Selected Gynecologic Disorders

Trevor R. Pour | *Carrie D. Tibbles*

Many women come to the emergency department (ED) with pelvic pain or vaginal bleeding. After the possibility of pregnancy-related problems has been eliminated, the primary goal is to recognize the presence of conditions that warrant urgent intervention, such as adnexal torsion, versus those that can be managed as an outpatient, such as new postmenopausal uterine bleeding. Most patients also benefit from relief of symptoms and reassurance. This chapter specifically addresses the ED management of adnexal torsion, ovarian cysts, abnormal uterine bleeding, and the provision of emergency contraception. The general approach to vaginal bleeding is discussed in Chapter 31, complications of pregnancy are discussed in Chapter 178, and sexually transmitted disease is discussed in Chapter 88.

OVARIAN TORSION

Principles

Adnexal torsion accounts for approximately 3% of gynecologic emergencies and refers to the twisting of the ovary and fallopian tube on the axis between the utero-ovarian and infundibulopelvic ligaments.[1] Commonly, both structures are implicated in this process. However, isolated ovarian torsion and, more rarely, isolated fallopian tube torsion may occur.[2] In ovarian torsion, venous and lymphatic obstruction occurs initially, with subsequent congestion and edema of the ovary, progressing to ischemia and necrosis.[3]

In addition to loss of tubal or ovarian function, torsion left untreated can progress further to hemorrhage, peritonitis, and infection. Because of the dual blood supply of the ovary from the uterine and ovarian arteries, complete arterial obstruction is rare. (Fig. 90.1). Ovarian torsion can occur at any age, but is most common in the reproductive years because of the regular development of a corpus luteal cyst during the menstrual cycle. Most cases of torsion in this population are associated with an enlarged ovary (>5.0 cm), either secondary to benign neoplasm or cysts, as seen in ovulation induction, hyperstimulation syndrome, or polycystic ovarian syndrome. In premenarchal patients, however, torsion frequently occurs despite normal ovarian size, thought to be secondary to the excessive mobility of the adnexa relative to older patients.[4] Masses prone to creating adhesions, such as malignant tumors, endometriomas, or tubo-ovarian abscesses, are less likely to develop torsion than benign lesions. Torsion may be a complication of pregnancy, more likely to occur in the first and early second trimesters.[5] A history of tubal ligation is a risk factor for ovarian torsion.[6] A slight predominance of torsion on the right side has been noted, likely related to the stabilizing effect of the fixed sigmoid colon on the left.

Clinical Features

The classic symptoms of ovarian torsion are severe, sharp, unilateral lower abdominal pain and nausea; however, some or all of these symptoms are often absent. Despite advances in imaging modalities, the preoperative diagnosis rate only approaches 40%, making clinical assessment more valuable. The presence of known risk factors, such as an ovarian mass or recent infertility treatments, may suggest the diagnosis in postmenarchal patients.

Patients typically report pain lasting from several hours to days. Rarely, patients report pain for weeks to months in duration, most likely due to intermittent torsion.[7] Nausea and vomiting are present in about 70% of cases.

Most patients will have unilateral tenderness on abdominal palpation, but up to 75% of patients will not have a palpable adnexal mass.[8] Clinical decision tools for ovarian torsion have been developed but suffer from poor sensitivity and therefore cannot be recommended.[9] Clinical signs of isolated tubal torsion are indistinguishable from those of ovarian torsion.

Differential Diagnosis

Considerations in the differential diagnosis include other causes of acute lower abdominal pain, such as appendicitis, ruptured ovarian cyst, urinary tract infection, nephrolithiasis, pelvic inflammatory disease, uterine leiomyoma, diverticulitis, bowel obstruction, and ectopic pregnancy. A pregnancy test, physical examination, and imaging with ultrasound or computed tomography (CT), if necessary, can usually distinguish among these possibilities.

Diagnostic Testing

Laboratory Tests

No specific laboratory tests are routinely used in the diagnosis of suspected torsion. Two small studies on serum interleukin-6, a proinflammatory cytokine, have revealed a pooled sensitivity of 85% and specificity of 84% for torsion and may evolve into a useful serum marker if reproduced by larger trials.[10] A negative pregnancy test may exclude ectopic pregnancy from the differential, but a positive test does not rule out adnexal torsion. Leukocytosis is not a reliable indicator of torsion.

Imaging

Ultrasonography. An ultrasound examination is the initial imaging test in the evaluation of patients with pelvic pain suggestive of ovarian torsion, but findings can vary depending on timing and duration of symptoms. Asymmetric enlargement of the ovary is the most common finding. Enlargement of an ovary with a heterogeneous stroma secondary to edema along with small, peripherally displaced follicles is the classic ultrasound appearance of torsion but is often absent, particularly with long-standing ischemia.[11] Ultrasound may reveal a mass in the ovary, evidence of hemorrhage, or free pelvic fluid (Fig. 90.2). Hemorrhagic cysts and other nonneoplastic masses frequently are associated with torsion; these may appear fluid-filled, exhibit a complex pattern with debris and septations, or be visualized as a solid mass. The characteristic appearance of torsion may be difficult to appreciate if the ovary is obscured by an associated mass. In isolated tubal
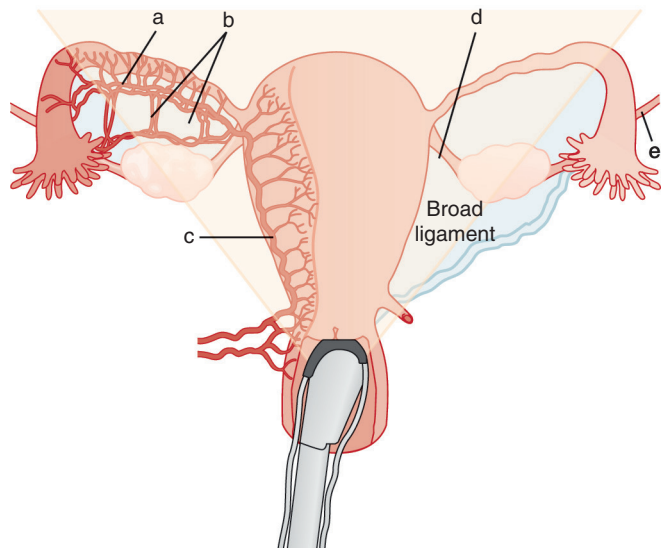
Fig. 90.1. Ovarian blood supply. **a,** Ovarian artery and vein. **b,** Branching arterioles supplying ovary. **c,** Utero-ovarian ligament. **d,** Utero-ovarian ligament. **e,** Infundibulopelvic ligament. (From Andreotti RF, Shadinger L, Fleischer A: The sonographic diagnosis of ovarian torsion: pearls and pitfalls. Ultrasound Clin 2:155, 2007.)
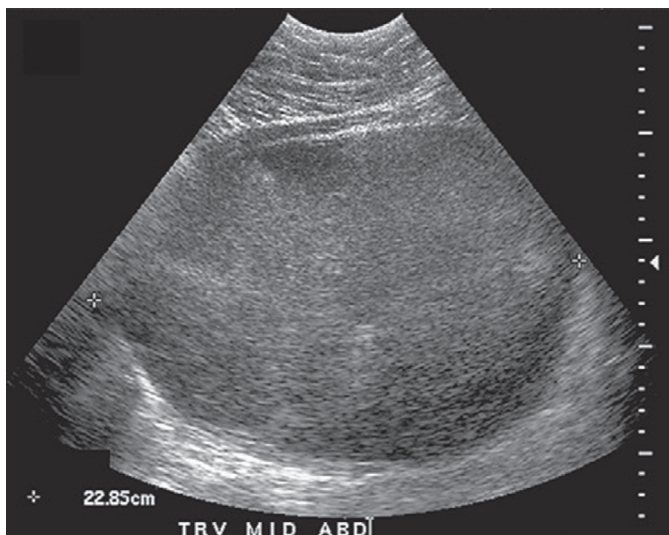

