

Chapter 10

GYNECOLOGIC AND OBSTETRIC CONDITIONS



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Nuchal Cord. Hand placement prior to applying downward traction to deliver the anterior shoulder. A loose nuchal cord is seen. (Photo contributor: William Leininger, MD.)

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Clinical Summary

Candidal vaginitis is characterized by a thick, clumping, white discharge and vulvar discomfort. Intense vulvar erythema, pruritus, and/or burning are often present. Predisposing factors may include oral contraceptive, antibiotic, or corticosteroid use; pregnancy; and diabetes. A microscopic slide prepared with 10% potassium hydroxide yielding characteristic branched chain hyphae and spores establishes the diagnosis. Sexually transmitted diseases are not usually associated with isolated Candidal vaginitis.

Trichomonas vaginitis presents as a persistent, thin, copious discharge that is often frothy, green, or foul-smelling. The amount of vaginal and cervical erythema and inflammation varies considerably. Diagnosis may be made by the presence of motile flagellates on normal saline wet-mount microscopy, but this is only 60% to 70% sensitive. New nucleic acid tests are emerging with ~95% specificity. Multiple petechiae on the vaginal wall or cervix (strawberry spots/strawberry cervix) are pathognomonic but only occasionally seen.

Bacterial vaginosis is characterized by a malodorous, homogeneous discharge with an amine (fishy) odor that can

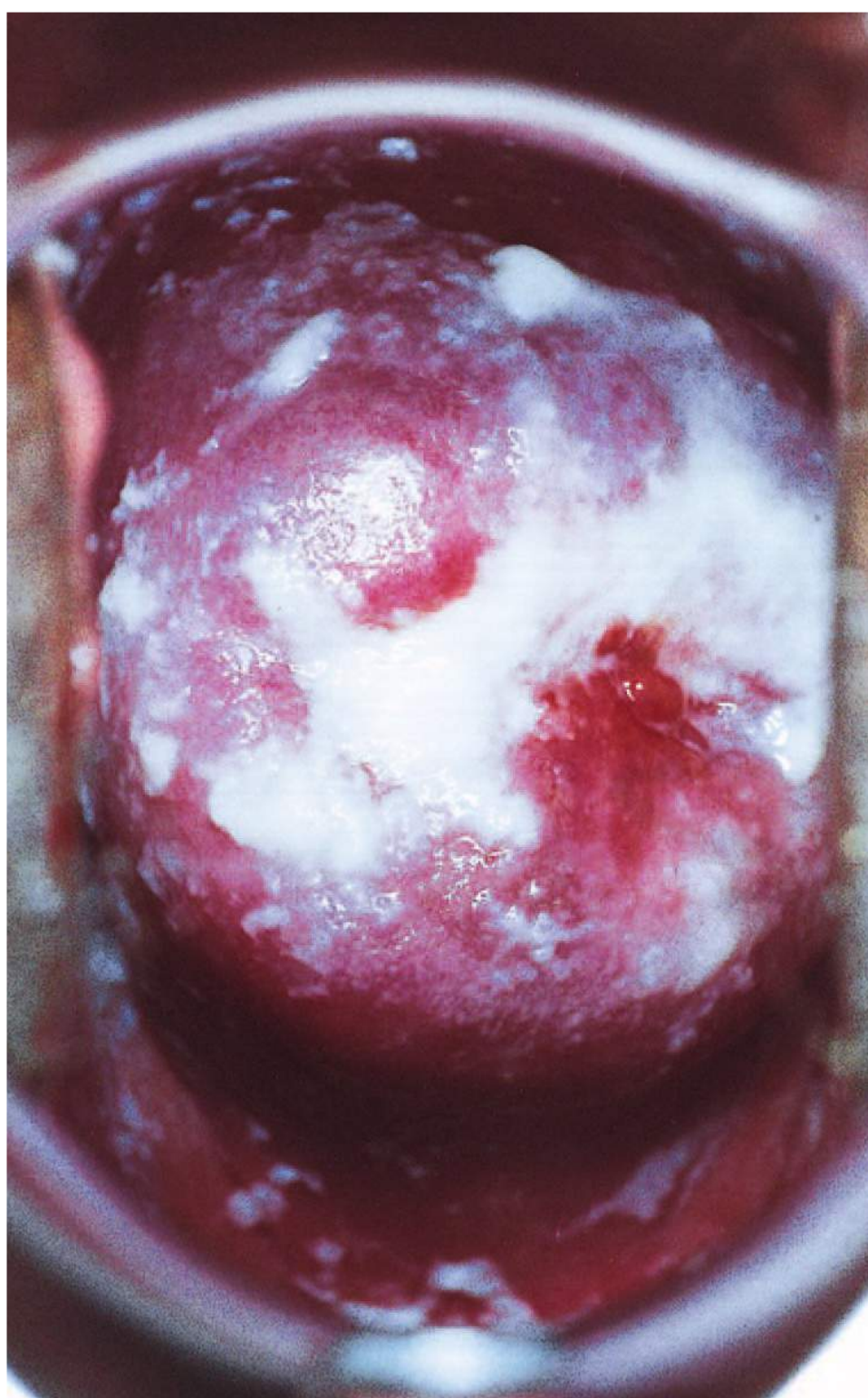


FIGURE 10.1 ■ Candidal Vaginitis. Thick, curdy white discharge secondary to candidal vaginitis. (Photo contributor: Kevin J. Knoop, MD, MS.)

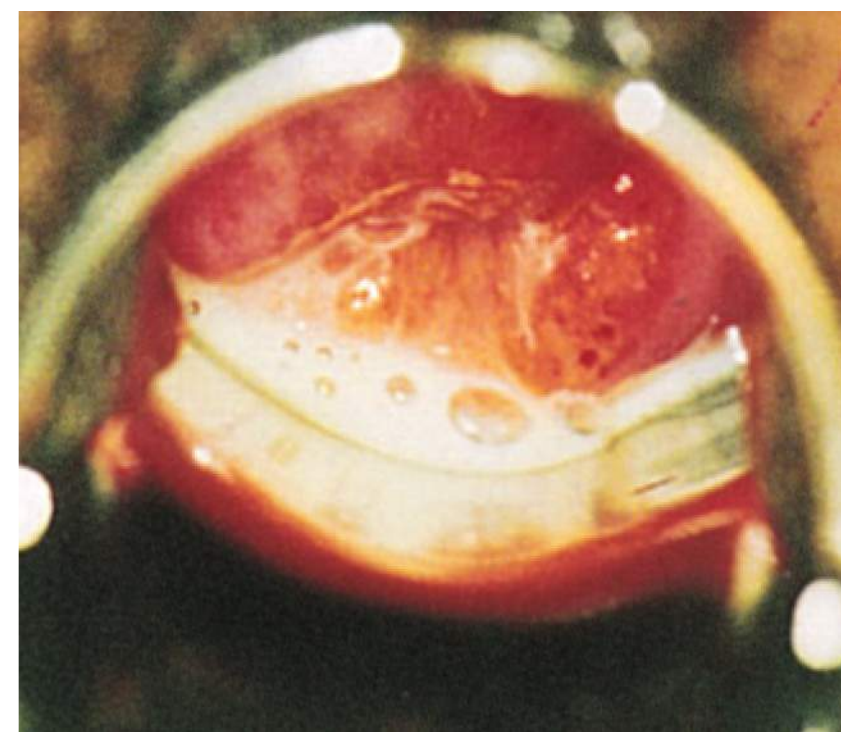


FIGURE 10.2 ■ Trichomonas Vaginitis. Thin vaginal discharge suggestive of trichomonas vaginitis. (Photo contributor: H. Hunter Handsfield. Atlas of Sexually Transmitted Diseases. New York: McGraw-Hill; 1992.)

be briefly accentuated by mixing with a drop of KOH solution. The presence of clue cells on normal saline wet mount establishes the diagnosis. Other associated vaginal or abdominal complaints are minimal and, if significant, suggest the presence of another disease process.

Although the above infectious causes are responsible for most cases of vaginitis, other possible etiologies including local chemical irritants or allergens, vaginal foreign bodies, and atrophic vaginitis should be considered in the differential diagnosis.



FIGURE 10.3 ■ Gardnerella Vaginosis. Thin, milky white discharge suggestive of Gardnerella vaginosis. (Photo contributor: Curatek Pharmaceuticals.)

