Vaginal Bleeding

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■ PERSPECTIVE

Vaginal bleeding is one of the most frequent chief complaints of women presenting for emergency care. Normal vaginal bleeding occurs cyclically in women who have achieved menarche, mean age 12.5 years, until menopause, mean age 51 years, in North America. The normal cycle, defined as the first day of bleeding of one cycle to the first day of bleeding of the next cycle, lasts 28 days, plus or minus 7 days, and average volume of blood loss is 60 mL. Vaginal bleeding is defined temporally as midcycle (ovulatory), premenstrual, menstrual, and postmenstrual. Abnormal vaginal bleeding is classified on the basis of the duration, amount, and frequency of bleeding (Table 27-1). It occurs in women of all ages, and it can result from a number of causes, including anatomic abnormalities, complications of pregnancy, malignancies, infections, systemic diseases, and endocrinologic imbalances. Typically, premenarchal or postmenopausal vaginal bleeding is rarely life-threatening, but bleeding as a complication of pregnancy has a significantly increased risk of morbidity and mortality for the mother and fetus.[1,2]

Epidemiology

Approximately 5% of women aged 30 to 45 years will see a physician for vaginal bleeding. Nonpregnancy causes are classified as ovulatory, anovulatory, and nonuterine. Menorrhagia secondary to anovulation is seen in 10 to 15% of all gynecologic patients. It is common in perimenarchal and perimenopausal women, as well as in patients with endocrine disorders, polycystic ovary syndrome, exogenous hormone use, and liver or renal disease. Nonuterine bleeding must also be considered.[3] Approximately 20% of all pregnant patients have vaginal bleeding before the 20th week of gestation; more than 50% of these women spontaneously abort. Vaginal bleeding is reported in 50 to 80% of ectopic pregnancies. Ectopic pregnancy is the most common cause of maternal death in the first trimester of pregnancy, accounting for 9% of pregnancy-related maternal deaths in the United States, and the second leading cause for maternal mortality overall, after postpartum hemorrhage. Teenagers and women of color have the highest risk of death related to ectopic pregnancy. Vaginal bleeding after the 20th week of gestation occurs in approximately 4% of pregnancies; approximately 30% of cases are due to placental abruption (abruptio placentae), and 20% are due to placenta previa. Postpartum hemorrhage accounts for nearly 30% of pregnancy-related maternal deaths. The most common cause of postpartum

hemorrhage in the first 24 hours is uterine atony. After 24 hours, retained products of conception are frequently the etiology.[4]

Pathophysiology

Pregnant Patients

The differential diagnosis of vaginal bleeding in early pregnancy (before the 20th week of gestation) includes ectopic pregnancy; threatened, inevitable, missed, or incomplete abortion; implantation bleeding; cervicitis; cervical conditions such as polyp or ectropion; bleeding from the urinary or gastrointestinal tract; and cervical carcinoma. Risk factors for ectopic pregnancy should increase clinical suspicion but are often absent. These include tubal abnormalities due to past infection or surgical scarring and assisted reproductive techniques. Disruption of the blood supply to the ectopic gestational sac can cause hemorrhage into the fallopian tube, or the size of the developing sac fetus can lead to rupture through the tubal wall.[5]

Spontaneous abortion is the most common complication of pregnancy and is defined as the passing of a pregnancy prior to completion of the 20th gestational week. It implies delivery of all or any part of the products of conception, with or without a fetus weighing less than 500 g. Threatened abortion is bleeding of intrauterine origin occurring before the 20th completed week, with or without uterine contractions, without dilatation of the cervix, and without expulsion of the products of conception. Complete abortion is the expulsion of all of the products of conception before the 20th completed week of gestation, whereas incomplete abortion is the expulsion of some, but not all, of the products of conception. Inevitable abortion refers to bleeding of intrauterine origin before the 20th completed week, with dilatation of the cervix without expulsion of the products of conception. In missed abortion, the embryo or fetus dies, but the products of conception are retained in utero. In septic abortion, infection of the uterus and sometimes surrounding structures occurs.[6]

