CHAPTER 26

Acute Pelvic Pain in Women

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PERSPECTIVE

Women of childbearing age who present with low abdominal pain often have pathologic conditions related to the female reproductive system or bladder, although additional causes must also be considered. Potential etiologic disorders range from the very benign to the immediately life-threatening. Pregnancy presents its series of considerations, and pregnancy status should be determined in all patients.

Epidemiology

Acute pain due to pelvic pathology is common, although the presenting complaint is often abdominal pain or lower abdominal pain; a complaint of low back pain may also signal pelvic pathology. A flare of chronic pelvic pain may manifest as an acute process.

In a survey of reproductive-age adult women, 39% reported that they experience nonmenstrual pelvic pain at least sometimes.[1] Among women who present to an emergency department (ED) and receive a gynecologic diagnosis, 24% of those diagnoses are for pelvic inflammatory disease (PID), 23% for lower genital tract infections (e.g., cervicitis, candidiasis, Bartholin's abscess), 12% for menstrual disorders, 12% for noninflammatory ovarian and tubal pathology (including cysts and torsion), and 4.3% for ectopic pregnancy.[2] In the general population, annually 5.8 of every 1000 women present to an ED and receive a diagnosis of PID, and 1.1 of every 1000 women are diagnosed with an ectopic pregnancy.[2]

Younger patients and those with multiple sexual partners are more likely to have PID, and a previous episode increases the likelihood of a subsequent episode.[3] The risk of ectopic pregnancy is higher in women who have had PID, pelvic surgery, or an intrauterine device. Heterotopic pregnancy is of special concern in women undergoing fertility treatment.[4] Common nongynecologic diseases, such as appendicitis, diverticulitis, urinary tract infection, and urolithiasis, remain important considerations in the woman with acute pelvic pain. Box 26-1 lists conditions accounting for pelvic pain in most women.[5,6]

Some causes of pelvic pain may lead to serious sequelae. PID carries the short-term risk of tubo-ovarian abscess, and the long-term risks of impaired fertility, chronic pelvic pain, and increased predisposition to ectopic pregnancy.[3] Rupture of an ectopic pregnancy or a hemorrhagic ovarian cyst may be acutely life-threatening. Unrecognized abuse may have serious or lethal consequences as well.

Pathophysiology

The female pelvis contains the vagina, uterus, fallopian tubes and ovaries, ureters and urinary bladder, and sigmoid colon and rectum, as well as components of the musculoskeletal system. Although pelvic pain often originates from the reproductive organs, it may arise from any structures that lie adjacent to or course through the pelvis. Visceral pain afferents supplying the pelvic organs have common innervation with the appendix, ureters, and colon. Their significant overlap makes accurate localization difficult for both patient and clinician. Pain may be initiated by inflammation, distention, or ischemia of an organ, or by spillage of blood, pus, or other material into the pelvis. Parietal pain develops when the afferent nerves in the parietal peritoneum adjacent to an affected organ are stimulated.

DIAGNOSTIC APPROACH

Differential Considerations

The differential diagnosis of pelvic pain is broad in scope (see Box 26-1). Most causes of pelvic pain fit into three categories, however: (1) those that originate in the reproductive tract, (2) those that originate in the urinary tract, and (3) those that originate in the intestinal tract. Within the reproductive tract, a subset of causes of pelvic pain is only found in pregnancy; the pregnancy test is therefore a key branch point in the diagnostic process. Potential pregnancy-related disorders can be divided into complications of early pregnancy and complications that occur further along in pregnancy. Although the specific cause of pelvic pain is not always determined at the initial ED visit, an organized approach usually leads to the confirmation or exclusion of disorders most likely to result in significant morbidity.

Pivotal Findings

It is rare that any particular finding on history or physical examination (summarized in Table 26-1) is reliable enough to conclusively make or exclude a particular diagnosis, so ancillary testing (beyond a simple pregnancy test) is commonly required in the evaluation of patients with acute pelvic pain.