Fig. 90.2. Ovarian torsion with a large pelvic mass. This transabdominal image reveals a largely homogeneous 22.8-cm pelvic mass. (From Cicchiello LA, Hamper UM, Scoutt LM: Ultrasound evaluation of gynecologic causes of pelvic pain. Obstet Gynecol Clin North Am 38:85–114, 2011.)

torsion, tubal lesions such as hydrosalpinx or a tubo-ovarian abscess may be seen.

Doppler ultrasound findings are inconsistent for diagnosing ovarian torsion. Up to 60% of surgically proven torsion will have documented blood flow on Doppler examination (Fig. 90.3).[3] Findings may vary depending on the time of the examination because torsion may occur intermittently, and clinical symptoms may precede arterial compromise. If a large mass is present, the examination may also be technically difficult to perform. Despite these limitations, the Doppler examination is still useful, and detection of abnormal venous flow is particularly important in early cases of torsion (Fig. 90.4). Absence of arterial flow is highly specific for torsion, with a positive predictive value of 94% to 100%.[3] Visualization of the twisting of the pedicle and coiled vessels is referred to as a whirlpool sign and has a 90% positive predictive value for torsion.[12]
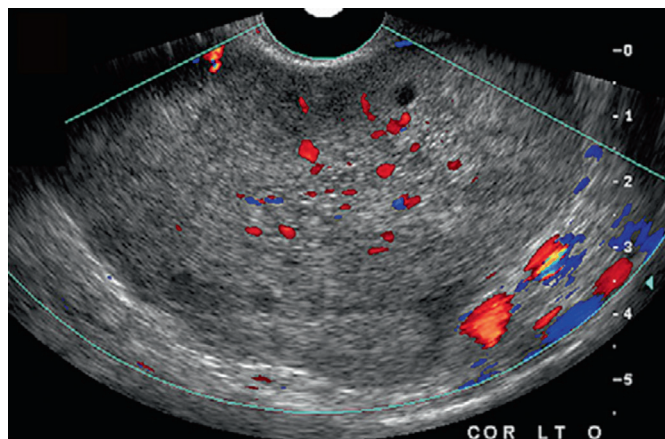

Fig. 90.3. Ovarian torsion with color Doppler image demonstrating venous and arterial flow. (From Cicchiello LA, Hamper UM, Scoutt LM. Ultrasound evaluation of gynecologic causes of pelvic pain. Obstet Gynecol Clin North Am 38:85–114, 2011.)

Computed Tomography. When alternative abdominal pathologies are strong considerations in the differential diagnosis for acute pelvic pain, abdominopelvic CT may be the best initial study, particularly in patients who have a presentation atypical for torsion. In ovarian torsion, CT findings include asymmetric ovarian enlargement or asymmetric adnexal enhancement following IV contrast, fallopian tube thickening, or twisted vascular pedicle, fat stranding surrounding the affected adnexa, and uterine deviation to the twisted side.[3] Pelvic free fluid in patients with a hemorrhagic infarction can be seen. A retrospective review of CT scans of patients with confirmed torsion has found that every CT scan had evidence of an ovarian abnormality, including enlargement or the presence of a mass, suggesting that torsion is unlikely if the CT visualized a normal ovary; another, more recent case-controlled study comparing pelvic ultrasound to CT has confirmed these findings.[13] Therefore, negative imaging findings should be interpreted with caution when clinical suspicion is high but, with lower suspicion, a normal-appearing ovary on the CT scan can be reassuring.

Magnetic Resonance Imaging. Magnetic resonance imaging (MRI) may demonstrate findings consistent with torsion. It is particularly helpful if the diagnosis is not clear, such as with intermittent pain over days, or for pregnant patients when the history is highly suggestive but ultrasound findings are inconclusive or equivocal. Findings on MRI suggestive of torsion are similar to those on CT (Box 90.1).

Laparoscopy. A diagnostic laparoscopy is the gold standard investigative modality in patients in whom clinical suspicion is high, despite negative imaging results. In one study of 100 nonpregnant patients with an acute abdomen, only 29 of the 66 laparoscopically proven cases of ovarian torsion were diagnosed preoperatively.[14] Laparoscopy also allowed diagnosis of other unsuspected conditions, including ovarian cysts, appendicitis, and pelvic inflammatory disease.