Placental abruption can occur spontaneously or secondary to abdominal trauma with transmission of forces to the uterus. An increased incidence is seen in association with cocaine use, hypertension, preeclampsia, HELLP (hemolysis, elevated liver enzymes, and low platelets) syndrome, smoking, increased maternal age, and abnormal implantation of the placenta (e.g., placenta previa, accreta, increta, or percreta). Placenta previa

occurs when the implanted placenta overlays the cervical os. Bleeding is due to partial separation of the placenta from the uterine wall. Uterine atony occurs when myometrial dysfunction prevents the uterine corpus from contracting, allowing continued bleeding at the placental site. Atony is more likely to occur with conditions that overdistend the uterus, such as polyhydramnios, multiparity, prolonged labor, induced labor, high pitocin usage during labor, precipitous labor, magnesium therapy, or intrauterine infection (chorioamnionitis).[7]

Nonpregnant Patients

The pathophysiology of nonpregnant vaginal bleeding varies with age group. Children may present with foreign bodies, genital trauma, or severe vulvovaginitis causing mucosal breakdown and hemorrhage. Sexual abuse must always be considered. In adolescent girls and women, anovulatory uterine bleeding occurs when estrogen stimulates endometrium proliferation without the stabilizing effect of progesterone, causing spontaneous sloughing of the endometrium. Submucosal leiomyomas cause hemorrhage by disrupting the endometrial vascular supply and the ability of the uterus to contract to stop bleeding. Cervical and endometrial polyps have vascular pedicles and are prone to bleed.

■ DIAGNOSTIC APPROACH

Differential Considerations

The differential diagnosis can be categorized by age of presentation and frequency of cause (Table 27-2). Primary coagulation disorders account for almost 20% of acute menorrhagia in adolescents. Von Willebrand's disease is the most common; however, myeloproliferative disorders and immune thrombocytopenia are also possibilities.[8] After immediate resuscitation and stabilization of unstable patients, pregnancy status is determined. Patients presenting with hemodynamic instability require intravenous access, fluid resuscitation, stabilization with blood components, and consultation with obstetrics/gynecology (or, less often, surgery). Concurrently, steps must be taken to prevent further vaginal bleeding. In hemodynamically unstable patients, surgical intervention is often necessary to control bleeding effectively. Ectopic pregnancy should be considered in all women of childbearing age who present with abdominal or pelvic complaints or with unexplained signs or symptoms of hypovolemia.

Nonuterine causes of vaginal bleeding must be included in the differential diagnosis, systematically addressed during the history taking and physical examination, and pursued with relevant investigations and consultations, if indicated. Potential sources of nonuterine bleeding include the cervix, vagina, lower urinary tract, and lower gastrointestinal tract. Cervical causes include carcinoma, polyps, condylomata, eversion of squamocolumnar junction associated with oral contraceptive use or pregnancy, trauma, and some infections. Vaginal sources of bleeding include carcinoma, sarcoma, adenosis, lacerations, infections, and retained foreign bodies. Lower urinary tract lesions, such as urethral faruncles and infected urethral diverticula, may also mimic vaginal bleeding.

Pivotal Findings (Symptoms, Signs, and Laboratory)

Symptoms

The volume, duration, and timing of bleeding should be ascertained. The average tampon or pad absorbs 20 to 30 mL of

Table 27-1	Definitions of Vaginal Bleeding
Polymenorrhea	Abnormally shortened cycle, with bleeding occurring every 21 days or sooner
Oligomenorrhea	A cycle duration of 35 days or longer
Menorrhagia	Cycle occurs at regular intervals but lasts for more than 7 days and involves the loss of more than 80 mL of blood
Hypomenorrhea	Cycle occurs at regular intervals but has a decrease in monthly blood loss
Intermenstrual bleeding	Bleeding that occurs between regular periods
Metrorrhagia	Bleeding that is frequent and irregular
Menometrorrhagia	When metrorrhagia becomes prolonged
Dysfunctional uterine bleeding	Abnormal vaginal bleeding due to anovulation
Postcoital bleeding	Bleeding after sexual intercourse, suggesting cervical pathology
Postmenopausal bleeding	Any bleeding that occurs more than 6 months after the cessation of menstruation