The bimanual examination may at times provide important and convincing information. Unfortunately, however, findings on pelvic examination are somewhat subjective and unreliable,[7,8] and the test may be more helpful to localize the process to one side or the other, or to help focus the workup of the

BOX 26-1 POTENTIAL CAUSES OF PELVIC PAIN IN WOMEN

Reproductive Tract
Ovarian torsion
Ovarian cyst
Salpingitis/tubo-ovarian abscess
Septic pelvic thrombophlebitis
Endometritis
Endometriosis
Uterine perforation
Uterine fibroids
Dysmenorrhea

Pregnancy-Related
First Trimester
Ectopic pregnancy
Threatened abortion
Nonviable pregnancy
Ovarian hyperstimulation syndrome

Second and Third Trimesters
Placenta previa
Placental abruption
Round ligament pain

Intestinal Tract
Appendicitis
Diverticulitis
Ischemic bowel
Perforated viscus
Bowel obstruction
Incarcerated/strangulated hernia
Inflammatory bowel disease
Gastroenteritis

Urinary Tract
Pyelonephritis
Cystitis
Ureteral stone

pathologic process to the reproductive organs. For instance, tenderness on examination that seems to arise from the right ovary may be appropriately used to guide the subsequent workup, perhaps the ordering of a pelvic ultrasound study. The lack of certainty of the findings on the bimanual examination, however, do not allow the examiner to completely exclude appendicitis, especially if the pelvic ultrasound study fails to identify a clear explanation for the pain.

A sequential approach, as outlined next, allows the clinician to progressively limit the diagnostic possibilities until a sound provisional diagnosis is reached.

Symptoms

The location of *pain* and the *radiation* pattern often are helpful in focusing the differential diagnosis toward a specific cause or group of causes. Lateral pelvic pain usually is related to a process in the tube or ovary. In right-sided pain, appendicitis is considered, and in left-sided pain (especially in patients older than 40 years of age), the differential diagnosis includes diverticulitis and colitis. Urolithiasis may also manifest as lateral pelvic pain, especially when the stone is impacted at the ureterovesicular junction. Central pelvic pain usually is due to processes involving the uterus or bladder, or involving both adnexae. Pain radiating to the rectum may be secondary to pooling of fluid or blood in the cul-de-sac. Diffuse pain may occur with a bilateral process, such as PID, or with diffuse peritonitis secondary to infection or intra-abdominal hemorrhage.

Information regarding the *onset* and *duration* of pain may also be useful. Patients with uncomplicated appendicitis (without perforation or abscess) typically present within 48 hours of symptom onset. Sudden-onset pain suggests acute intrapelvic hemorrhage, cystic rupture, or ovarian torsion. Gradual-onset pain is more consistent with inflammation (such as in PID) or obstruction. Chronic or recurrent pain is consistent with endometriosis, recurrent ovarian cysts, or a persistent ovarian mass. The quality of pain may differentiate the crampy, intermittent pattern of muscular contractions along a hollow viscus (arising from, e.g., uterine, ureteral, or bowel pathology) from the steady, progressive pain associated with inflammatory or neoplastic causes, but this finding is highly variable. Pain associated with PID often manifests at the end of menses. Ovarian cyst pain may fluctuate through several menstrual cycles, finally manifesting as rupture, which often occurs in the middle of the menstrual cycle.

A complaint of fever and chills is more common with an infectious process. Nausea and vomiting occur more frequently when the process originates within the gastrointestinal tract but also may accompany ovarian torsion, ureteral colic, other causes of severe pain, and pregnancy. Dysuria and frequency occur in many local vulvar and vaginal processes, such as herpesvirus infection, candidiasis, and other types of vulvovaginitis, but urgency typically signals an irritated bladder or urethra, focusing attention on the urinary tract.

Information about the patient's last menstrual period, pattern of menses, and sexual activity pattern is useful, although such data cannot be used to rule out pregnancy. Accordingly, a pregnancy test is always indicated except in women who have had a hysterectomy or are clearly postmenopausal. In a pregnant patient, the obstetric history may provide some helpful diagnostic clues. Recurrent spontaneous abortion or previous ectopic pregnancy increases the likelihood of these conditions, respectively. Patients who are actively undergoing infertility treatment are at increased risk for ectopic pregnancy, heterotopic pregnancy, ovarian torsion, and ovarian hyperstimulation syndrome. Round ligament pain usually is noted in the second trimester. Postpartum patients are at increased risk for endometritis.