Management and Disposition

Once the diagnosis of ovarian torsion has been made, the patient should be taken to the operating room as soon as possible. The ovary often will recover, even if black or dusky in appearance at the time of surgery, because of its dual blood supply, so attempts at ovarian salvage are warranted, even if the diagnosis is made late. This is particularly true in adolescent patients. Ovarian function returns in most patients.
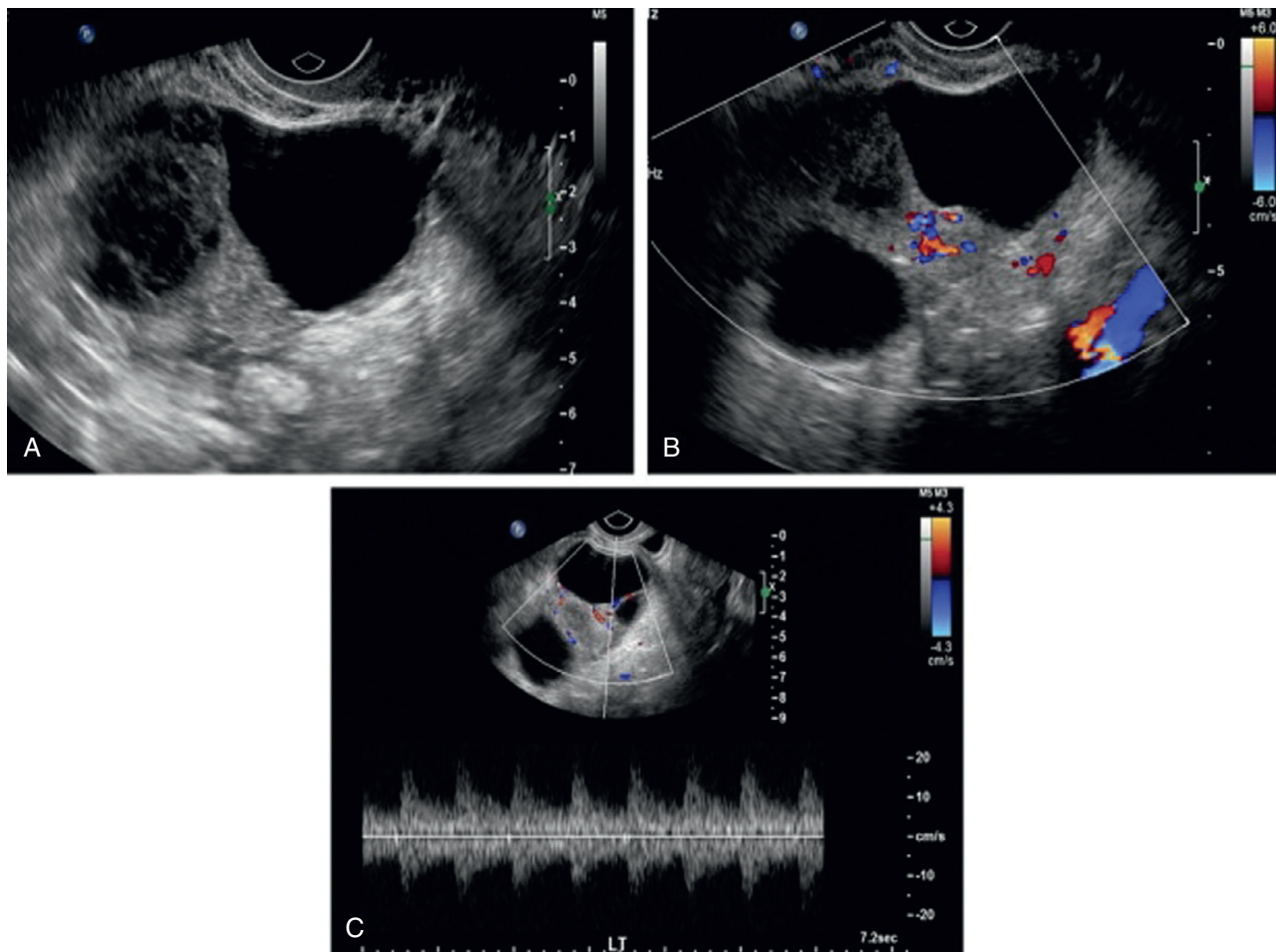
Fig. 90.4. Arterial Doppler signal without venous signal in a patient with surgically proven torsion. The ultrasound examination also demonstrated an associated hemorrhagic cyst. (From Andreotti RF, Shadinger L, Fleischer A: The sonographic diagnosis of ovarian torsion: pearls and pitfalls. Ultrasound Clin 2:155, 2007.)

BOX 90.1

Imaging Characteristics of Adnexal Torsion

ULTRASONOGRAPHY
Enlargement of the ovary
Associated ovarian mass
Loss of enhancement
Edema
Free pelvic fluid
Loss of venous waveforms
Loss of arterial waveforms

COMPUTED TOMOGRAPHY AND MAGNETIC RESONANCE IMAGING
Enlargement of the ovary
Associated ovarian mass
Thickening of the fallopian tube
Free pelvic fluid
Edema of the ovary
Deviation of the uterus to the affected side
Associated hemorrhage

OVARIAN CYSTS AND MASSES

Principles

Cysts are the most common cause of gynecologic masses. They occur at any stage of life but are most frequent in the reproductive years because of the cyclic changes of the ovary associated with menstruation (Fig. 90.5). Most ovarian cysts in premenopausal and postmenopausal women are benign and resolve with no intervention, but on occasion they may be malignant or associated with complications such as hemorrhage or torsion.[15,16] Benign cysts are less common in premenarchal girls, however, with an incidence of malignancy as high as 25% when an adnexal mass is found.[17]

The most common type of cyst is a simple follicular, or functional cyst, developing from a follicle that fails to rupture or regress, and is defined as pathologic when the diameter exceeds 3.0 cm. Follicular cysts are typically thin-walled and filled with clear fluid, whereas a corpus luteal cyst is often filled with hemorrhagic fluid. Several other types of cystic masses can occur in the ovary, including endometriomas (chocolate cysts), nonneoplastic lesions such as benign cystic teratoma (dermoid cyst), fibroma, cystadenoma, and various types of malignant neoplasms.[18]

Clinical Features

The most common presentation for patients with an ovarian cyst is pelvic pain. Rupture of a follicular cyst may produce transient
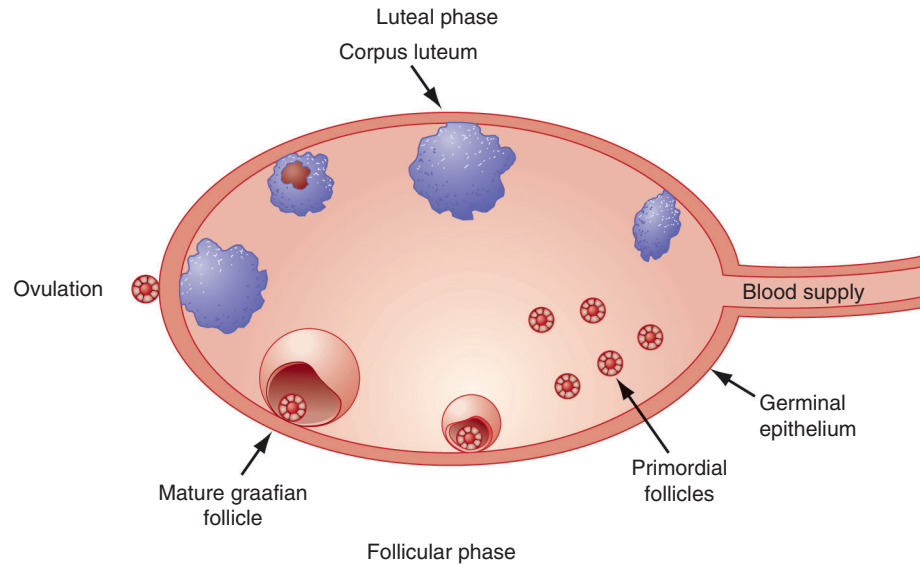
Fig. 90.5. Ovarian function during the normal menstrual cycle. (From Lambert MJ, Villa M: Gynecologic ultrasound in emergency medicine. Emerg Med Clin North Am 22:683–696, 2004.)

pelvic pain, be associated with dyspareunia, or be asymptomatic. Because of its thin fragile wall, a follicular cyst may rupture during sexual intercourse or during the pelvic examination. Follicular cysts are rarely associated with hemorrhage.