Table 27-2	Causes of Vaginal Bleeding by Age in Descending Order of Frequency				
	PREPUBERTAL	**ADOLESCENT**	**REPRODUCTIVE**	**PERIMENOPAUSAL**	**POSTMENOPAUSAL**
Most common	Vaginitis	Anovulation	Pregnancy	Anovulation	Endometrial lesions, including cancer (30%)
	Anovulation	Pregnancy	Anovulation	Uterine leiomyomas	Exogenous hormone use (30%)
	Genital trauma or foreign bodies	Exogenous hormone use	Exogenous hormone use	Cervical and endometrial polyps	Atrophic vaginitis (30%)
		Coagulopathy (von Willebrand's disease)	Uterine leiomyomas	Thyroid dysfunction	Other tumor: vulvar, vaginal, cervical (10%)
			Cervical and endometrial polyps		
Least common			Thyroid dysfunction		

vaginal effluent, although the number of pads or tampons used is unreliable because personal habits vary greatly among women. Amenorrhea may not indicate pregnancy, and bleeding during approximately the time of the last expected period does not exclude pregnancy. Bleeding during or after intercourse may indicate a cervical lesion and is more common in pregnancy because of increased blood flow to the cervix. Abdominal pain may indicate critical, emergent, or noncritical causes, depending on the severity of pain, bleeding, and hemodynamic state. During active labor, a history of previous cesarean section, cocaine abuse, or high doses of oxytocin or prostaglandins should raise the suspicion of uterine rupture. A history of trauma should be considered in an adolescent with bleeding, and sexual assault should be considered in an adult in whom abuse is present. In the pregnant patient, there is significant increased risk of maternal and fetal morbidity and mortality after blunt trauma, such as motor vehicle accident, interpersonal violence, or falls. Associated symptoms of nausea, breast tenderness, urinary frequency, and fatigue may indicate that the patient is pregnant. In the absence of pregnancy, vaginal discharge, pelvic pain, and fever may suggest pelvic inflammatory disease. Pelvic inflammatory disease is very rare during pregnancy.

Signs

A thorough evaluation includes recording and interpreting vital signs, abdominal and pelvic examinations, and, in the pregnant patient of sufficient gestational age, fetal heart tones and fundal height. Vaginal bleeding associated with hemodynamic shock alerts the clinician to ruptured ectopic pregnancy. Fetal heart tones that are diminished to less than 100 or that are absent in a gravid female may indicate fetal distress. Pelvic examination may reveal the source of bleeding; however, after the 20th week of gestation, ultrasound should precede pelvic examination to avoid disruption of a possible placenta previa. Bedside transabdominal ultrasound imaging may reveal free intraperitoneal fluid in an unstable patient, which should lead to immediate gynecologic or surgical evaluation.

Uterine size, measured from the symphysis pubis to the fundus, is the quickest means of roughly estimating gestational age. This distance in centimeters equals the gestational age in weeks (e.g., 24 cm = 24 weeks), which allows some early indication of fetal viability if delivery is necessary. Usually, 24 or 25 weeks is used as the cutoff point for fetal viability. As a rough guide, the fetus is potentially viable when the dome of the uterus extends beyond the umbilicus. Fetal heart tones can be detected by auscultation at 20 weeks of gestation or by Doppler probe at 10 to 14 weeks. If either the uterus is less than 24 cm in size or fetal heart tones are absent, the pregnancy is probably too early to be viable, and treatment is directed solely at the mother.