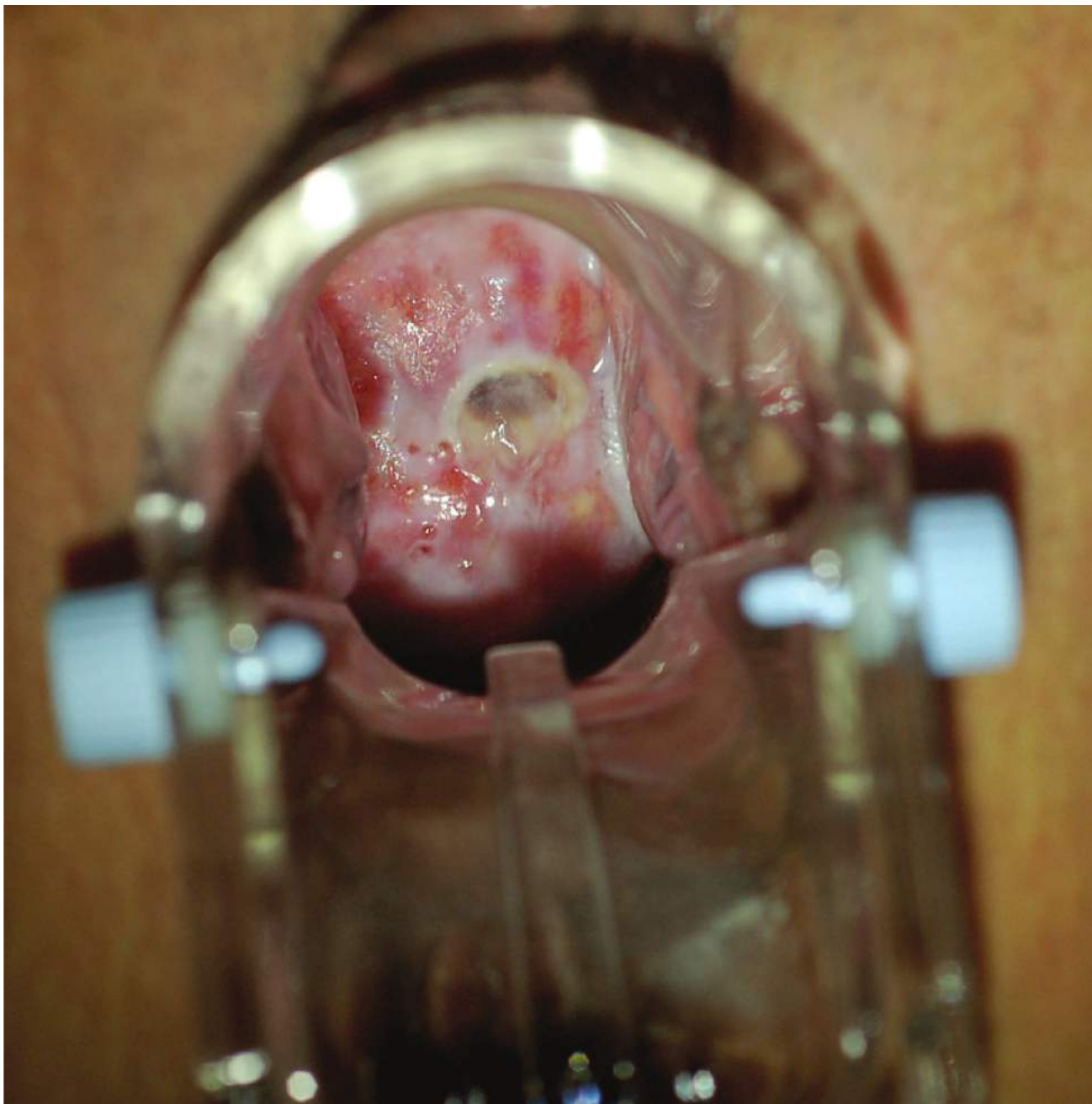


FIGURE 10.4 ■ Bacterial Vaginosis. Thin, milky white discharge suggestive of bacterial vaginosis. (Photo contributor: David Effron, MD.)

Management and Disposition

For Candidal vaginitis, treat with topical antifungals (eg, clotrimazole: 1% cream, 5 g for 7 to 14 days or two 100-mg vaginal tablets for 3 nights). Oral fluconazole (150 mg as a single dose) is also effective, but has a higher risk of adverse effects.

For Trichomonas vaginitis, a single dose of metronidazole (2 g orally) is generally curative but is associated with a disulfiram-like reaction when taken with alcohol. Although metronidazole was previously considered contraindicated in pregnancy, the Centers for Disease Control and Prevention (CDC) now recommends its use due to the association of Trichomonas infections with preterm rupture of membranes, low birth weight, and increased risk of prematurity.

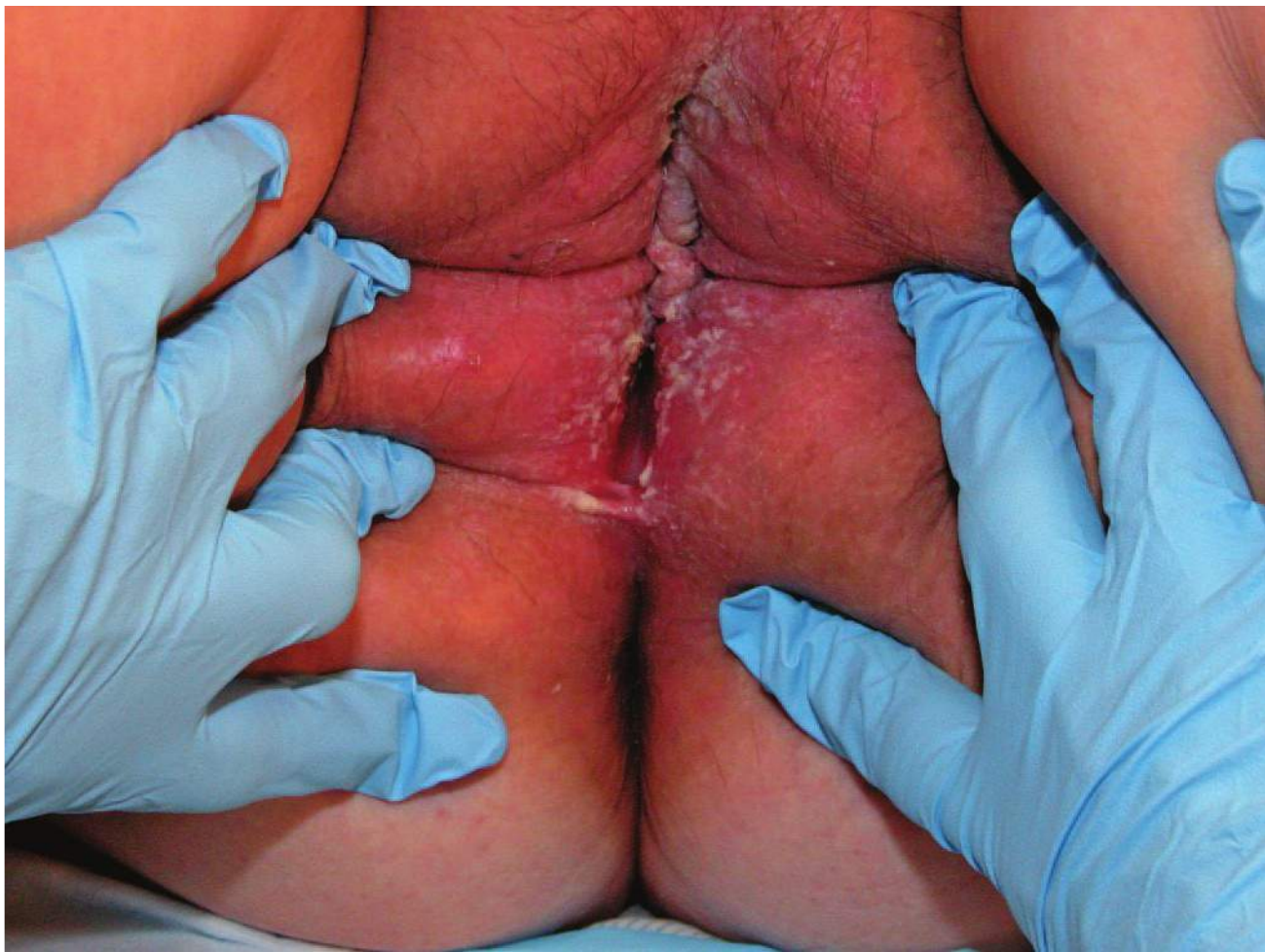


FIGURE 10.5 ■ Candida Vulvovaginitis. Intense vulvar erythema with thick white clumping discharge consistent with candida vulvovaginitis. (Photo contributor: David Effron, MD.)

For bacterial vaginosis, metronidazole (500 mg orally twice daily for 7 days) is recommended. Treatment for asymptomatic infection or for male sexual partners is not generally recommended. The equivocal risk of metronidazole teratogenicity must be weighed against the likelihood of alleviating symptoms and discomfort.

Pearls

- 1. Diabetes mellitus or immunosuppression should be considered in refractory or recurrent cases of candidal vaginitis.
- 2. A history of balanitis in the sexual partner should be sought and treated if present.
- 3. Trichomonas should be considered a sexually transmitted infection. Therefore, it is generally recommended that concomitant culturing for Neisseria gonorrhoeae and Chlamydia be performed. Serologic testing for syphilis, HIV, and hepatitis B should also be considered for patient and partner.

TABLE 10.1 ■ CHARACTERISTICS OF INFECTIOUS VAGINITIS

Disease	Discharge Qualities	Vaginal pH	Microscopic Findings
Candida spp.	White, thick, clumping	<4.5	Hyphae and spores in KOH
Trichomonas vaginitis	Green, thin, frothy, foul	>4.5	Flagellates in wet mount
Bacterial vaginosis	Thin, white, “fishy” odor in KOH	>4.5	Clue cells

Clinical Summary

Cervical polyps are friable, fleshy, fingerlike growths that emanate from the cervical os or endocervical canal. They are typically asymptomatic, but may bleed with minimal trauma such as intercourse or douching. Single polyps are more common, but multiple polyps can occur. The etiology of polyps varies and may be related to infection, chronic inflammation, or excess estrogen.

Management and Disposition

No treatment is necessary in the emergency department (ED). Consider alternative causes of vaginal bleeding such as

infection and pregnancy. Refer all patients with incidentally discovered polyps for outpatient gynecological evaluation.

Pearls

1. The majority of cervical polyps are benign, but all should be referred for ligation and histologic evaluation.
2. Cervical polyps are the most common benign neoplasm of the cervix.