Presentation of a corpus luteal cyst may range from an asymptomatic mass to dull, chronic pelvic pain to severe pain associated with rupture. Rupture of a corpus luteal cyst is frequently associated with a significant degree of hemorrhage. As with a follicular cyst, rupture may follow a pelvic examination, sexual intercourse, exercise, or trauma. Rupture of a large or complex cyst may result in severe pain and peritoneal signs. Occasionally, a large cyst may be discovered on a routine pelvic examination as an asymptomatic mass, but this is uncommon.

Differential Diagnosis

Diagnostic considerations in the patient with ovarian cysts and masses include other causes of pelvic pain that require urgent intervention, such as ectopic pregnancy, pelvic inflammatory disease, urinary tract infections, nephrolithiasis, appendicitis, and diverticulitis. Tumors or abscesses of the gastrointestinal tract may also mimic adnexal masses.

Diagnostic Testing

Laboratory Tests

The initial step in the evaluation of pelvic pain or a pelvic mass is to exclude pregnancy with a urine or serum β-human chorionic gonadotropin (β-hCG) test. A hematocrit may be valuable in the unstable patient as a marker of blood loss. The serum antigen CA-125 is elevated in 80% of women with epithelial ovarian cancer but can also be elevated by nonmalignant conditions such as endometriosis, pregnancy, and pelvic inflammatory disorder, limiting its usefulness in the emergency setting.[19]

Imaging

Ultrasonography. Ultrasonography is the standard initial imaging modality used to diagnose and characterize all ovarian pathologic processes and lesions, including cysts and masses. Approximately 90% of adnexal masses are adequately charac-
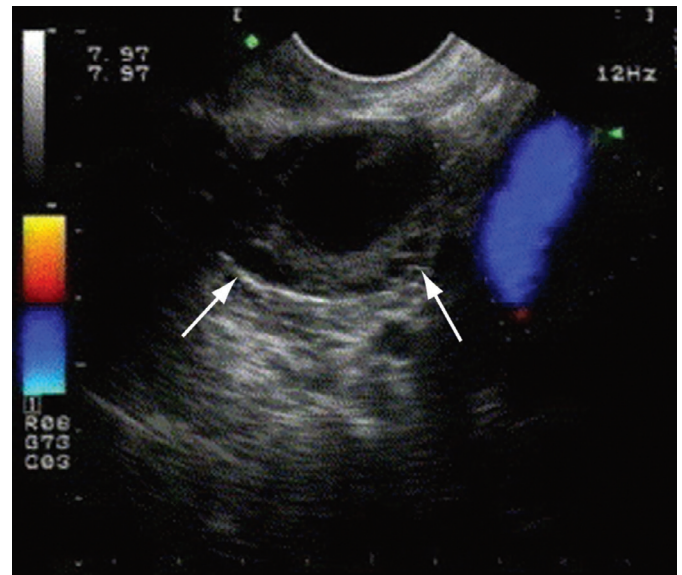

Fig. 90.6. Endovaginal ultrasound image of a normal ovary with a dominant follicle *(arrows)*. (From Lambert MJ, Villa M: Gynecologic ultrasound in emergency medicine. Emerg Med Clin North Am 22: 683–696, 2004.)

terized by ultrasound imaging alone.[20] Transabdominal and endovaginal examinations provide useful information. The transabdominal approach should be performed with a full bladder as a sonographic window. It permits an overall view of the pelvis and will visualize large masses and pelvic free fluid. Use of the endovaginal probe, which should be performed with an empty bladder to reduce artifact, provides a detailed picture of the ovary. Follicles are part of the normal architecture of the ovary and are typically smaller than 1.0 cm in diameter, whereas the dominant follicle may measure up to 2.5 cm at the time of ovulation. Depending on the timing of the scan and degree of clot formation and lysis, hemorrhage may be seen. Fig. 90.6 demonstrates a normal ovary with a dominant follicle, Fig. 90.7 demonstrates a large cyst, and Fig. 90.8 demonstrates hemorrhage and free pelvic fluid. Ultrasound findings suggestive of malignancy include internal

septations, solid elements within cystic structures, a thickened wall, and large amounts of ascites or free fluid.

Computed Tomography. When the differential diagnosis of unilateral pelvic pain is broad, particularly in the patient with symptoms or physical findings not solely confined to the pelvis, a CT scan may be a more appropriate initial imaging study. It is not recommended as the first-line imaging study if an adnexal mass is of primary concern due to poor soft tissue discrimination.[21] Once the diagnosis of malignancy has been made, however, ultrasound is insensitive for staging or follow-up imaging, and contrast-enhanced CT is indicated at that time. A CT scan can detect a cyst and associated complications, including torsion, as noted earlier. CT findings suggestive of malignancy are a cystic solid mass, necrosis in a solid lesion, complex or cystic lesion with thick, irregular walls, and the presence of ascites, peritoneal metastases, and lymphadenopathy.

Magnetic Resonance Imaging. MRI provides better soft tissue contrast as compared with CT and has been shown in multiple studies to differentiate benign from malignant adnexal masses better as compared with ultrasound. It is limited by availability, cost, and duration of examination. MRI should be considered for pregnant patients or those with equivocal findings on ultrasound or CT.

Management and Disposition

Patients with a simple cyst and improvement in symptoms may be safely discharged with referral for outpatient gynecologic follow-up to ensure resolution of the cyst. Most uncomplicated simple cysts will resolve without further intervention. Pain should be controlled with nonsteroidal antiinflammatory drugs (NSAIDs) as a first-line approach and with oral opioids reserved only for severe cases. Oral contraceptives are not recommended for the routine management of ovarian cysts; despite being theorized to accelerate the regression of ovarian cysts, multiple randomized controlled trials have shown no difference in cyst resolution when compared to expectant management.[22]

A complex cyst concerning for malignancy requires more urgent gynecologic intervention. Such patients may benefit from gynecologic consultation in the ED, particularly if reliable follow-up is unlikely or if the patient is particularly symptomatic.

ABNORMAL UTERINE BLEEDING IN THE NONPREGNANT PATIENT

Principles

An understanding of the normal menstrual cycle is needed to understand the potential causes of abnormal uterine bleeding (Fig 90.9). The menstrual cycle starts on the first day of menses. During the first part of the menstrual cycle, the endometrium thickens under the influence of estrogen, and a dominant follicle develops in the ovary, releasing an ovum at the midpoint of the cycle. After ovulation, the luteal phase begins and is characterized by the production of progesterone from the corpus luteum. Progesterone matures the lining of the uterus and, if implantation does not occur, the corpus luteum dies, accompanied by sharp drops in progesterone and estrogen levels. These changes typically are followed by menstruation. Menstrual bleeding is usually predictable, cyclic, and results from withdrawal of the effects of hormones on the endometrium, which occurs approximately 14 days after ovulation.