Ancillary Testing

In hemodynamically compromised patients, blood is obtained for hematocrit, platelet count, prothrombin time, partial thromboplastin time, ABO and Rh typing, and cross-matching of blood. Ultrasound is the imaging modality of choice for simultaneous assessment of the mother and the fetus. In the pregnant trauma patient, it is useful in the detection of major abdominal injury (sensitivity 80%, specificity 100%) and for establishing fetal well-being or demise, gestational age, and placental location.[9] Computed tomography and magnetic resonance imaging are rarely indicated in the evaluation of vaginal bleeding, except in the case of pregnant trauma patients to diagnose potentially life-threatening injuries in those patients not proceeding directly to surgical intervention.

Qualitative pregnancy tests in clinical use are typically reported as positive when the β-hCG concentration is 20 mIU/mL or higher in urine and 10 mIU/mL or higher in serum. At this level of detection, the false-negative rate for detection of pregnancy will not be more than 1% for urine and 0.5% or less for serum. In clinical use, the performance of urine qualitative testing has been found to be 95 to 100% sensitive and specific compared with serum testing. When a bedside urine test is negative and ectopic pregnancy is still being considered, a quantitative serum test should be performed. The sensitivity of quantitative serum testing for the diagnosis of pregnancy is virtually 100% when an assay capable of detecting 5 mIU/mL or more of β-hCG is used.[10] The discriminatory level of serum β-hCG for ectopic pregnancy is 1500 to 2000 mIU/mL.[11] Below this level, with no evidence of an intrauterine pregnancy (IUP) on transvaginal ultrasound, ectopic pregnancy as well as normal IUP are still possible. Above this level, ectopic pregnancy is diagnosed by the absence of an IUP on transvaginal ultrasound. In stable patients with minimal symptoms who are below the discriminatory level, serial quantitative β-hCG levels every 48 hours may distinguish ectopic pregnancy from IUP and spontaneous abortion in pregnancies less than 5 to 7 weeks of gestation. A system for close follow-up with gynecology is essential to an outpatient strategy for such patients. Additional testing such as progesterone level may help to distinguish normal verses abnormal pregnancy. A progesterone level of less than or equal to 5 ng/mL indicates a nonviable pregnancy, ectopic pregnancy, or IUP and excludes normal pregnancy with 100% sensitivity (Figs. 27-1 and 27-2).[12]

■ EMPIRICAL MANAGEMENT

All patients who present in shock with a surgical abdomen or evidence of intra-abdominal free fluid should be resuscitated and promptly evaluated with immediate consideration of operative intervention in consultation with obstetrics/gynecology and surgery.

Pregnant Patients

If ectopic pregnancy is suspected and the serum or urine β-hCG is positive, and the patient is hemodynamically unstable, immediate surgical consultation is indicated. If bleeding presents with shock after the 20th week of pregnancy, stabilization is performed while obtaining a transabdominal ultrasound to evaluate the placenta (location in placenta previa and separation and hemorrhage in placentae abruptio). In the presence of vaginal bleeding in these patients, bimanual or speculum vaginal examination or transvaginal ultrasound should not be undertaken until placenta previa is excluded. High-grade third-trimester bleeding should prompt immediate obstetric consultation, even before diagnostic studies elucidate the possible cause. Vaginal delivery is the preferred management of third-trimester vaginal bleeding in the absence of placenta previa, but cesarean section is indicated if (1) fetal distress is present and vaginal delivery is not imminent, (2) there is severe abruption with a viable fetus, (3) life-threatening hemorrhage exists, or (4) the patient has failed a trial of labor.

Uterine rupture may present with excessive vaginal bleeding, uterine pain, and a change in abdominal contour. A soft horizontal lump often appears below a hard fundus, representing expanding hematoma and a retracting uterus, respectively. Emergent surgical delivery is indicated.