The presence, quantity, and duration of associated vaginal bleeding should be ascertained. (See also Chapters 27 and 176.) In a nonpregnant patient, bleeding may be associated with PID, trauma, dysfunctional uterine bleeding, or cervical or uterine cancer. In a pregnant patient, bleeding may be associated with a subchorionic hemorrhage in an otherwise viable pregnancy or with an ectopic pregnancy or a nonviable intrauterine pregnancy (which may continue to cause bleeding after expulsion of the uterine contents, especially if any products of conception are retained), or later in pregnancy with placenta previa or abruption. In some cases, the amount of bleeding may be substantial enough to necessitate blood transfusion and surgical intervention.

As part of the past medical history, any recent procedures should be ascertained. All women are interviewed in private to permit disclosure of sensitive information, such as a known pregnancy or recent abortion. The onset of pelvic pain shortly after uterine instrumentation increases the possibility of uterine perforation or infection. Sexual history is important, with an emphasis on recent sexual contact and previous history of sexually transmitted diseases.

Signs

The physical examination is directed toward the abdomen and pelvis. Pelvic examination is performed in virtually all patients, including pregnant patients at less than 20 weeks of gestation.

Table 26-1 Differentiation of Common or Potentially Catastrophic Causes of Pelvic Pain

CAUSATIVE DISORDER/CONDITION	PAIN HISTORY	ASSOCIATED SYMPTOMS	SUPPORTING HISTORY	PREVALENCE IN ED	PHYSICAL EXAMINATION	USEFUL TESTS	ATYPICAL OR ADDITIONAL ASPECTS
Ectopic pregnancy (critical if ruptured)	Classically severe, sharp, lateral pelvic pain, but severity, location, and quality highly variable	Vaginal bleeding	Missed period; history of previous ectopic pregnancy, infertility, tubal ligation, PID, or IUD use	Common	Classically unilateral adnexal tenderness, adnexal mass, and CMT	Pelvic US, quantitative β hCG, T&C progesterone?, laparoscopy	Cannot reliably exclude diagnosis based on history and physical; severe pain, hypotension, or peritonitis suggests rupture.
Ruptured corpus luteum cyst (emergent-critical with significant hemorrhage; otherwise, urgent)	Abrupt moderate to severe lateral pain	Light-headedness if bleeding is severe; rectal pain arises from fluid in cul-de-sac.		Uncommon	Hypotension and tachycardia if blood loss is significant; possible peritonitis	Pelvic US, CBC, T&C	Physical examination findings often do not correlate with volume of blood in pelvis at US.
Ovarian torsion (emergent)	Acute onset of moderate to severe lateral pain	Nausea and vomiting	History of ovarian mass	Uncommon	Adnexal mass and tenderness, possible peritonitis	US with Doppler flow studies, laparoscopy	Torsion can be intermittent.
Appendicitis (emergent)	Duration often <48 hr, generalized followed by localized RLQ	Low-grade fever, nausea, anorexia	Migration of pain to RLQ from center, abdominal pain before vomiting	Common	RLQ tenderness, possible peritonitis	US or CT in unclear cases	Early in course, tenderness may be minimal or poorly localized.
PID/TOA (TOA: emergent; PID: urgent-emergent)	Without TOA, pain usually bilateral. May present acutely within 48 hr, or subacutely with up to 3 wk of pain.	Fever, vaginal discharge	Vaginal discharge, history of PID, history of unprotected intercourse/ multiple partners	PID: common TOA: uncommon	Pus from cervical os, (+) CMT, adnexal tenderness. Peritonitis suggests severe PID or TOA.	CBC, ESR, CRP, pelvic US, laparoscopy, cervical cultures, cervical smear for WBCs	History and physical may be inaccurate for diagnosis, particularly in patients presenting subacutely.
UTI (urgent)	Pain with urination usually is not severe unless patient has flank pain from associated pyelonephritis.	Urinary urgency and frequency; fever and vomiting if patient has associated pyelonephritis	Recent urologic procedure, prior history of UTI	Common	Suprapubic tenderness, flank tenderness, and fever with pyelonephritis	Urinalysis, urine culture	WBC can be present in urine with PID and appendicitis.
Ureteral colic (urgent)	Acute onset, presents within hours. Pain is lateral, usually moderate to severe. Often radiates into the groin.	Nausea and vomiting	Prior history of stones	Common	Patient often appears uncomfortable, but physical examination can be otherwise unremarkable	Urinalysis: hematuria present in ~80% of cases; abdominal CT	If stone is at junction of ureter and bladder, can have localized pain that can mimic appendicitis or other acute pelvic pathology
Nonruptured ovarian cyst/tumor	Lateral ache, gradual onset	Often minimal	Prior history of similar pain	Common	Lateral pelvic tenderness, with or without a mass	Pelvic US, CBC	
Endometriosis	Unilateral or bilateral pelvic pain, often recurrent	Dysmenorrhea, dyspareunia	Prior history of same type of pain in association with menstrual cycle	Common	Unilateral or bilateral adnexal tenderness, occasionally pelvic mass present, peritoneal findings uncommon	Pelvic US, laparoscopy	Symptoms can mimic other types of pelvic pathology; laparoscopy often is needed for confirmation.