A revised system of terminology, PALM-COEIN, regarding abnormal uterine bleeding (AUB) was created in 2011 by the International Federation of Gynecology and Obstetrics (FIGO) to
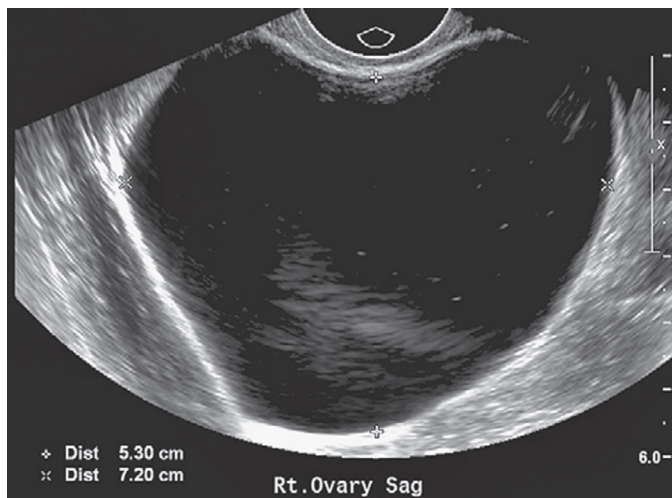

Fig. 90.7. Endovaginal ultrasound image of a follicular cyst, with smooth wall and posterior wall enhancement. (From Cicchiello LA, Hamper UM, Scoutt LM: Ultrasound evaluation of gynecologic causes of pelvic pain. Obstet Gynecol Clin North Am. 38:85–114, 2011.)

Fig. 90.8. Endovaginal ultrasound image of a hemorrhagic ovarian cyst with free fluid (*). (From Cicchiello LA, Hamper UM, Scoutt LM: Ultrasound evaluation of gynecologic causes of pelvic pain. Obstet Gynecol Clin North Am. 38:85–114, 2011.)
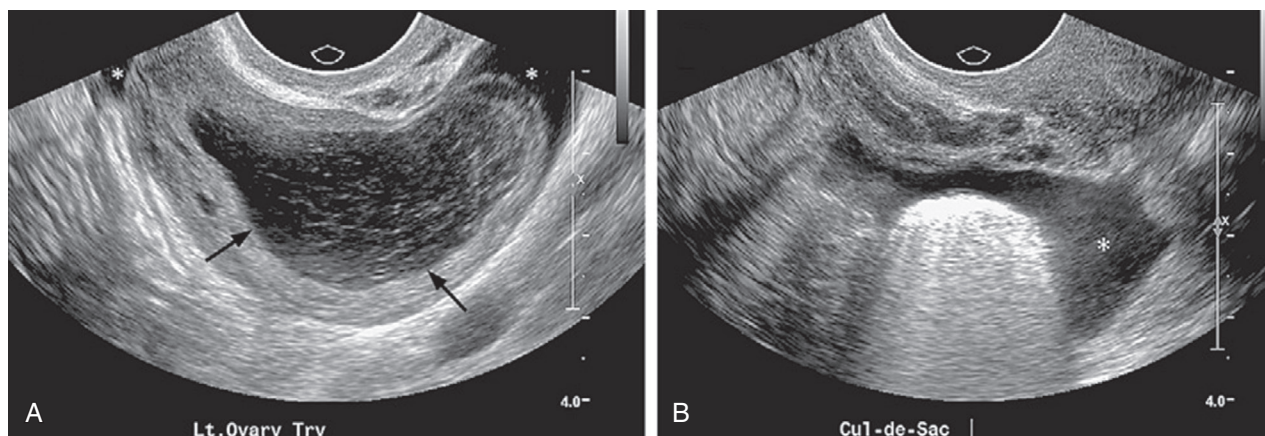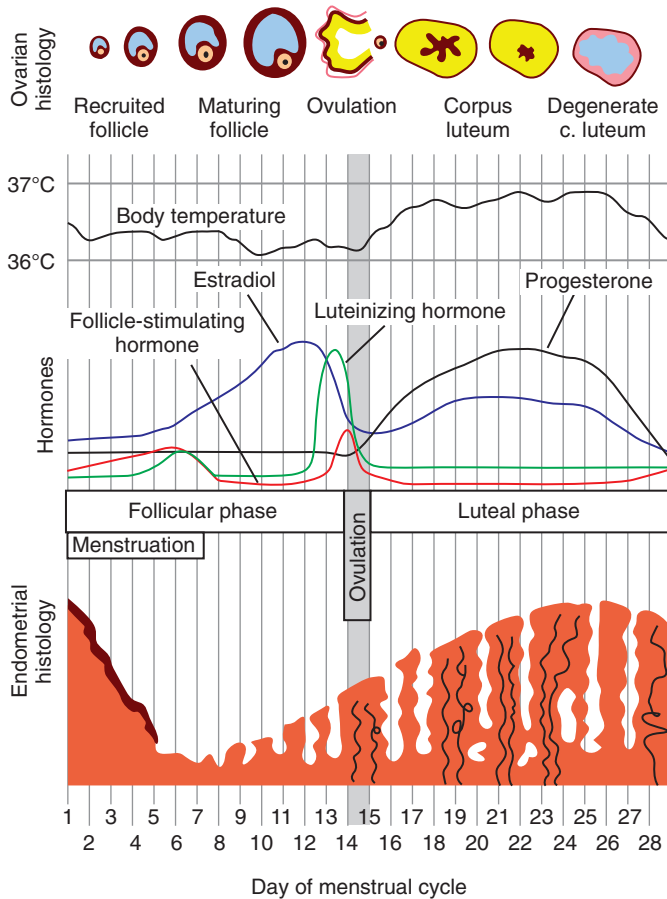
Fig. 90.9. Normal menstrual cycle.