Urgent cesarean section is performed if excessive vaginal bleeding accompanies the rupture of membranes and the fetus
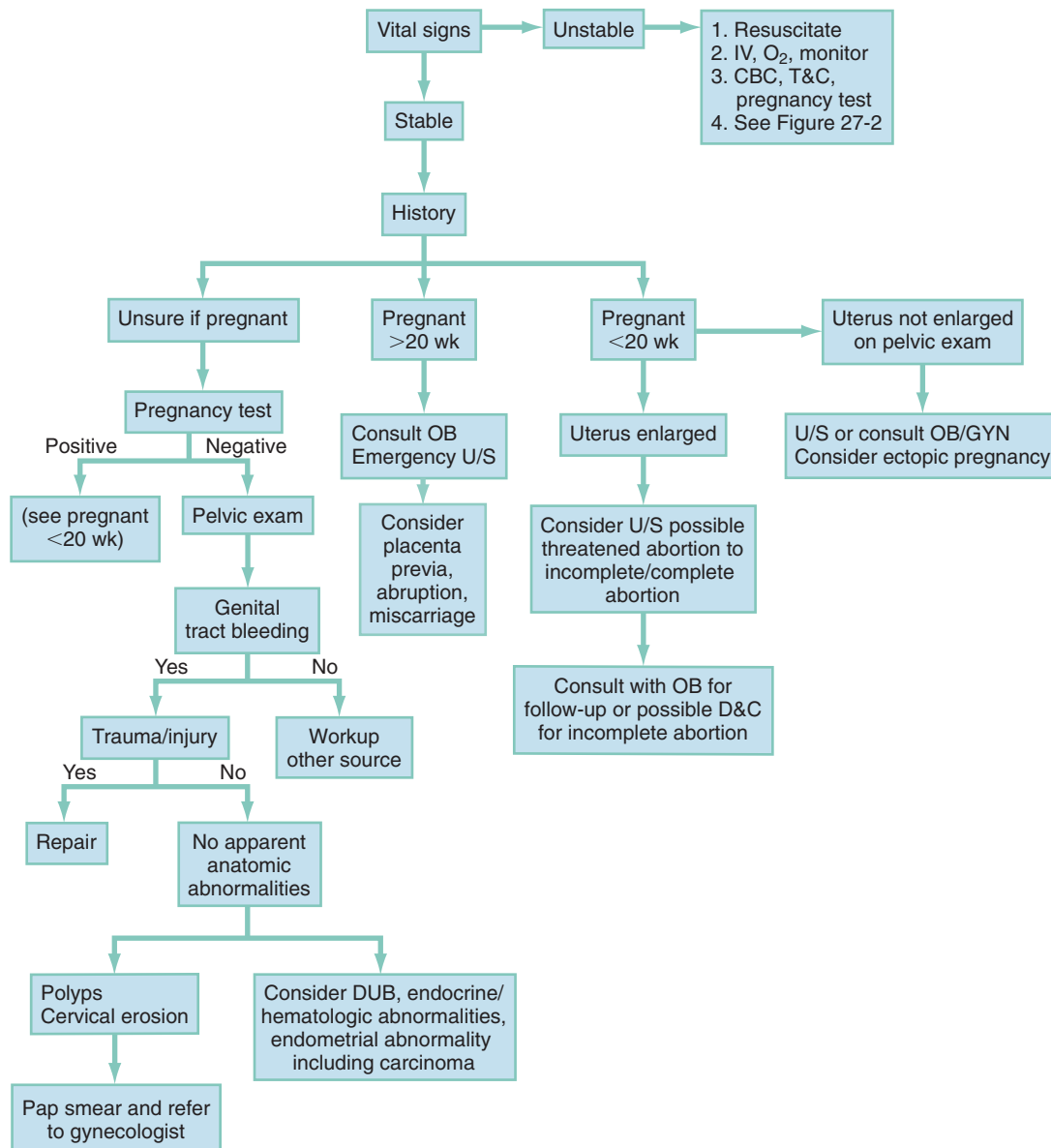
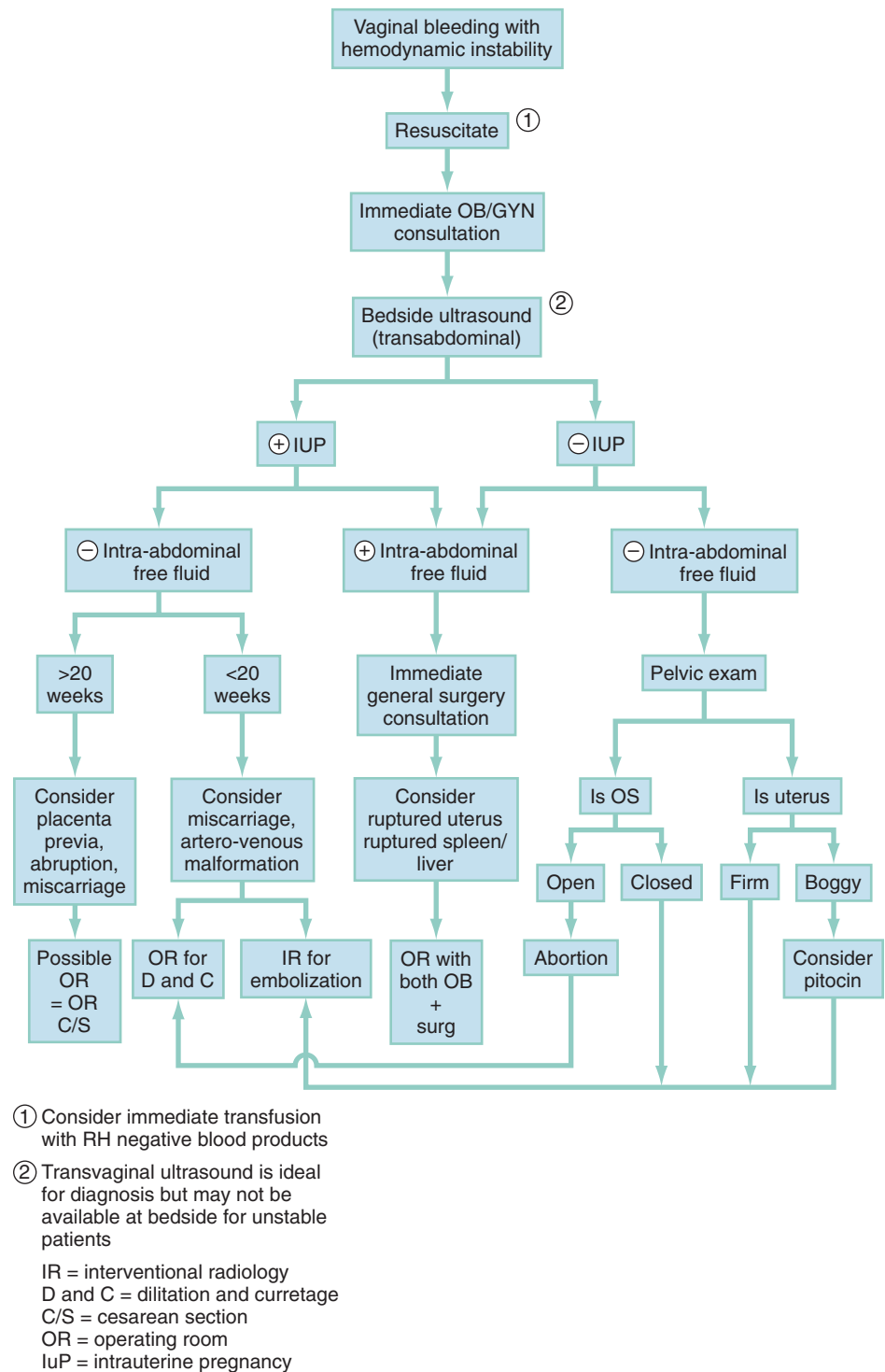**Figure 27-1.** Diagnostic approach to patient with vaginal bleeding.

