocrine disorders

Diabetes

The epidemic of diabetes is growing in parallel with the epidemic of obesity. In 2005, 7% of the US population (21 million persons) had diabetes [33]; of these, about 6 million persons were undiagnosed. The prevalence of diabetes increases progressively with age to reach 21% of individuals aged 60 years and older. The disease occurs more commonly among Native American and Black people than among Hispanic American or non-Hispanic White people.

In general, pregnancy increases medication requirements for adequate glucose control in the second and third trimesters. Women with type I diabetes may become more brittle in the first trimester and therefore prone to hypoglycemia. In addition, hyperemesis may complicate oral intake for diabetic pregnant women. Management of diabetic women having surgical abortions depends in part on plans for pain management. No changes in diet or medication are required for those having abortions under local anesthesia. When deeper sedation requires preprocedure fasting, a common approach is to have the patient inject half her usual long-acting insulin dose the evening before and skip the morning dose. Ideally, a woman with diabetes is scheduled to have one of the first procedures of the day, so that she can eat and take her usual dose of morning insulin afterwards; morning NPH will be active in the afternoon. Glucose is monitored frequently by finger stick before, during, and after the procedure, with insulin given as needed until the patient resumes eating. Although sliding scales of insulin doses related to blood glucose levels have been used in hospitals for decades, little evidence supports this approach [34].

When advising women regarding medications and diet, providers should keep in mind that modest hyperglycemia poses no acute risk to women undergoing an abortion. "Loose" control of diabetes around the time of the procedure is preferred to "tight" control. For example, a transient blood glucose concentration of 180 to 200 mg/dL during an abortion is not worrisome, whereas a blood glucose level of 30 mg/dL is. Hence, providers should have food, intravenous glucose solutions, or glucagon available. After the procedure, the patient's medication requirements may decrease substantially. Coordination of care with her medical provider is recommended, especially during this transitional time.

Thyroid disease

Hyperthyroidism in pregnancy may present with tachycardia, vomiting, tremulousness, and wide pulse pressure (Box A). Rarely, women with hydatidiform mole present with clinical hyperthyroidism related to high human chorionic gonadotropin production [35]. Women with mild hyperthyroidism can undergo abortion as usual, but uncontrolled hyperthyroidism can lead to thyroid storm. Hence, treatment should begin promptly and the abortion should proceed after the disease is stabilized by medication. Consultation with an anesthesiologist is advisable if the patient is to receive deep sedation or general anesthesia.

Pulmonary disease

Asthma

Asthma is another common illness among women seeking abortion: in 2005, an estimated 8% of the US population (about 22 million persons) currently had asthma [36]. Women have a 40% higher prevalence of asthma than do men. In 2005, approximately 4% of the population had at least one asthma episode in the previous year.

Women with a history of childhood asthma without current symptoms may undergo usual care. If a woman reports current well-controlled asthma, she should be encouraged to use her usual medications and to bring an inhaler with her for her visit. Even if her lungs are clear on auscultation, prophylactic use of an inhaler with nebulized albuterol or metaproterenol before the procedure may be prudent. Additionally, the facility should be equipped to manage the rare acute asthma exacerbation. Concurrent respiratory infection or inadequately controlled asthma may require delaying the abortion until treatment achieves better control. The prostaglandin carboprost tromethamine is not recommended for women with asthma, because it may cause bronchoconstriction; misoprostol is not contraindicated.

The use of inhaled corticosteroids does not require "stress dose" steroids at the time of surgery. However, if the woman has received repeated oral glucocorticoid therapy for asthma control (doses equivalent to at least 20 mg of prednisone daily for 5 or more days) [37,38], stress dose(s) of hydrocortisone may be used to prevent adrenal insufficiency. The dose should be individualized; for example, not all patients need hydrocortisone 100 mg given intravenously at intervals.

Severe asthma with bronchospasm constitutes a medical emergency requiring intensive medical intervention. Indeed, the asthma mortality rate for women is 45% higher than that for men [36]. Women with a history of recent emergency department visits for asthma or intubation also may benefit from a hospital-based setting for the abortion. Management may include premedication with steroids and the availability of a team of pulmonary specialists. Local or regional anesthesia may be preferable if severe, uncontrolled asthma is present in order to avoid bronchospasm during deep sedation or intubation.