CBC, complete blood count; CMT, cervical motion tenderness; CRP, C-reactive protein; CT, computed tomography; ED, emergency department; ESR, erythrocyte sedimentation rate; β hCG, β human chorionic gonadotropin; IUD, intrauterine device; PID, pelvic inflammatory disease; RLQ, right lower quadrant; T&C, type and crossmatch; TOA, tubo-ovarian abscess; US, ultrasonography; UTI, urinary tract infection.

Pregnant patients beyond 20 weeks of gestation with complaints of vaginal bleeding undergo transabdominal pelvic ultrasound study for placental localization before the pelvic examination (see Chapter 27). Timely obstetric consultation should be obtained for patients beyond 20 weeks of gestation.

Abnormal vaginal discharge may be seen in a variety of conditions, including vaginitis, cervicitis, endometritis, and PID more generally, as well as retained foreign body. Cervical motion tenderness most commonly indicates reproductive tract inflammation, but irritation of adjacent structures (e.g., cystitis, appendicitis) also may give rise to this finding. Although an open os is most consistent with an incomplete or inevitable abortion, it does not definitively exclude an ectopic pregnancy. A large uterus in a nonpregnant patient may indicate fibroids. Fundal tenderness often is difficult to distinguish from cystitis but could suggest endometritis or necrotic fibroids. Adnexal masses and tenderness suggest cystic disease, as well as ectopic pregnancy, tubo-ovarian abscess, and torsion, especially if these findings are unilateral.

The constellation of bilateral lower abdominal tenderness, bilateral adnexal tenderness, and cervical motion tenderness is classically associated with PID, particularly when onset of the pain occurs during or just after menstruation, although the diagnosis may (and often should) be made without the presence of all three signs.

Laboratory Tests

A pregnancy test is required in almost all patients. A positive test may indicate intra- or extrauterine pregnancy or, rarely, molar pregnancy or cancer. Urine dipstick testing of a clean-catch specimen can be used to identify pyuria, typically seen in the setting of urinary tract infection, or hematuria, which is consistent with urolithiasis and also hemorrhagic cystitis. The absence of hematuria does not rule out a ureteral stone, although it lowers the likelihood. Urinalysis should be performed in all pregnant patients, even if their symptomatology does not include urinary tract complaints.

Patients who may be hemorrhaging either internally or externally should have blood drawn for a hemoglobin and hematocrit, as well as for typing and crossmatching.

Patients with a positive pregnancy test should undergo formal ultrasound assessment or bedside ED ultrasound examination to evaluate for ectopic pregnancy.[9,10] Identification of an intrauterine pregnancy by ultrasound imaging excludes ectopic pregnancy with a high degree of certainty. Heterotopic pregnancy is exceedingly rare in patients who are not undergoing assisted reproduction. Conversely, a patient with a positive pregnancy test result in whom a definite intrauterine pregnancy cannot be seen is presumed to have an ectopic pregnancy until proved otherwise. Furthermore, presence of free intra-abdominal fluid on ultrasound images is consistent with hemorrhage from either an ectopic pregnancy or a ruptured ovarian cyst and must be addressed expediently.