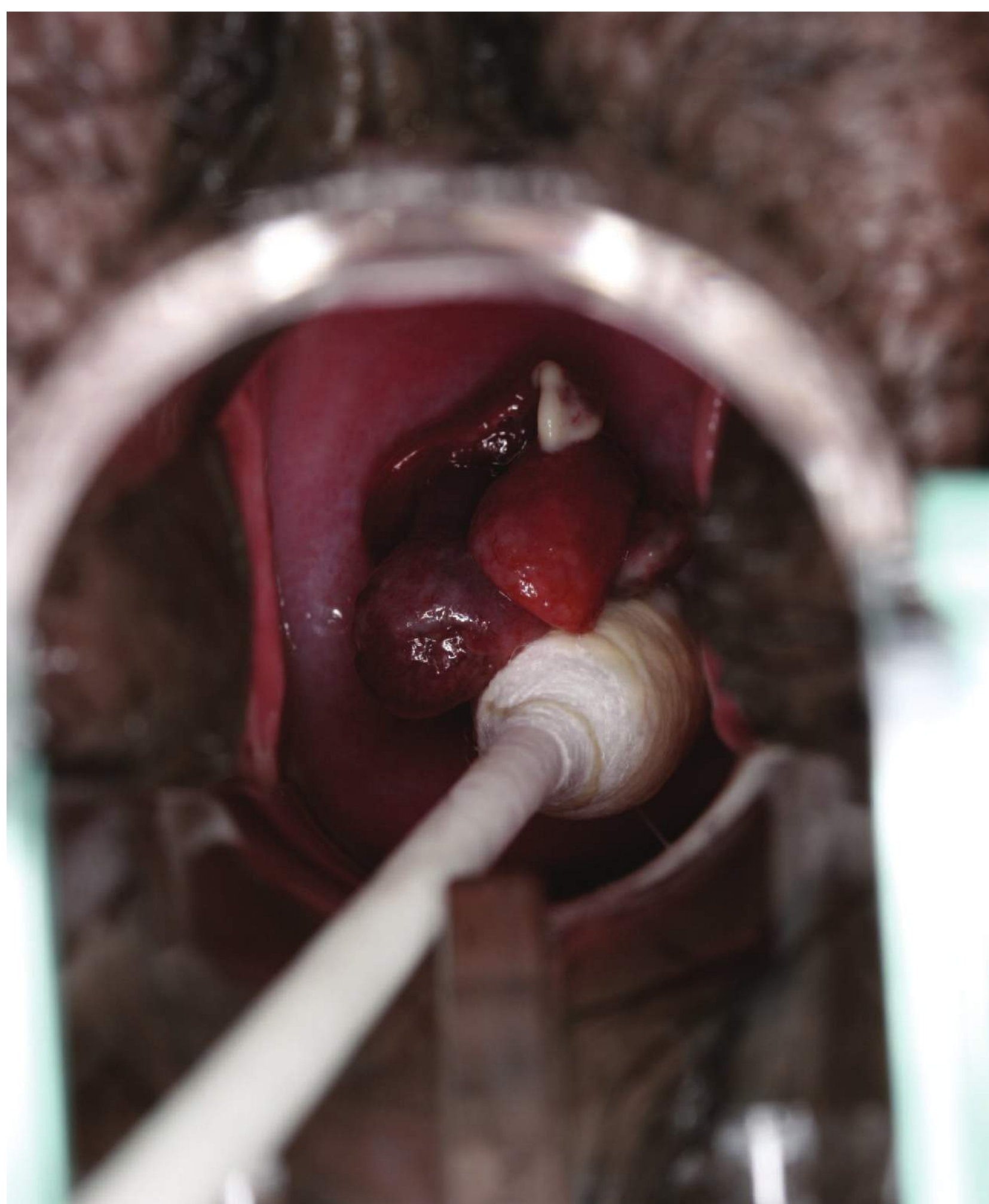


FIGURE 10.6 ■ Cervical Polyps. Several fleshy fingerlike growths are seen protruding from the cervical os. (Photo contributor: Kevin J. Knoop, MD, MS.)

Clinical Summary

Bartholin glands are located on either side of the lower third of the vaginal introitus near the labia minora. A cyst or abscess may result from an obstructed duct, often secondary to trauma or inflammation. Infection of the cyst is usually with mixed vaginal or fecal flora (*Escherichia coli*) but may also contain *N gonorrhoeae* and *Chlamydia trachomatis*. Cysts or abscesses may be asymptomatic or may lead to increasing pain, swelling, and dyspareunia. A tender, fluctuant cystic mass with surrounding labial edema is easily appreciated on examination. Differential should include epidermal inclusion cysts and sebaceous cysts of the labia majora, hidradenitis suppurativa, vulvar hematomas, leiomyomas, lipomas, and fibromas.

Management and Disposition

Simple incision and drainage followed by sitz baths is the most effective immediate treatment, but recurrence of cysts is common with this method. Placement of a Word catheter into the cyst cavity decreases the incidence of reocclusion. The catheter, however, must remain in place up to 6 weeks to ensure epithelialization.

Pearls

1. Antibiotics are usually not required.
2. Incise the internal (medial) surface of the cyst or abscess rather than the external (lateral) aspect, as the incision site may become the new drainage tract.
3. Refer recurrent abscesses to gynecologist for definitive treatment which may involve marsupialization of the gland.



FIGURE 10.7 ■ Bartholin Gland Cyst. Bartholin gland cyst that is not infected. The labia minora lies over the middle of the cyst. (Photo contributor: Hope Haefner, MD.)

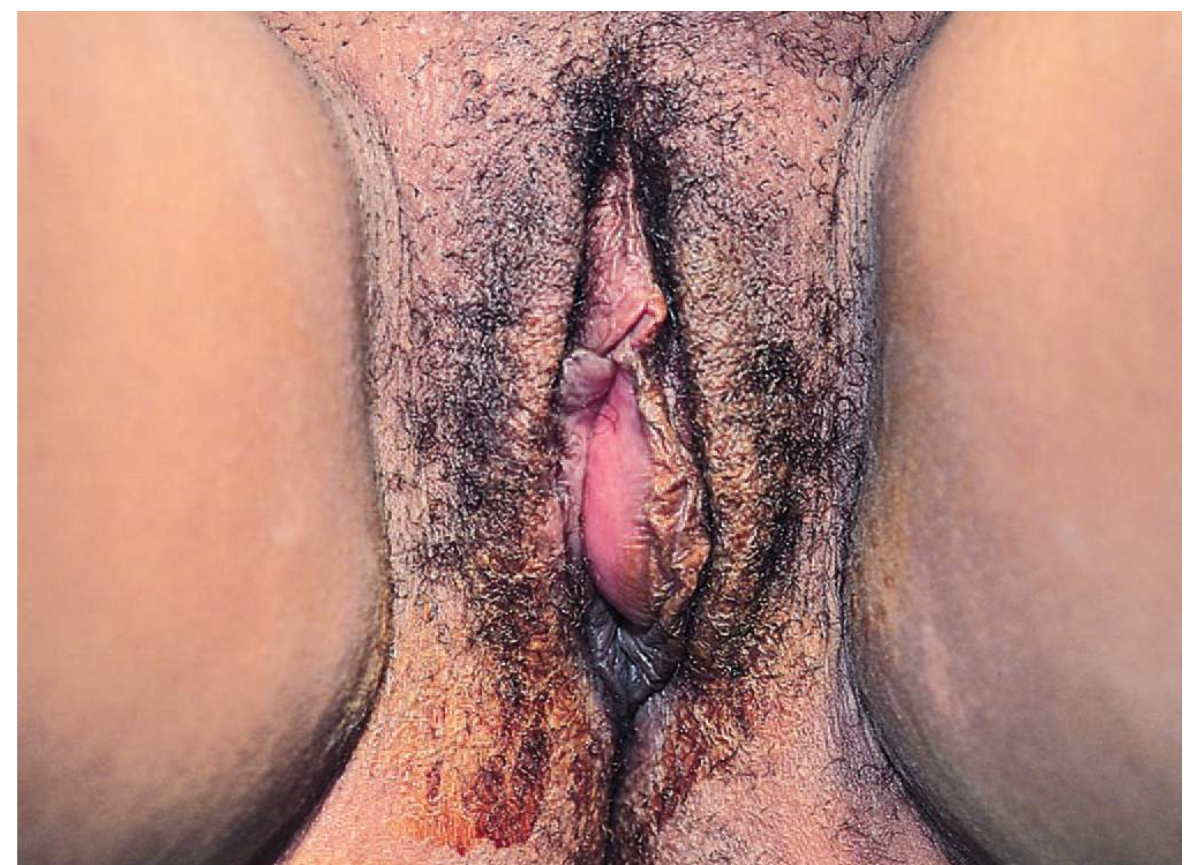


FIGURE 10.8 ■ Bartholin Gland Abscess. Bartholin gland abscess with the labial fluctuance pointing medially. (Photo contributor: Medical Photography Department, Naval Medical Center, San Diego, CA.)