PALM-COEIN Classification for Abnormal Uterine Bleeding (AUB)

PALM—STRUCTURAL CAUSES
*P*olyp (AUB-P)
*A*denomyosis (AUB-A)
*L*eiomyoma (AUB-L)
    Submucosal leiomyoma (AUB-LSM)
    Other leiomyoma (AUB-LO)
*M*alignancy and hyperplasia (AUB-M)

COEIN—NONSTRUCTURAL CAUSES
*C*oagulopathy (AUB-C)
*O*vulatory Dysfunction (AUB-O)
*E*ndometrial (AUB-E)
*I*atrogenic (AUB-I)
*N*ot yet classified (AUB-N)

standardize language and facilitate multiinstitutional investigation (Box 90.2).[23] The first four letters. PALM, represent structural causes for AUB—*p*olyp, *a*denomyosis, *l*eiomyoma, and *m*alignancy or hyperplasia, whereas the last five letters, COEIN, represent nonstructural causes—*c*oagulopathy, *o*vulatory dysfunction, *e*ndometrial, *i*atrogenic, and *n*ot yet classified. The term *dysfunctional uterine bleeding* is no longer used.[24]

Disruption of the hypothalamic-pituitary-ovarian axis from a variety of causes can result in bleeding related to ovulatory dysfunction (AUB-O). Returning the balance of estrogen and progesterone with oral contraceptives will help many patients regulate the cycle, with reduction in or cessation of abnormal uterine bleeding.[25]

Clinical Features

History

A large number of conditions cause abnormal uterine bleeding, and a systematic history and physical examination can help narrow the possibilities. Vaginal bleeding before the age of menarche is abnormal and may be the result of infection, trauma, such as sexual abuse or a foreign body, or a structural lesion.[26] In a woman of reproductive age, abnormal uterine bleeding includes a change in the frequency, duration or amount of bleeding, or bleeding between menstrual cycles. In the postmenopausal woman, any bleeding 12 months after the cessation of menses or unpredictable bleeding during hormone therapy is abnormal. The amount and frequency of bleeding and the duration of symptoms, as well as the relationship to the menstrual cycle, should be established. A menstrual cycle shorter than 21 days in duration or more than 35 days apart, or flow for less than 2 or more than 7 days, is classified as abnormal. A pattern of irregular bleeding between cycles or an abrupt change in the previous pattern of bleeding should also be determined.

Systemic conditions, such as liver or thyroid disease, may be associated with abnormal uterine bleeding. Endometrial cancer is associated with underlying diabetes mellitus, metabolic syndrome and obesity, anovulatory cycles, nulliparity, and age older than 55 years. Cervical dysplasia or other genital tract pathology may cause postcoital or irregular bleeding, and patients should be questioned on risk factors for sexually transmitted infections.

Prior history of cesarean section may contribute to iatrogenic AUB; studies have found that irregular scarring postoperatively leads to a higher prevalence of vaginal spotting.[27] Disruption along the hypothalamus-pituitary-ovarian pathway leading to anovulation is frequently the cause of AUB. Disruption of this pathway may be physiologic, such as during adolescence, perimenopause, or lactation. Pathologic causes include polycystic ovary syndrome (PCOS), hypothalamic dysfunction seen in anorexia nervosa, hyperprolactinemia, and primary pituitary disease.

Patients should be questioned about excessive bleeding or bruising or any family history of bleeding disorders because up to 20% of women presenting with heavy menstrual bleeding will have an underlying coagulopathy.[28] Von Willebrand disease is the most common of these, seen in up to 13% of cases of AUB, and often first presents with heavy uterine bleeding since menarche.[29]

Physical Examination

With prolonged heavy bleeding, signs of chronic anemia may be noted on the physical examination. PCOS is a common cause of abnormal uterine bleeding, and physical findings suggestive of such include obesity, acne, hirsutism, and acanthosis nigricans. Other causes of bleeding include vaginal or cervical lesions, which may be visible on the speculum examination. A leiomyoma or fibroid uterus may be palpable on the bimanual examination.

Differential Diagnosis

The cause of abnormal uterine bleeding in the nonpregnant patient is extensive but may be narrowed by age. In adolescents, consider undiagnosed coagulopathy, pelvic infection, or

hypothalamic-pituitary-ovarian axis dysregulation due to physiologic immaturity or PCOS. Patients older than adolescent age should be considered for structural lesions such as polyps or leiomyomas, endometrial hyperplasia, or anovulation secondary to PCOS or other conditions listed above. In patients older than 40 years but not yet postmenopausal, anovulatory bleeding due to perimenopause becomes more likely, as does endometrial carcinoma or hyperplasia and leiomyoma. Postmenopausal patients require an evaluation for malignancy.

Diagnostic Strategies

Laboratory Studies

In evaluating a woman of reproductive age with vaginal bleeding, a urine or serum pregnancy test is the most essential laboratory test. In a patient with excessive bleeding, hemodynamic instability, or clinical evidence of anemia (eg, excessive fatigue, pale conjunctiva), a hemoglobin or hematocrit test may be helpful. If coagulopathy is suspected, platelet count, prothrombin and partial thromboplastin time should be measured. *Chlamydia trachomatis* testing is indicated in patients at risk of infection. Thyroid dysfunction, particularly hypothyroidism, is associated with AUB, and therefore screening to determine the thyroid-stimulating hormone serum level is recommended.

Imaging

The decision to perform ultrasound imaging in the ED depends on the urgency to determine the cause of bleeding and on the reliability of outpatient follow-up. Transvaginal ultrasonography (TVUS) may reveal a fibroid uterus, endometrial thickening, or a focal mass (Fig. 90.10). In postmenopausal patients with AUB, an endometrium measuring less than 4 to 5 mm thick on TVUS reliably excludes endometrial cancer. A thickened endometrium may indicate an underlying lesion or excess estrogen.

For most nonpregnant patients with AUB, ultrasound findings do not immediately affect ED decision making. In patients who have access to gynecologic services, imaging may be deferred until follow-up evaluation with the gynecologist.
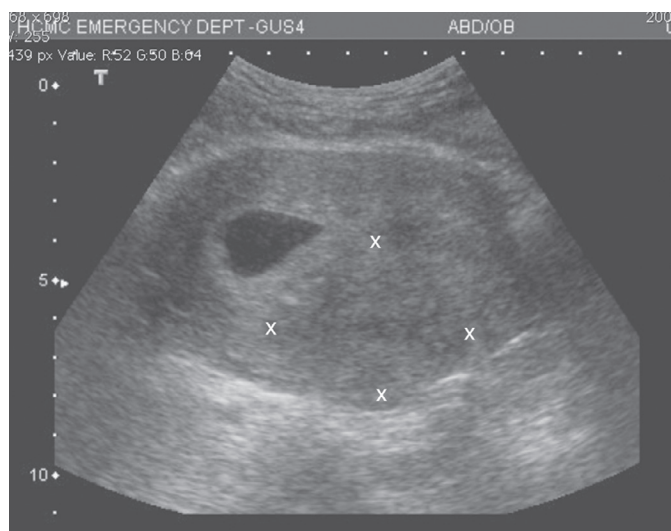

Fig. 90.10. Longitudinal view of the uterus with thickened endometrium. (Courtesy Dr. Robert Reardon, Hennepin County Medical Center, Minneapolis; with permission.)