DIAGNOSTIC ALGORITHM

The algorithm in Figure 26-1 is designed to help focus further testing and progress to a rational provisional diagnosis. It is not unusual, however, for common diseases to present in uncommon ways or for more than one disease to be present, and tests

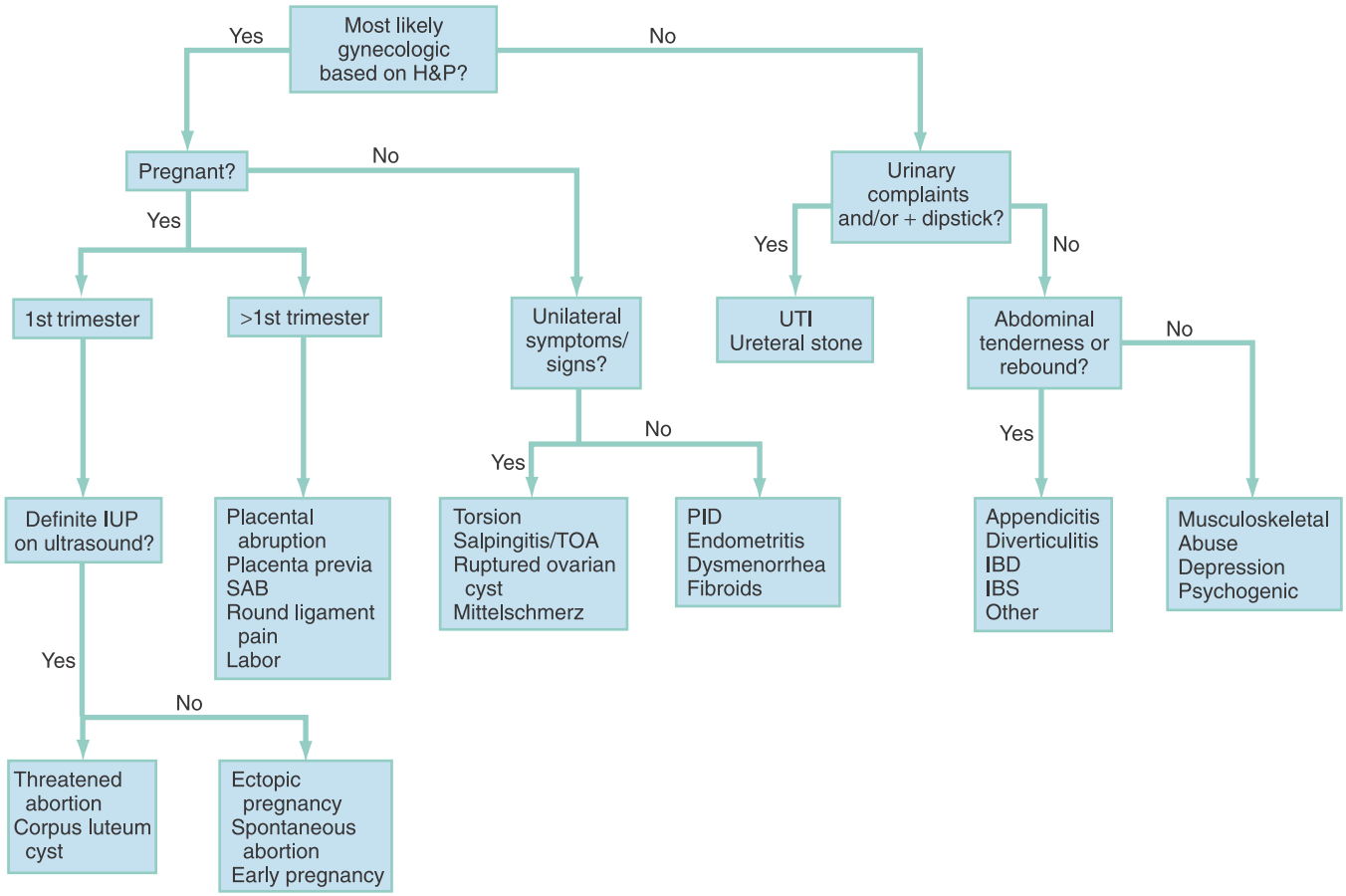

Figure 26-1. Diagnostic algorithm for acute pelvic pain. H&P, history and physical; IBD, inflammatory bowel disease; IBS, irritable bowel syndrome; IUP, intrauterine pregnancy; PID, pelvic inflammatory disease; SAB, spontaneous abortion; TOA, tubo-ovarian abscess; UTI, urinary tract infection.