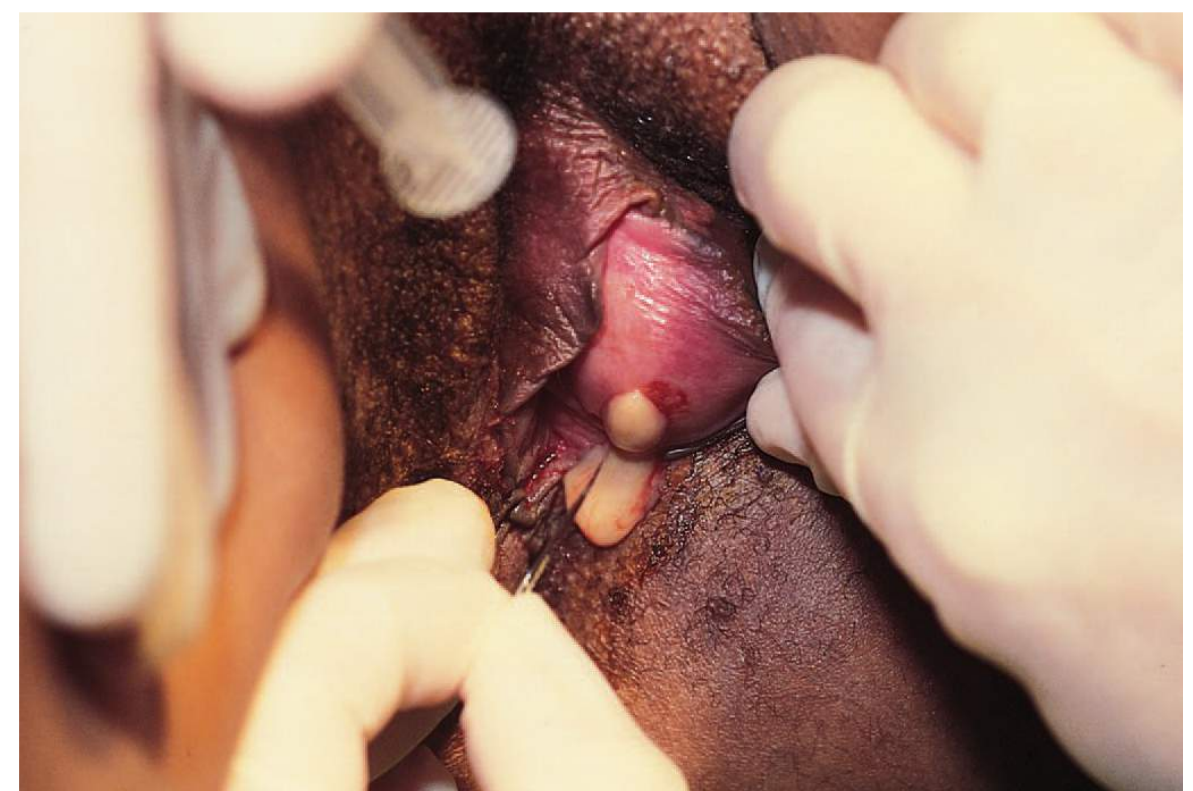


FIGURE 10.9 ■ Bartholin Gland Abscess. Medial incision of the cyst yielding purulent fluid, consistent with a Bartholin gland abscess. (Photo contributor: Medical Photography Department, Naval Medical Center, San Diego, CA.)

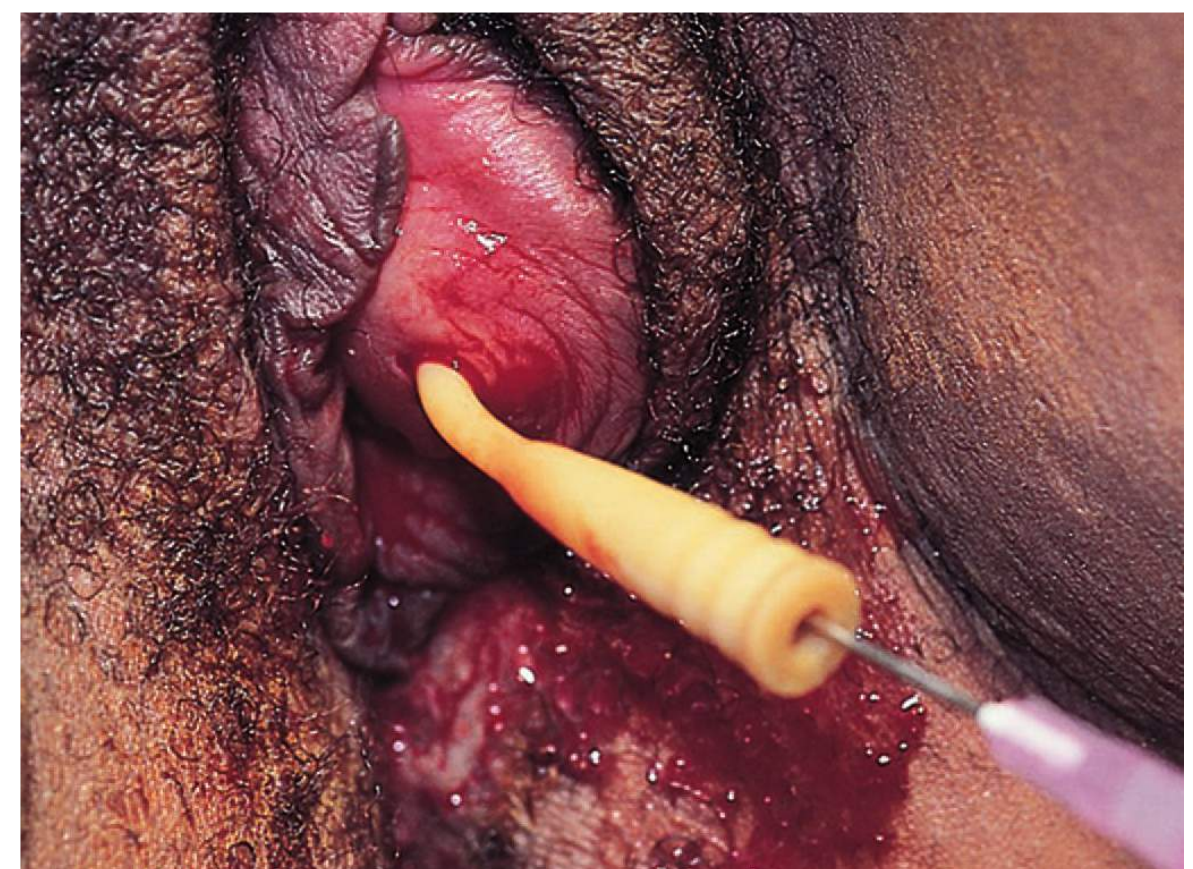


FIGURE 10.10 ■ Bartholin Gland Abscess. Insertion and inflation of a Word catheter into the cyst cavity. The free end of the catheter can be tucked into the vagina for long-term placement, allowing for epithelialization of the incision site. (Photo contributor: Medical Photography Department, Naval Medical Center, San Diego, CA.)

Clinical Summary

Spontaneous abortion is associated with vaginal bleeding and abdominal discomfort. Severe pain, heavy bleeding, passage of clots or tissue, and hypotension may also be present. Mild cramping and vaginal bleeding that are not accompanied by passage of tissue or cervical dilation constitutes a threatened abortion. Uterine cramping with progressive cervical dilation indicates an inevitable abortion. An incomplete abortion is diagnosed when some products of conception (POC) have passed, while other retained intrauterine tissue leads to ongoing symptoms. Fever, leukocytosis, pelvic tenderness, and malodorous cervical discharge suggest a septic abortion. Completed abortion is characterized by the passage of confirmed POC, followed by resolution of bleeding and closure of the cervical os. Large blood clots or intrauterine decidual casts may be mistaken for POC and their presence cannot be used to rule out ectopic pregnancy.

Management and Disposition

Immediately obtain large-bore intravenous access and institute aggressive fluid resuscitation for any patient with severe pain, heavy bleeding, or hypovolemia. Also request cross-matched blood and urgent gynecologic consultation. Stable patients can undergo routine ED evaluation with complete blood count (CBC), human chorionic gonadotrophin (hCG), pelvic exam, and ultrasound (US). Send all identified tissue to pathology for definitive identification. Ectopic pregnancy must be ruled out by US, close clinical follow-up, and serial hCG testing.

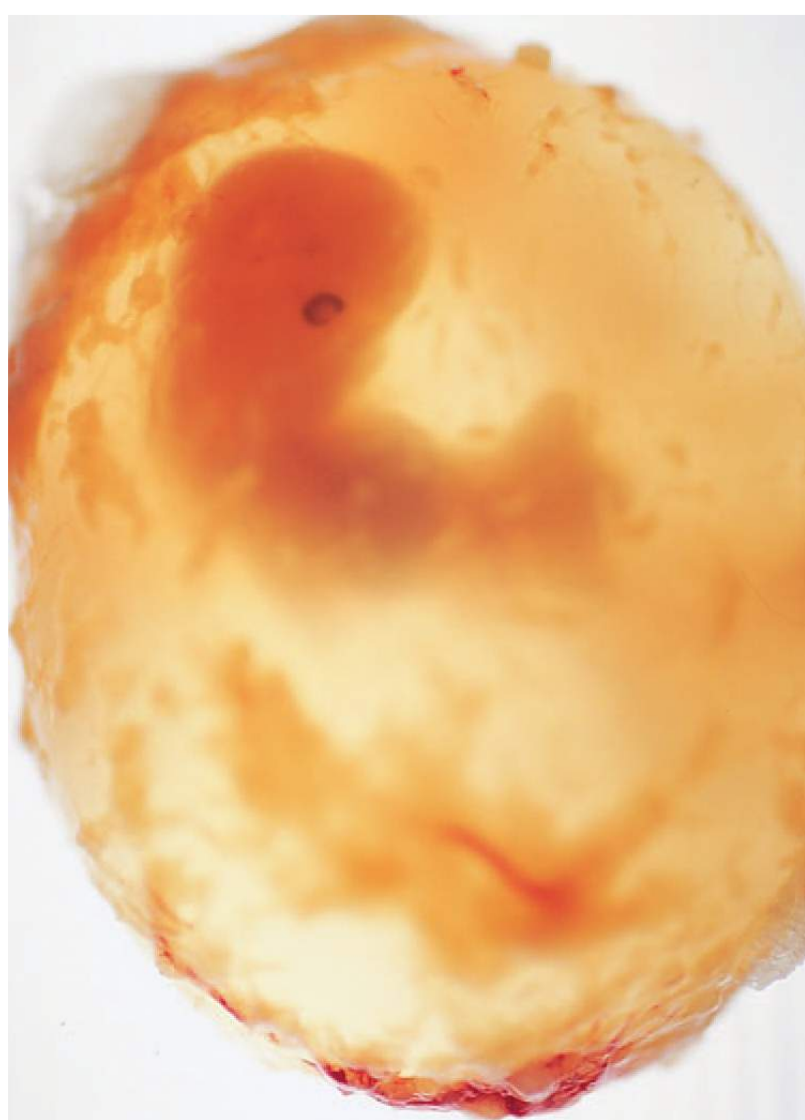


FIGURE 10.11 ■ Spontaneous Abortion. Passage of tissue in a spontaneous abortion at 4 weeks. (Photo contributor: Lawrence B. Stack, MD.)