shows signs of distress. Painless vaginal bleeding with rupture of membranes classically suggests vasa previa; it indicates fetal bleeding and requires emergent cesarean section. If after delivery of the fetus the placenta adheres abnormally and has difficulty separating, placenta accreta is likely present and may require urgent hysterectomy to prevent life-threatening hemorrhage. If available, interventional radiology for thromboembolization may be considered. Firm bimanual compression of the uterus or insertion and inflation of a Foley catheter with a 30-mL balloon may limit hemorrhage until surgery is arranged. Uterine atony often responds to vigorous uterine massage and intravenous oxytocin.[13]

Evidence for the administration of anti-D immunoglobulin (Rhogam) for the prevention of Rh seroconversion in pregnant women is limited. Nevertheless, it is recommended to administer anti-D immunoglobulin to Rh-negative women in all cases of documented first-trimester loss of established pregnancy, including threatened abortion, incomplete abortion, and ectopic pregnancy. One may consider administration of anti-D immunoglobulin in cases of minor trauma in Rh-negative pregnant women.[14]

Nonpregnant Patients

In nonpregnant patients, heavy vaginal bleeding may be under ovulatory control or related to anovulatory dysfunctional uterine bleeding. Nonsteroidal anti-inflammatory drugs are the mainstay of treatment for both conditions, although the exact mechanism of action is not clearly understood.[15] In nonpregnant hemodynamically unstable patients, consider administering IV conjugated estrogen (Premarin) 25 mg and repeat doses if necessary until bleeding stops, usually within 1 to 5 hours. If bleeding continues after IV estrogen, insert a pediatric Foley catheter into the cervical os and inflate to tamponade the bleeding. Distend the balloon with saline until the bleeding stops. A larger balloon may be needed and this can be left in place for 12 to 24 hours.[16] Hemodynamically stable patients can be referred for outpatient ultrasound and/or endometrial biopsy. All patients with abnormal uterine bleeding should receive close follow-up from a primary care physician or gynecologist. Outpatient treatment with oral contraceptives can arrest bleeding. Patients older than 35 years or with risk factors for endometrial cancer should have an endometrial

Figure 27-2. Diagnostic approach to unstable patient with vaginal bleeding.

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                    │  Vaginal bleeding with│
                    │  hemodynamic instability│
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                    ┌──────────────┐  ①
                    │  Resuscitate  │
                    └──────────────┘
                              │
                    ┌──────────────────┐
                    │  Immediate OB/GYN │
                    │   consultation    │
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                    ┌──────────────────┐  ②
                    │  Bedside ultrasound│
                    │  (transabdominal) │
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① Consider immediate transfusion with RH negative blood products

② Transvaginal ultrasound is ideal for diagnosis but may not be available at bedside for unstable patients

IR = interventional radiology
D and C = dilitation and curretage
C/S = cesarean section
OR = operating room
IuP = intrauterine pregnancy

biopsy within one week of starting hormonal manipulation. A baseline hemoglobin/hematocrit is recommended. Finally, other medical causes, such as hypothyroidism, hemostasis disorders, or anticoagulant therapy, must be considered and appropriate outpatient consultation obtained.

■ DISPOSITION

In a patient with postpartum uterine atony or coagulopathy, medical management is often sufficient. Obstetrics consultation is rarely indicated. In a preadolescent patient, abuse must be ruled out before the patient is discharged to her current environment. In a nonpregnant stable patient, malignancy always should be suspected, and additional inpatient or timely outpatient gynecologic workup is indicated. Laboratory studies such as thyroid function and prolactin levels may be helpful to the consultant or in the initial outpatient workup of dysfunctional uterine bleeding, but they are not required in the emergency department setting.[17]

The references for this chapter can be found online by accessing the accompanying Expert Consult website.