Management

The likely causative disorder, as well as the amount of bleeding and stability of the patient, will guide ED management. NSAIDs are generally effective for relief of associated cramping pelvic pain.[30] For anovulatory bleeding, combination oral contraceptive pills can help regulate the cycle and also counteract the long-term effects of unopposed estrogen on the endometrium. We recommend a combination oral contraceptive with 35 µg of ethinyl estradiol or 20 mg or medroxyprogesterone tid for 1 week. Contraindications must be reviewed with the patient prior to prescribing these medications, specifically to determine a history of deep vein thrombosis or pulmonary embolus, cigarette smoking, breast cancer, or liver disease.

Oral tranexamic acid, a prothrombotic agent, may also be used for outpatient management of bleeding. The dose is 1.3 g orally every 8 hours for 5 days. Rarely, a patient will have uncontrolled bleeding and signs of blood loss on presentation, in which case they should receive resuscitation with blood products, as is done for other types of hemorrhagic shock. In these patients, surgical options should be considered, including urgent dilation and curettage, uterine artery embolization, or hysterectomy. Alternatively, intravenous conjugated equine estrogen may be used and was shown in one randomized controlled trial to stop bleeding in 72% of study participants in 8 hours compared to 38% treated with placebo.[25] The dose is 25 mg intravenously every 4 to 6 hours for 24 hours or until the bleeding stops.

Disposition

Most patients with pelvic pain from ovarian cysts or abnormal uterine bleeding without hemodynamic compromise may be managed with specific therapies to minimize symptoms and should be referred to a gynecologist for definitive management on an outpatient basis. Patients with severe, acute abnormal uterine bleeding and hemodynamic instability require urgent gynecologic consultation and hospitalization.

EMERGENCY CONTRACEPTION

Emergency contraception, also commonly known as the morning after pill, consists of therapy to prevent pregnancy after unprotected or inadequately protected sexual intercourse. At present, there are three oral formulations available globally—ulipristal acetate, a progesterone receptor modulator, levonorgestrel, and combined oral contraceptives consisting of progestin and estrogen.

The most commonly used regimen, and the only formulation available without a prescription in the United States, consists of a single dose of 1.5 mg or two doses of 0.75 mg levonorgestrel spaced 12 hours apart. The one-time dose is simpler to use and is at least as effective as the two-dose regimen.[31] It is labeled for use for up to 72 hours from intercourse. Another regimen, a single tablet of 30 mg of ulipristal acetate, is only available with a prescription and has demonstrated effectiveness for up to 120 hours from intercourse, making it a preferred choice over levonorgestrel beyond the 72-hour window.[32] Both forms of contraception are maximally effective when used within 24 hours.[33] Combined oral contraceptives, also known as the Yuzpe method, has largely fallen out of favor due to the simplicity and success of levonorgestrel.

Adverse effects of oral emergency contraception include nausea and headache, with combined oral contraceptives producing significantly higher rates of nausea than levonorgestrel or ulipristal alone. Irregular menstrual bleeding, which can occur within 1 week to 1 month after treatment, resolves without intervention.

In addition to oral emergency contraception, the copper intrauterine device (IUD) is highly effective when placed within 5 days

of intercourse and appears to be effective for as long as 10 days.[34] The copper IUD carries a 1/1000 risk of uterine perforation and is associated with uterine cramping, but also provides ongoing contraceptive benefit.

Both levonorgestrel and ulipristal act to delay or inhibit ovulation, whereas whereas the copper IUD prevents fertilization. As such, a common misconception is that emergency contraception is equivalent to medical abortion. None of the methods discussed involve the termination of a preexisting pregnancy, and emergency contraception has not been shown to have any adverse effects on a developing fetus when taken during an established pregnancy. It is still possible for a patient who uses emergency contraception to get pregnant in the same menstrual cycle, so she should be advised to use an alternative form of contraception and to undergo a pregnancy test if menstruation is delayed for more than 3 weeks. Patients who receive emergency contraception should be counseled regarding birth control and have a follow-up pregnancy test should they miss their next period.

KEY CONCEPTS

- Ovarian torsion is easily missed on initial presentation, and diagnosis cannot rely on radiologic findings alone. Doppler ultrasound is the optimal imaging study; absence of arterial flow, although not always present, is highly specific for torsion. Torsion should be a consideration in any patient with known risk factors, even if symptoms are subtle or atypical.
- An ultrasound examination may distinguish among the various types of ovarian cysts and identify associated complications, such as torsion, hemorrhage, and malignancy. Most ovarian cysts are simple follicular cysts that resolve without pharmacologic or surgical intervention.
- Abnormal uterine bleeding has many structural, hormonal, and coagulopathic causes. Selected imaging and laboratory testing, based on a careful history and physical examination, can often lead to determination of the cause. Combined oral contraceptive pills can help regulate the cycle and alleviate AUB.
- Emergency contraception is a safe effective option to prevent an undesired pregnancy. Levonorgestrel and ulipristal are both effective oral medications and are associated with fewer side effects than the traditional combined contraceptive method.