Box A

A woman presented at 23 weeks LMP with a history of thyroid disease of unknown etiology. She was clinically hyperthyroid with exophthalmia, tachycardia, and tremor. Her case was managed in consultation with the anesthesia service, which recommended beta-blockade prior to the procedure and a brief hospitalization afterward with telemetry to monitor for thyroid storm.

Restrictive lung disease

Pregnancy is usually well tolerated in women with restrictive lung disease if the vital capacity exceeds 50%. Increased oxygen demand may result in desaturation at rest or with exercise. Postprocedure volume shifts that complicate respiratory function can be managed with diuresis. Women with complicated cystic fibrosis may require hospital-based care because of altered pulmonary physiology. When functional status is normal, first-trimester abortion in an outpatient setting is acceptable.

Pulmonary hypertension

Pulmonary hypertension because of increased pulmonary vascular resistance is life-threatening in pregnancy, with maternal mortality as high as 50%. Systolic pulmonary artery pressures exceeding 60 mmHg, particularly in the context of a dilated right ventricle, are very concerning. Echocardiography can be used to evaluate pulmonary pressures. Women with pulmonary hypertension require hospital-based care, including providers experienced in treating the condition. Clinicians can use specific pulmonary vasodilators to lower pulmonary vascular resistance and improve right heart function and forward flow. In the context of a failing right heart, management of volume loading in the second trimester usually requires invasive hemodynamic monitoring. Even modest volume shifts may result in right heart decompensation. Aggressive but appropriate diuresis is critical postprocedure.

Renal disease

Asymptomatic bacteruria does not complicate abortion; hence, screening for it is not required. Women who have symptomatic cystitis usually are infected with *E. coli*, adequately treated by a 3-day course of antibiotics, such as fluoroquinolones or beta-lactams [39]. Longer courses, such as 5 to 10 days of therapy, yield higher bacteriological cure rates but have significantly more side effects. No evidence indicates an important interaction between abortion and pyelonephritis, although many providers would hesitate to perform an elective abortion on a febrile patient.

In the context of adequately controlled hypertension, renal disease should not complicate an abortion procedure. Postabortion volume shifts may complicate the control of hypertension and require more aggressive diuresis. Dialysis after an abortion may require additional hyperfiltration. Adjustments of chronic medications for dialysis patients can be made in consultation with a pharmacist.

Box B SELECTED RISK FACTORS FOR THROMBOEMBOLISM (Adapted from ACOG) [40].)

Hereditary
- Factor V Leiden deficiency (5–6% of Caucasian population; 1% of African American population)
- Prothrombin gene mutation (2–4% of general population)
- Antithrombin III deficiency (0.02–0.2% of general population)
- Protein C deficiency (0.2–0.5% of general population)
- Protein S deficiency (0.08% of general population)
- Hyperhomocysteinemia (1–11% of general population)

Other
- Prior venous thromboembolism
- Mechanical heart valve
- Atrial fibrillation
- Trauma
- Major operation
- Prolonged immobilization
- Antiphospholipid syndrome

Organ transplant recipients

Management of a woman with a solid organ transplant will depend on the allograft organ's function. Cyclosporine and tacrolimus must be adjusted during and after pregnancy. Many other medications, (e.g., erythromycin) given concurrently with cyclosporine and tacrolimus can increase drug levels into a toxic range.

Thrombophilia

Pregnancy increases the risk of venous thromboembolism (VTE), with the risk greatest in the postpartum interval. Women with thrombophilia have even greater risks of VTE during and after pregnancy. Identification of women at increased risk of VTE related to pregnancy can allow prophylactic measures to reduce the risk around the time of abortion. Recognized risk factors for VTE may be inherited or acquired (Box B [40]).