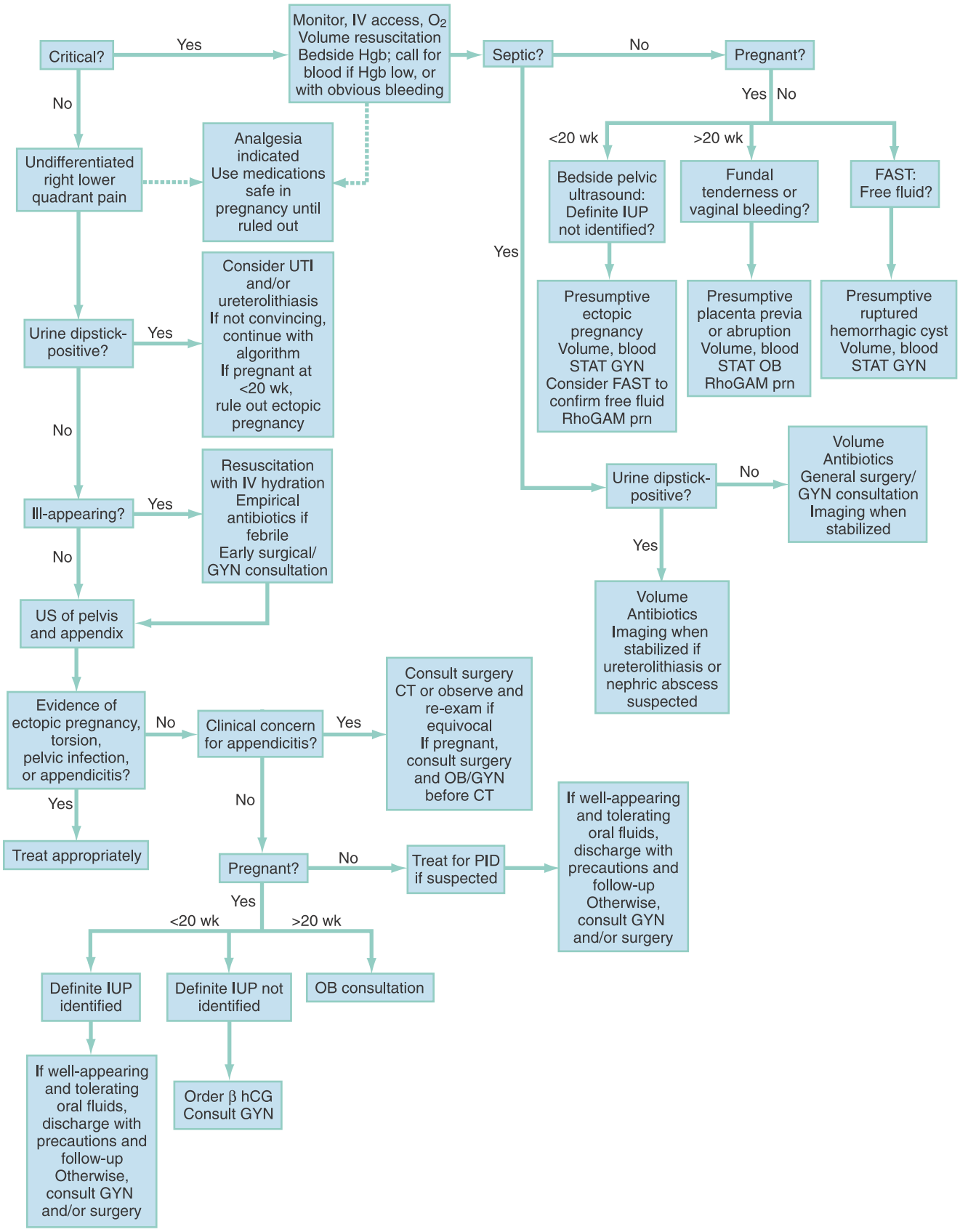

Figure 26-2. Management algorithm for acute pelvic pain: critical patients and right lower quadrant pain presentations. CT, computed tomography; FAST, focused assessment with sonography for trauma; GYN, gynecology; β hCG, β human chorionic gonadotropin; Hgb, hemoglobin; IUP, intrauterine pregnancy; IV, intravenous; OB, obstetrics; PID, pelvic inflammatory disease; US, ultrasound; UTI, urinary tract infection.

must be interpreted carefully in the context of the individual patient's presentation. As examples, patients with a positive result on urine dipstick testing may have appendicitis, and pregnant patients may suffer from ovarian torsion. With certain diseases, such as endometriosis, definitive testing is not available in the ED, and the patient's history may become the most important discriminator.