Administer anti-Rh immunoglobulin (RhoGAM) in all cases of vaginal bleeding where the mother is Rh-negative.

Pearls

1. The passage of large clots usually indicates rapid heavy bleeding.
2. Heterotopic pregnancy is rare, but should be considered in patients with significant ongoing symptoms despite identification of a viable early intrauterine pregnancy (IUP).
3. Septic abortion may extend to the surrounding tissues or blood, with the potential for septic shock, ARDS, DIC, and group A strep induced toxic shock syndrome.

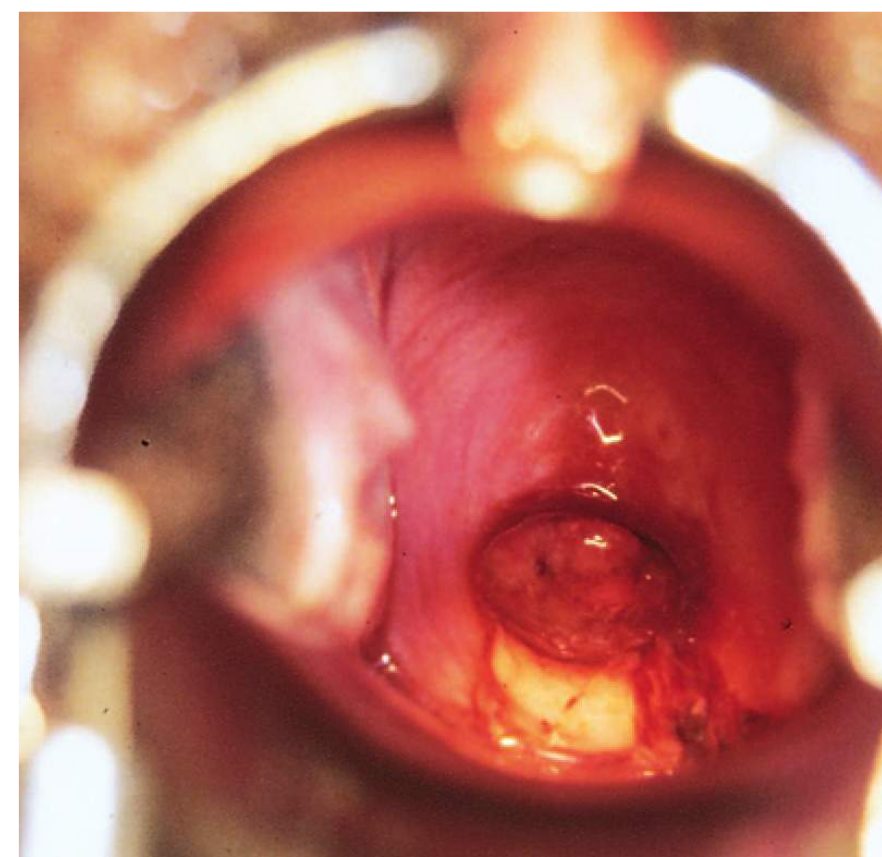


FIGURE 10.12 ■ Spontaneous Abortion. Dilation of the cervical os with partial extrusion of tissue in the setting of an inevitable abortion. (Photo contributor: Robert Buckley, MD.)



FIGURE 10.13 ■ Decidual Cast. A decidual cast or organized clot may occasionally be mistaken for products of conception. (Photo contributor: Medical Photography Department, Naval Medical Center, San Diego, CA.)

Clinical Summary

In cases of sexual assault, immediate care for the acute medical and psychosocial needs of the patient must happen in concert with forensic and legal requirements. Ideally, this care is provided by a specially trained sexual assault examiner. Regardless of who performs the examination, the provider must be very thorough in collecting and preserving all potential evidence and carefully documenting any physical findings. Chain of custody must be established and maintained for all samples collected in order for them to be used in later legal proceedings. Meticulous inspection of the genital structures in addition to a thorough general physical examination may reveal injuries to the perineum, rectum, vaginal fornices, vagina, and cervix as well as associated injuries to other areas of the body. Toluidine staining and colposcopy are useful in

enhancing less apparent injuries such as those to the posterior fourchette and perianal area. Tears to the posterior fourchette are most commonly found in the distribution between the 3- and 9-o'clock positions when the patient is examined in dorsal lithotomy. Perianal lacerations are more evident with toluidine staining and appear as linear tears. Perineal injuries from accidental trauma may be indistinguishable from those of sexual assault and should be interpreted in the context of the history.

Management and Disposition

Treatment other than pain relief is preceded by forensic evidence gathering, consisting of a Wood lamp examination to identify semen for collection, pubic hair sampling and combing, vaginal and cervical smears (air-dried), a cervical and

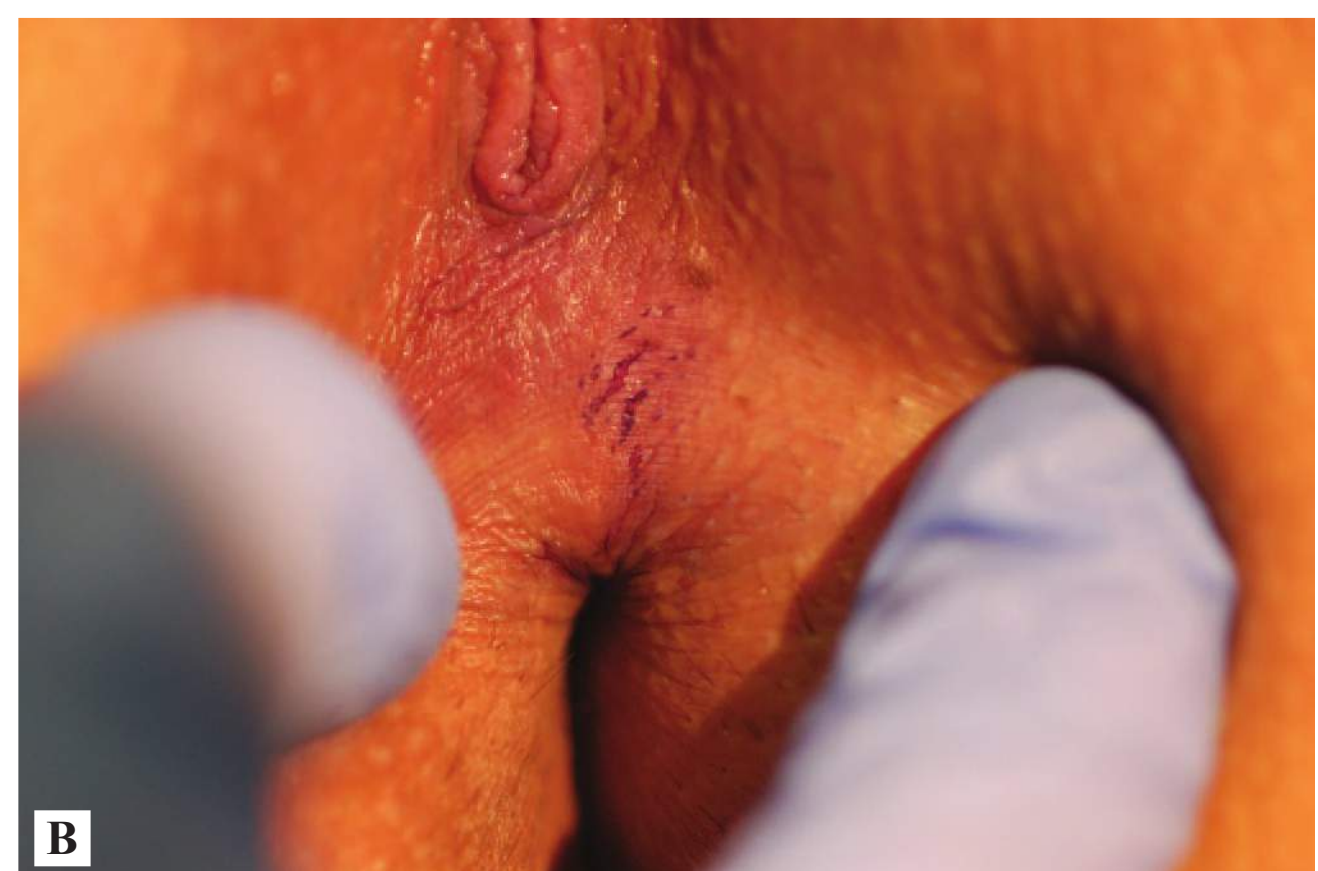
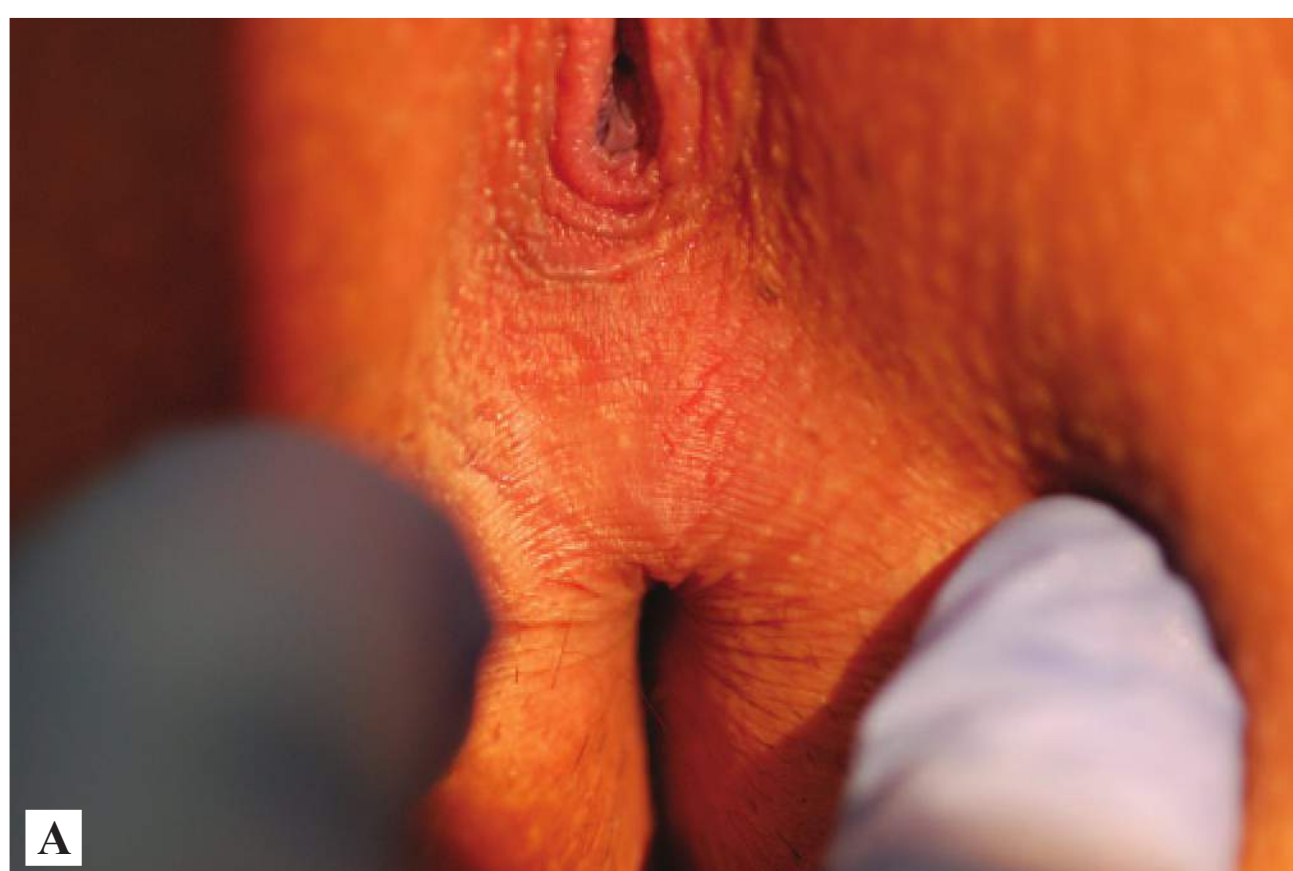