The most common inherited thrombophilias are Factor V Leiden deficiency and prothrombin gene mutation (e.g., G20210A) (Box C). Other genetic predispositions to VTE are less prevalent. If a woman requesting abortion is already receiving VTE prophylaxis, coordinating her abortion care with her treating physician is helpful. For patients identified as being at increased risk and not on prophylaxis, consultation with a hematologist is useful. How long to continue anticoagulants after an abortion remains unclear; little evidence exists to guide therapy [41]. Women at high risk for thromboembolism may require lifelong anticoagulation and deserve special consideration in contraceptive choice (Chapter 14).

For women at increased risk who are undergoing labor induction abortion, several approaches help to reduce the risk of VTE. Graduated compression stockings reduce the risk of calf-vein clots, but they must be properly fitted to avoid an inadvertent tourniquet effect. Pneumatic compression devices can be used if the woman is confined to bed. Low-dose unfractionated heparin, such as 5,000 units subcutaneously every 8 hours, has been shown to protect women having cancer operations from developing a VTE. Low-molecular-weight heparin is more convenient (enoxaparin 40 mg subcutaneously daily as a single injection) but incurs higher cost. Combinations of these strategies can be used, depending on the perceived risk. Women receiving anticoagulants should avoid spinal or epidural anesthesia because of the risk of spinal hematomas.

Neurologic disorders

Because pregnancy increases the metabolism of many antiepileptic medications, women with seizure disorders may require medication adjustment during pregnancy. Women with well-controlled epilepsy may undergo routine care. Hospital-based care should be considered for those with recent onset or uncontrolled seizures. For any woman with epilepsy, a seizure may occur at any time. If a seizure occurs during abortion in an awake patient, appropriate measures include maintaining patient safety (safe positioning with support) and interrupting the abortion procedure if possible until the seizure has ended. Most seizures resolve

Box C

A woman seeking abortion in the first trimester of pregnancy has a personal history of venous thromboembolism and is known to be heterozygous for Factor V Leiden deficiency. She may benefit from prophylactic anticoagulation at the time of the abortion and for a period of time afterwards. This can be accomplished appropriately with heparin (unfractionated or low molecular weight) or warfarin.

Box D INTRAVENOUS LOADING DOSE OF ANTIEPILEPTIC DRUGS USED IN STATUS EPILEPTICUS (From Sivven and Waterhouse [42].)

Diazepam 10–20 mg
Lorazepam 4 mg
Midazolam 0.2 mg per kg
Propofol 2 mg per kg

spontaneously and do not require intravenous anticonvulsants. Protecting the patient from falling is usually all that is required.

Fortunately, status epilepticus is rare. Stopping the prolonged or repetitive tonic-clonic seizures quickly is crucial to avoid neurologic and systemic injury [42]. This requires prompt administration of intravenous antiepileptic drugs; several of these benzodiazepines, such as midazolam, are commonly available in abortion settings (Box D [42]). Ancillary measures include airway maintenance, administration of oxygen and intravenous fluids, and monitoring of vital signs. Hospitalization for further evaluation and care should be prompt.

Contraceptive counseling in women with seizure disorders must include a careful review of antiepileptic drugs. Some, but not all, antiepileptic drugs induce the hepatic cytochrome p450 system that metabolizes oral contraceptive steroid hormones [43]. For instance, carbamazepine and phenobarbital decrease levels of contraceptive steroids but valproic acid does not. The decreases in serum levels of contraceptive steroids may lead to breakthrough bleeding and decreased efficacy; intrauterine contraception is often an easier and more effective approach.

Gastrointestinal disorders

A history of mild past or current liver disease does not affect usual care (e.g., hepatitis with mildly elevated transaminases). Coagulopathy may complicate cases of severe liver disease; an appropriate laboratory evaluation should precede the abortion. Women with portal hypertension warrant referral for hospital care.

Psychiatric conditions and substance abuse

Issues for women with psychiatric conditions seeking abortion include ensuring appropriate informed consent and identifying social support during and after the abortion. Some women seeking abortion are in a personal crisis; the request for abortion may reflect threats to the woman, such as an abusive partner, abandonment, or coerced sex. The current social situation and risk of suicide must be addressed (Chapter 5).