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

REFERENCES

1. Sasaki KJ, Miller CE: Adnexal torsion: review of the literature. J Minim Invasive Gynecol 21:196–202, 2014.
2. Casey RK, Damle LF, Gomez-Lobo V: Isolated fallopian tube torsion in pediatric and adolescent females: a retrospective review of 15 cases at a single institution. J Pediatr Adolesc Gynecol 26:189–192, 2013.
3. Lourenco AP, Swenson D, Tubbs RJ, et al: Ovarian and tubal torsion: imaging findings on US, CT, and MRI. Emerg Radiol 21:179–187, 2014.
4. Tsafrir Z, Azem F, Hasson J, et al: Risk factors, symptoms, and treatment of ovarian torsion in children: the twelve-year experience of one center. J Minim Invasive Gynecol 19:29–33, 2012.
5. Hasson J, Tsafrir Z, Azem F, et al: Comparison of adnexal torsion between pregnant and nonpregnant women. Am J Obstet Gynecol 202:536.e1–536.e6,2010.
6. Asfour V, Varma R, Menon P: Clinical risk factors for ovarian torsion. J Obstet Gynaecol 35:721–725, 2015.
7. King A, Keswani S, Biesiada J, et al: The utility of a composite index for the evaluation of ovarian torsion. Eur J Pediatr Surg 24:136–140, 2014.
8. Huchon C, Staraci S, Fauconnier A: Adnexal torsion: a predictive score for preoperative diagnosis. Hum Reprod 25:2276–2280, 2010.
9. Huchon C, Panel P, Kayem G, et al: Does this woman have adnexal torsion? Hum Reprod 27:2359–2364, 2012.
10. Christopoulos G, Goubet S, Kelly T: Interleukin-6 for the diagnosis of ovarian torsion: a systematic review and meta-analysis. J Obstet Gynaecol 33:438–441, 2013.
11. Dupuis CS, Kim YH: Ultrasonography of adnexal causes of acute pelvic pain in premenopausal non-pregnant women. Ultrasonography 34:258–267, 2015.
12. Valsky DV, Esh-Broder E, Cohen SM, et al: Added value of the gray-scale whirlpool sign in the diagnosis of adnexal torsion. Ultrasound Obstet Gynecol 36:630–634, 2010.
13. Swenson DW, Lourenco AP, Beaudoin FL, et al: Ovarian torsion:case-control study comparing the sensitivity and specificity of ultrasonography and computed tomography for diagnosis in the emergency department. Eur J Radiol 83:733–738, 2014.
14. Bar-On S, Mashiach R, Stockheim D, et al: Emergency laparoscopy for suspected ovarian torsion: are we too hasty to operate? Fertil Steril 93:2012–2015, 2010.
15. Hall TR, Randall TC: Adnexal masses in the premenopausal patient. Clin Obstet Gynecol 58:47–52, 2015.
16. Rauh-Hain JA, Melamed A, Buskwofie A, et al: Adnexal mass in the postmenopausal patient. Clin Obstet Gynecol 58:53–65, 2015.
17. Oltmann SC, Garcia N, Barber R, et al: Can we preoperatively risk stratify ovarian masses for malignancy? J Pediatr Surg 45:130–134, 2010.
18. Bennett JA, Oliva E: Pathology of the adnexal mass. Clin Obstet Gynecol 58:3–27, 2015.
19. Liu JH, Zanotti KM: Management of the adnexal mass. Obstet Gynecol 117:1413–1428, 2011.
20. Brown DL, Dudiak KM, Laing FC: Adnexal masses: US characterization and reporting. Radiology 254:342–354, 2010.
21. Perera DS, Prabhakar HB: Imaging of the adnexal mass. Clin Obstet Gynecol 58:28–46, 2015.
22. Grimes DA, Jones LB, Lopez LM, et al: Oral contraceptives for functional ovarian cysts. Cochrane Database Syst Rev (4):CD006134, 2014.
23. Munro MG, Critchley HO, Broder MS, et al: FIGO classification system (PALM-COEIN) for causes of abnormal uterine bleeding in nongravid women of reproductive age. Int J Gynaecol Obstet 113:3–13, 2011.
24. Committee on Practice Bulletins—Gynecology: Practice bulletin no. 128: diagnosis of abnormal uterine bleeding in reproductive-aged women. Obstet Gynecol 120:197–206, 2012.
25. Committee on Practice Bulletins—Gynecology: Practice bulletin no. 136: management of abnormal uterine bleeding associated with ovulatory dysfunction. Obstet Gynecol 122:176–185, 2013.
26. Borhart J: Emergency department management of vaginal bleeding in the nonpregnant patient. Emerg Med Pract 15:1–20, 2013.
27. van der Voet LF, Bij de Vaate AM, Veersema S, et al: Long-term complications of caesarean section. The niche in the scar: a prospective cohort study on niche prevalence and its relation to abnormal uterine bleeding. BJOG 121:236–244, 2014.
28. Committee on Practice Bulletins—Gynecology: Practice bulletin no. 128: diagnosis of abnormal uterine bleeding in reproductive-aged women. Obstet Gynecol 120:197–206, 2012.
29. Committee on Adolescent Health Care; Committee on Gynecologic Practice: Committee Opinion No. 580: von Willebrand disease in women. Obstet Gynecol 122:1368–1373, 2013.
30. Bradley LD, Gueye NA: The medical management of abnormal uterine bleeding in reproductive-aged women. Am J Obstet Gynecol 214:31–44, 2016.
31. Practice bulletin no. 152: emergency contraception. Obstet Gynecol 126:e1–e11, 2015.
32. Glasier AF, Cameron ST, Fine PM, et al: Ulipristal acetate versus levonorgestrel for emergency contraception: a randomised non-inferiority trial and meta-analysis. Lancet 375:555–562, 2010.
33. Committee on Health Care for Underserved Women: ACOG Committee Opinion Number 542: access to emergency contraception. Obstet Gynecol 120:1250–1253, 2012.
34. Turok DK, Godfrey EM, Wojdyla D, et al: Copper T380 intrauterine device for emergency contraception: highly effective at any time in the menstrual cycle. Hum Reprod 28:2672–2676, 2013.

CHAPTER 90: QUESTIONS & ANSWERS

90.1. Which of the following statements regarding ovarian torsion is true?
  A. Abdominal tenderness is predictable.
  B. Complete arterial obstruction is common.
  C. Computed tomography (CT) has a higher sensitivity than ultrasound.
  D. Most cases are associated with an ovarian mass.
  E. There is a left-sided predominance.

Answer: D. Most cases are associated with a benign ovarian tumor or cyst. There is a modest right-sided predominance. Due to the collateral uterine and ovarian arterial supply, complete arterial obstruction is rare. In cases of intermittent or chronic torsion particularly, abdominal tenderness may be absent. CT has a lower sensitivity than ultrasound, which is still only approximately 71%. Interpret negative studies carefully.

90.2. Which of the following patterns of menses should be considered abnormal?
  A. A 23-day menstrual cycle
  B. A 40-day menstrual cycle
  C. Bleeding 6 months after menopause
  D. Seven days of menstrual flow
  E. Three days of menstrual flow

Answer: B. A menstrual cycle shorter than 21 days or more than 35 days apart, or flow that is less than 2 days or more than 7 days, is considered abnormal. In the postmenopausal woman, any bleeding 12 months after cessation of menses is considered abnormal.

90.3. A 33-year-old G3P3 woman presents with 7 days of heavy but painless vaginal bleeding. Her only other complaint is dizziness. Urine pregnancy test is negative. Vital signs are blood pressure, 85/40 mm Hg, and heart rate, 130 beats/min. The pelvic examination reveals copious vaginal bleeding through a partially open cervical os. The hemoglobin level is 6.8 g/dL. Which of the following is the most appropriate intervention?
  A. 20 μg of ethinyl estradiol daily until the bleeding subsides
  B. 35 μg ethinyl estradiol bid until the bleeding subsides
  C. Blood transfusion and urgent gynecologic consultation for dilation and curettage
  D. Premarin, 25 mg IV every 6 hours
  E. Saline hydration followed by a 2-day recheck

Answer: C. This patient is symptomatic, hypovolemic, anemic, and exhibiting ongoing bleeding. Oral estrogens are indicated in cases of modest bleeding. Parenteral estrogen may be used as an adjunct to other therapies for patients requiring admission. The degree of anemia in the face of ongoing bleeding in this case warrants gynecologic intervention.

90.4. To be most effective, the emergency contraceptive ulipristal should be given as soon as possible but is approved to be given within how many hours of intercourse?
  A. 12
  B. 24

C. 48
D. 72
E. 120

Answer: E. The efficacy of all emergency contraceptive pills in preventing pregnancy is greatest when a contraceptive is taken soon after intercourse. Ulipristal is labeled for 120 hours post-coitus. Because it is not as effective as preplanned contraception, women should still be aware of the possibility of pregnancy after its use.