After an initial history and physical examination, the pregnancy test determines the subsequent priorities. If the patient is in early pregnancy, an ectopic pregnancy is the most emergent diagnosis to consider. Bedside or formal ultrasound assessment may rapidly confirm an intrauterine pregnancy, in which case a threatened abortion is most likely, although unilateral pain may prompt further evaluation for torsion. An empty uterus on ultrasound imaging (or any ultrasound study that cannot confirm a definite intrauterine pregnancy) is consistent with both an ectopic pregnancy and a spontaneous abortion; a very normal pregnancy is also possible. Later in pregnancy, formal ultrasound study often is indicated, and many women whose pregnancies are past 20 weeks' gestation will require observation with monitoring.

Nonpregnant patients with pain that seems to be gynecologic in nature must be assessed for hemorrhage from a ruptured ovarian cyst; for ovarian torsion; and for infection, including cervicitis, endometritis, salpingitis, and tubo-ovarian abscess. Although the history and physical examination often are sufficient to diagnose infection, formal ultrasound assessment usually is required if torsion or tubo-ovarian abscess is suspected. Ultrasound findings also may support a diagnosis of PID if evidence of salpingitis is noted, or of a ruptured cyst if a characteristic ovarian appearance is combined with presence of a small amount of free fluid. Although not as reliable as CT scanning, the ultrasound study also may be used to examine the appendix.

Because in practice it is difficult to differentiate some gynecologic origins of pain from classic intra-abdominal causes (such as right ovarian pathology from appendicitis), the workup often will require an ultrasound study or a CT scan, or both. If the cause appears to be most likely gynecologic, then an ultrasound exam of both the ovary and the appendix is more reasonable, followed by a CT scan if the ultrasound findings are negative and the presentation is possibly consistent with (say) appendicitis. Patients whose pain does not seem to be from the reproductive tract usually are found to have urinary infections or stones, abdominal sources of pain (see Chapter 21), or musculoskeletal pathology, or may be suffering from abuse or depression.

If the available data either do not make sense or conflict with the clinical gestalt, execution of the following three steps should be considered: (1) Ensure that emergent, life-threatening diagnoses have been addressed (e.g., is a reliable, negative pregnancy test recorded, so that ectopic pregnancy is ruled out?). (2) Move back up the algorithm and reassess whether the presentation may be atypical (e.g., is the examiner confident that appendicitis is not a consideration?). (3) If it seems reasonable that emergent causes are unlikely and sufficient consideration was given to less likely etiologic disorders without uncovering an apparent cause, review the possibility of depression or abuse before disposition. Follow-up planning for all patients is recommended.

EMPIRICAL MANAGEMENT

An algorithm for management of patients with acute pelvic pain is presented in Figure 26-2. Patients who are in extremis are most likely to be hemorrhaging, although on occasion their critical condition arises from septic shock. Presentations related to vaginal bleeding are discussed in Chapter 27. Ectopic pregnancy, placental abruption, and hemorrhagic ovarian cyst also may cause life-threatening hemorrhage with no or minimal vaginal bleeding. Patients with these disorders need rapid treatment with fluid and blood products and may require surgical intervention before stabilization can be achieved. A bedside ultrasound assessment by an appropriately trained operator may help the clinician reach the presumptive diagnosis expediently. The obstetric-gynecologic service should be consulted promptly. Septic shock may be a consequence of abdominal or pelvic processes and may require both general surgical and gynecologic consultations, as well as admission to an intensive care setting.

In both critical and noncritical patients, early administration of analgesia is advisable, both for patient comfort and to improve the yield of examinations. Intravenous opioids, such as morphine, are rapid and effective, titratable, and safe in pregnancy. Patients who do not appear ill and for whom a sound provisional diagnosis is reached may be discharged with close follow-up and appropriate precautions. However, pregnant patients who are at more than 20 weeks of gestation should be referred to the obstetrics service for observation. Abdominal trauma in pregnancy, especially in patients who present later in pregnancy, arouses additional concerns not addressed in this chapter.

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