Women with a history of substance abuse may have a tolerance to narcotics and other drugs and thus require larger doses of medications (Chapter 8). With appropriate monitoring, larger than customary doses of narcotics and benzodiazepines can be administered safely in an outpatient setting. Establishing venous access in intravenous drug abusers can be challenging. Hence, clinicians should consider starting an intravenous line and securing it well with tape before the procedure begins.

Referral for abortion services

Abortion is a safe medical procedure. For a small number of women, a freestanding clinic or office may not offer the optimal conditions for care. Gestational age is important. Medical conditions easily managed at 8 weeks' gestation may be more complicated at 18 weeks. Similarly, the potential for uncommon but serious complications is greater in the second trimester than in the first.

Available medical services vary by site. Hospitals have more resources to manage complex problems (e.g., a full range of blood products, more anesthesia options, intensive care). Hospitals with perinatal services will have more resources than some community hospitals. Unfortunately, abortion expertise, particularly with dilation and evacuation at more advanced gestational ages, may be limited in hospitals. Although referral for hospital-based care can provide more sophisticated medical resources, it may limit the abortion options available to women.

The facility's resources to manage uncommon but potentially serious complications, such as hemorrhage or perforation, should be considered. A woman with moderate cardiac disease may easily tolerate a routine abortion but not one with complications. Is a hospital nearby, or would referral require transport of some distance?

Ideally, every freestanding clinic or office would have an established relationship with a Level III perinatal center where a patient with complications could receive appropriate counseling, medical management, and a safe abortion. Unfortunately, this scenario may be the exception rather than the rule in the USA. In some circumstances, referral to a hospital may be appropriate (Table 7.1). In other cases, consultation and coordination of care may permit a safe clinic-based procedure.

Conclusion

Although most women seeking abortion care are healthy, abortion providers also encounter women with a broad spectrum of medical and psychiatric illnesses. A focused history and physical examination, review of pertinent records, selective use of laboratory tests, and careful planning with treating physicians will enable safe outpatient care for many women with acute and chronic illness. Others will benefit from hospital-based or inpatient care. The overriding concern in deciding the optimal site for abortion care is patient safety. Although convenience and cost may have to be compromised, patient care must not be.

Table 7.1 Potential indications for referral to a hospital-based provider.

Here are some conditions seen in young women that may require intensive medical management around the time of an abortion. The list is not meant to be exhaustive or proscriptive. The decision about the optimal site of care depends on many factors such as gestational age, the severity of the medical condition, the capacity of the abortion facility to manage medical problems, and the availability or proximity of local referral resources.

Central nervous system
- Vascular – Arteriovenous malformation, untreated aneurysm
- Space-occupying lesions

Renal
- Impaired renal function (serum creatinine >2.5 mg/dL)

Hypertension
- Uncontrolled BP (systolic BP >160 or diastolic BP >105)

Endocrine
- Uncontrolled hyperthyroidism or diabetes
- Pheochromocytoma

Cardiac
- Congenital (cyanotic disease, right or left ventricular dilation, uncontrolled tachyarrhythmia)
- Coronary artery disease – (prior MI, angina)
- Cardiomyopathy – (current or history of pregnancy-related cardiomyopathy)

Pulmonary
- Uncontrolled asthma
- Restrictive lung disease (FVC <50%)
- Pulmonary hypertension (sPAP ≥50 mmHg)

Rheumatologic
- Lupus flare
- Lupus requiring anticoagulation

Gastrointestinal
- Hepatic disease with elevated prothrombin time
- Esophageal varices with history of bleeding
- Uncontrolled inflammatory bowel disease

Hematologic
- Severe anemia
- Sickle cell disease (current or recent crisis, history of thrombosis)
- Thrombophilia requiring anticoagulation

Oncology
- Counseling (timing of abortion relative to chemotherapy or radiation)
- Gynecologic cancers restricting access to the uterus

Transplant
- Impaired renal function (creatinine >2.5 mg/dL)
- Recent organ rejection
- Poorly functioning transplanted organ

Psychiatric
- Current suicidal ideation

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