FIGURE 10.14 ■ Genital Trauma (Posterior Fourchette). (A) Linear tears of the posterior fourchette consistent with sexual assault. (B) Findings enhanced by toluidine blue staining. (Photo contributors: Hillary J. Larkin, PA-C, and Josua Luftig, PA-C.)



FIGURE 10.15 ■ Genital Trauma (Posterior Fourchette). (A) Linear midline tear of posterior fourchette. (B) Findings enhanced by toluidine blue staining. (Photo contributors: Hillary J. Larkin, PA-C, and Josua Luftig, PA-C.)

vaginal wet mount to identify sperm, vaginal aspirate to test for acid phosphatase, and rectal or buccal swabs for sperm. A prepackaged kit with directions may be available to facilitate the collection of evidence. Consult your state's laws for requirements.

Obtain cervical cultures for Chlamydia and N gonorrhoeae as well as serum testing for syphilis, hepatitis, and HIV. Provide empiric antibiotic coverage against sexually transmitted diseases and offer an oral contraceptive to prevent unwanted pregnancy after confirming a nonpregnant state.

Pearls

1. Victims of sexual assault may initially be reluctant to disclose their history and often present with an unrelated chief complaint. A thorough sexual history is necessary in order to properly identify and treat them.
2. The medical care of the patient who has been sexually assaulted is ideally performed by experienced supportive staff familiar with the details of forensic evidence gathering and colposcopic photography.
3. Normal physical examination and lack of sperm on wet preparation do not exclude the possibility of assault.

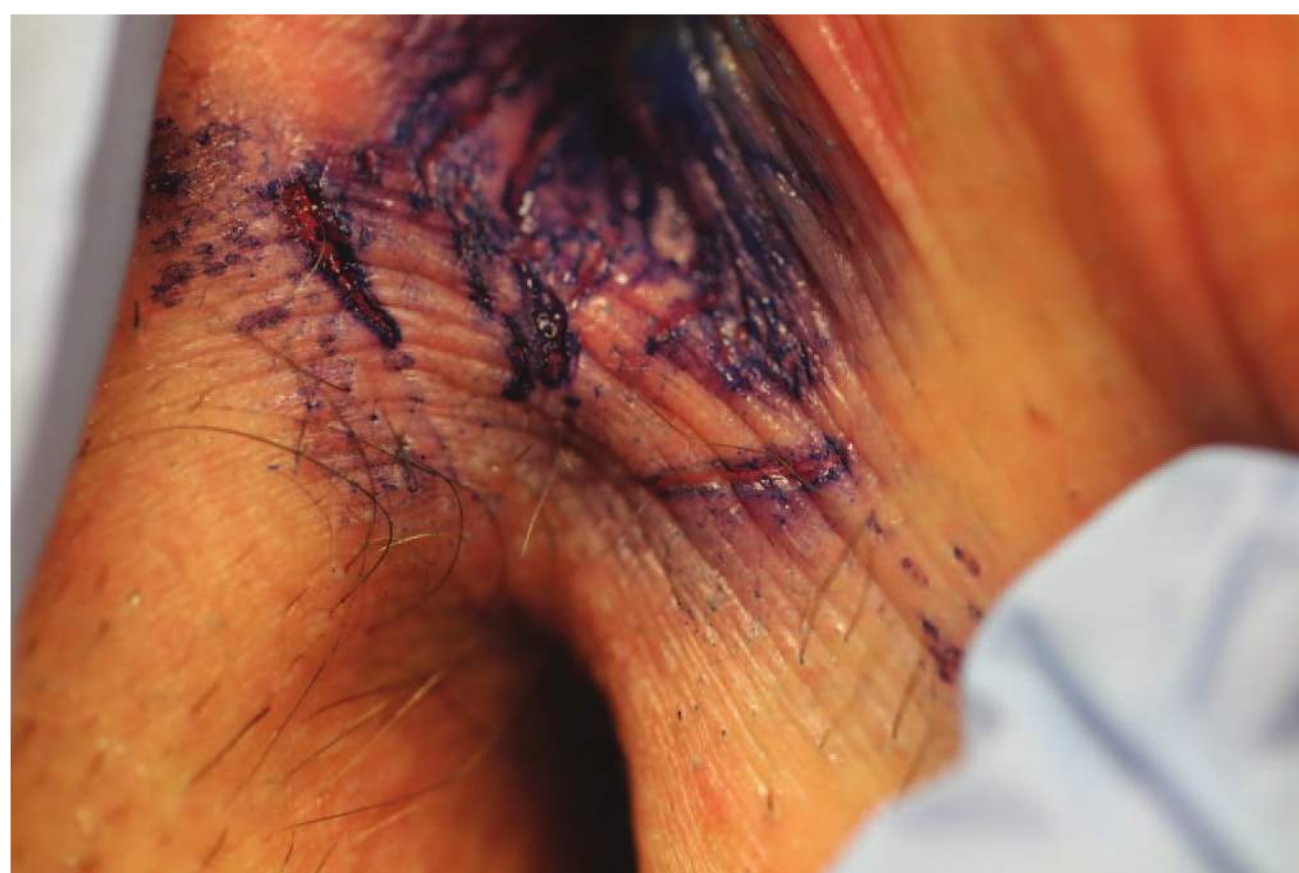


FIGURE 10.16 ■ Genital Trauma (Posterior Fourchette and Perineum). Multiple linear tears of posterior fourchette and perineum enhanced with toluidine blue stain. (Photo contributors: Hillary J. Larkin, PA-C, and Josua Luftig, PA-C.)



FIGURE 10.17 ■ Genital Trauma (Cervix). Cervical trauma in an elderly victim of sexual assault. Petechiae and freshly bleeding abrasions are noted from 10- to 3-o'clock position. (Photo contributors: Hillary J. Larkin, PA-C, and Lauri A. Paolinetti, PA-C.)

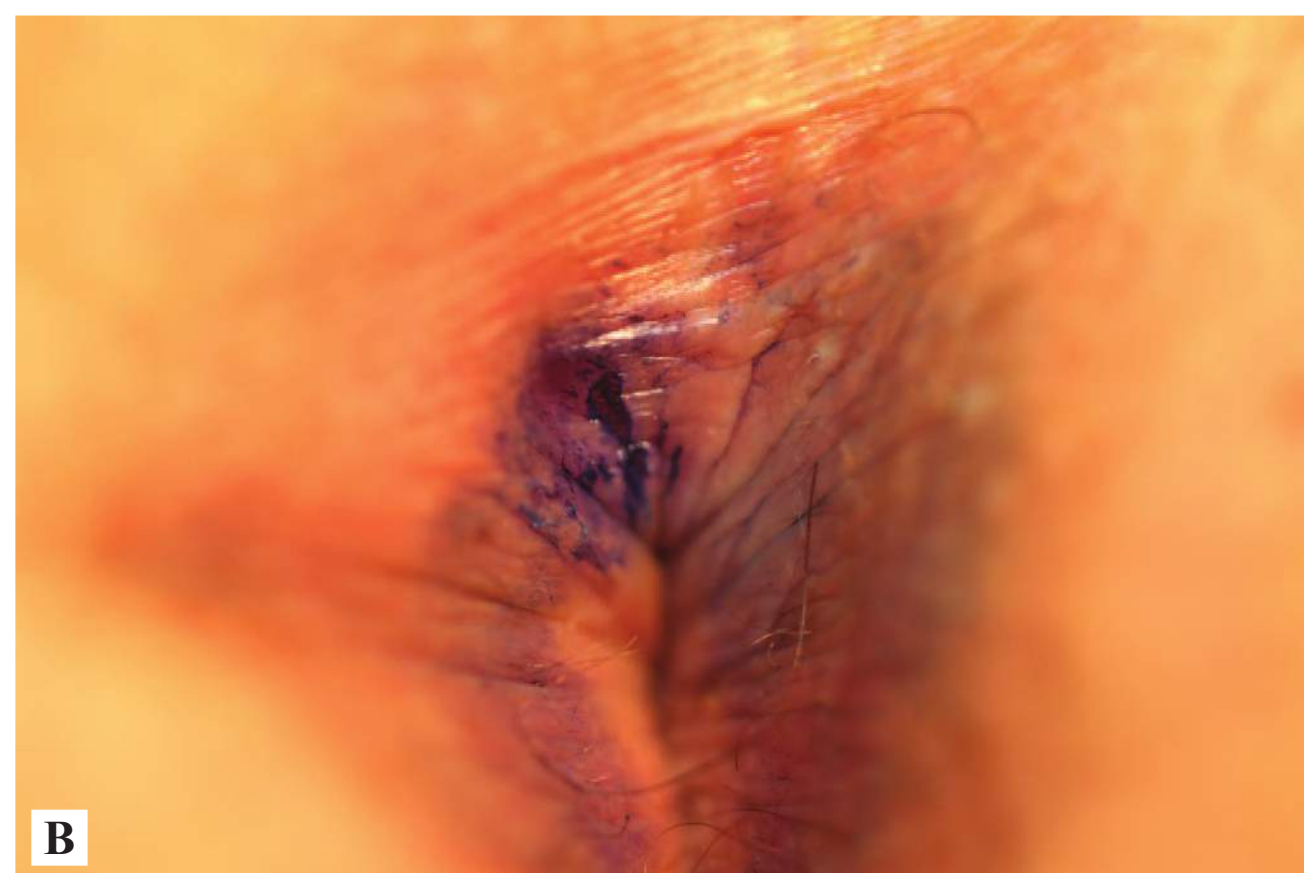
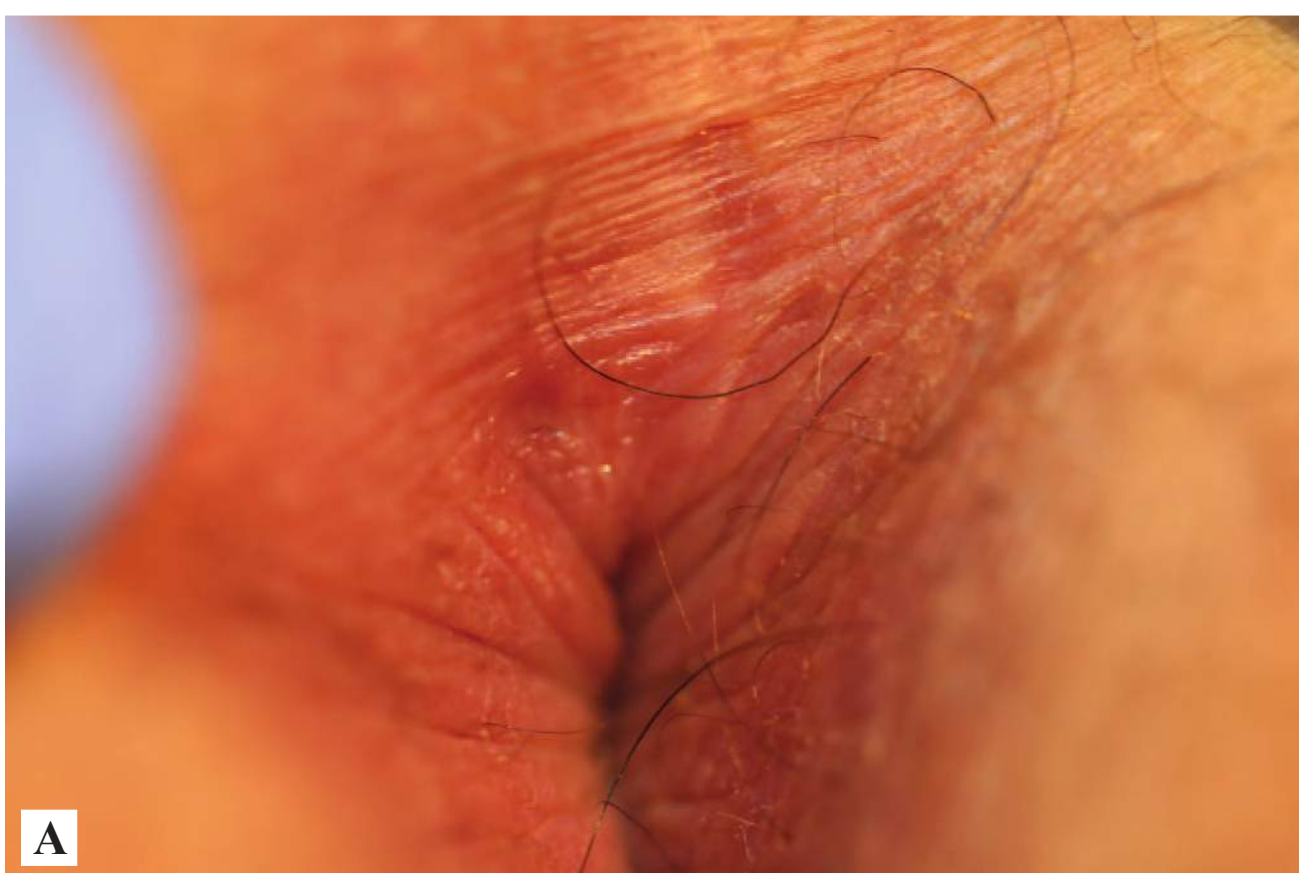


FIGURE 10.18 ■ Anal Trauma (Perianal, Toluidine Blue). Multiple perianal tears without toluidine blue stain (**A**) and with stain (**B**). Note specific stain uptake enhancing two tears at 11-o'clock position in contrast to nonspecific uptake elsewhere. (Photo contributors: Hillary J. Larkin, PA-C, and Josua Luftig, PA-C.)

Clinical Summary

Lichen sclerosus (LS) is a benign, chronic, inflammatory condition that results in epithelial atrophy or hyperplasia, and scarring. The condition typically occurs in the anogenital region (85-98%), but can develop on any skin surface. Women are affected 10 times more often than men and onset is often perimenopausal. The etiology is unknown, but it is seen more commonly in individuals with autoimmune conditions such as diabetes mellitus type 1, vitiligo, and thyroid disorders in women in a low estrogen state, suggesting that these may be contributing factors.

Patients may be asymptomatic or may have intense pruritis and pain in the affected areas. Other symptoms may include bleeding, dyspareunia, or dysuria. Lesions appear as white, atrophic papules and patches and most often affect the labia minora and/or labia majora. Excoriations may be present and scratching may lead to secondary lichenification (thickening of the epidermis with exaggeration of normal skin lines). As the disease progresses, scarring may lead to loss of the vulvar architecture with fusion of the labia. The vagina and cervix are not involved. Extragenital lesions may occur on the thighs, breasts, wrists, shoulders, neck, and, rarely, the oral cavity. These lesions also consist of white papules or plaques and are not as pruritic as genital lesions.

Management and Disposition

No treatment is necessary. Potent topical steroids, hormonal treatments, and/or immunosuppressants may benefit.



FIGURE 10.19 ■ Lichen Sclerosus. Early lichen sclerosus appearing as white, atrophic papules and patches of the labia minora and labia majora. (Photo contributor: Hope Haefner, MD.)

Advise patients on good vulvar hygiene cessation of scratching to prevent secondary infections. Consider oral antihistamines for pruritis. Refer patients for outpatient gynecological evaluation. Definitive diagnosis is made by biopsy.

Pearls

1. LS is associated with an increased risk of vulvar squamous cell cancer. Refer all patients for biopsy and histologic evaluation.
2. Although LS is not an infectious condition, the presence of open excoriations and fissures can increase risk of acquiring sexually transmitted infections.

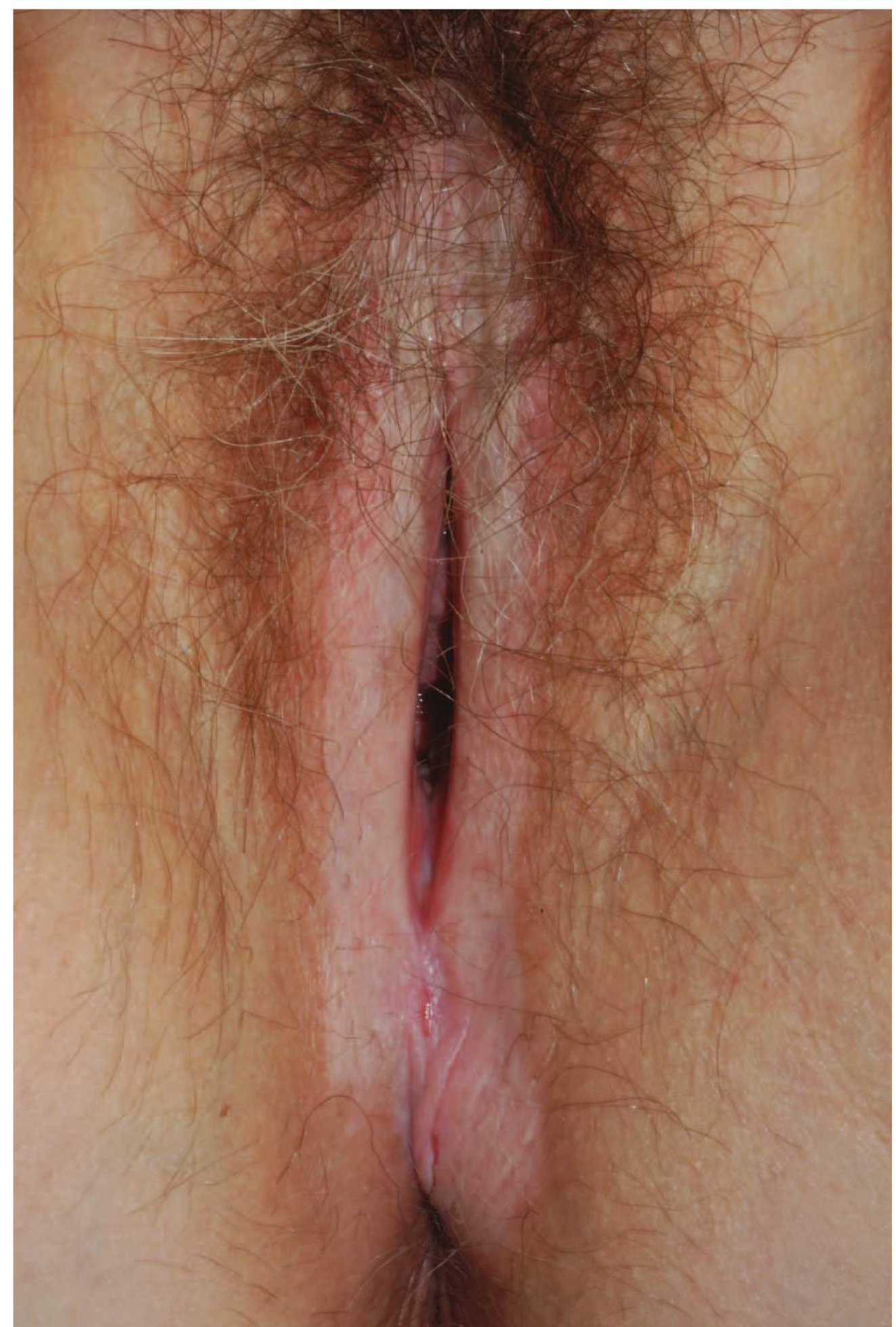


FIGURE 10.20 ■ Lichen Sclerosus—Chronic. Atrophy and scarring of chronic lichen sclerosus with early fusion of the anterior labia. (Photo contributor: Hope Haefner, MD.)



FIGURE 10.21 ■ Lichen Sclerosus—Advanced. Extensive fusion of the labia minora in advanced lichen sclerosus over the vaginal opening. (Photo contributor: Hope Haefner, MD.)

Clinical Summary

Lichen planus is a chronic inflammatory condition that can affect any area of skin, mucosa, nails, and scalp. Vulvar involvement is found in 50% of women with lichen planus. The etiology is unknown, but may be autoimmune as the disorder is often associated with other autoimmune diseases.

Affected women may complain of intense vulvar pruritus, pain, and/or dysuria. Vaginal involvement is seen in 70% of cases and may cause vaginal discharge, dyspareunia, and occasionally postcoital bleeding. Coexisting oral or other cutaneous lesions are common. On examination, vulvar lichen planus is characterized by glassy, erosive, or papular lesions. Desquamation may be present. Recurrent lesions may lead to extensive scarring with resultant loss of the vulvar architecture including stenosis of the vaginal introitus and urethral obstruction.

Lichenoid drug eruptions can be clinically indistinguishable from lichen planus. Use of specific medications including β -blockers, methyldopa, penicillamine, quinidine, nonsteroidal anti-inflammatory drugs (NSAIDs), angiotensin-converting-enzyme (ACE) inhibitors, sulfonylurea agents, carbamazepine, gold, lithium, quinidine,

or hydrochlorothiazide (HCTZ) has been associated with lichenoid drug eruptions.

Management and Disposition

No treatment is necessary in the ED. Potent topical steroids are first-line treatment. Sitz baths may help alleviate symptoms. Advise patients on good vulvar hygiene including cessation of scratching to prevent secondary infections. Consider oral antihistamines for pruritis. Discontinue any medications that may be associated with a lichenoid drug eruption. Refer all patients for outpatient gynecological evaluation. Definitive diagnosis is made by biopsy.

Pearls

1. HCTZ and NSAIDs are common triggers for recurrent lichen planus. Discontinuation of these medications may improve symptoms.
2. Lichen planus does not involve the perianal region.

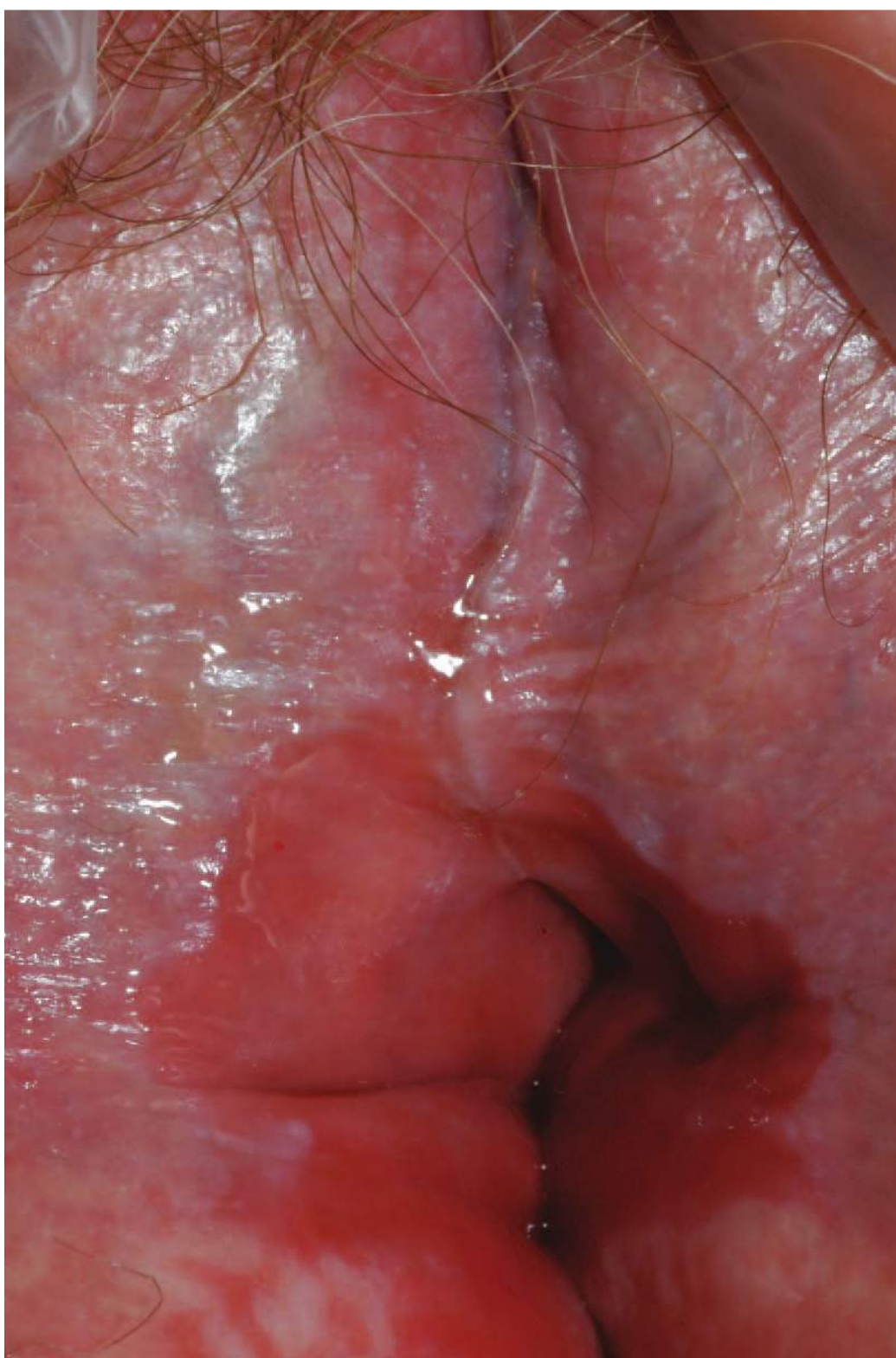


FIGURE 10.22 ■ Erosive Lichen Planus. Glassy erosive lesions of lichen planus with “lichenification,” or thickening of the epidermis, in peripheral areas. (Photo contributor: Hope Haefner, MD.)



FIGURE 10.23 ■ Erosive Lichen Planus. Glassy erosive lesions of lichen planus. (Photo contributor: Hope Haefner, MD.)



FIGURE 10.24 ■ Erosive Lichen Planus—Oral. Lichen planus can affect any area of skin, mucosa, nails, and scalp. (Photo contributor: Hope Haefner, MD.)

Clinical Summary

Vulvar cancer accounts for 5% of gynecological malignancies and occurs most commonly in postmenopausal women. Many vulvar neoplasms are asymptomatic and are discovered incidentally during gynecologic examination. Patients with symptoms most commonly complain of vulvar pruritis. They may also have noticed a vulvar mass. In advanced cases, vulvar bleeding or discharge, dysuria, or inguinal lymphadenopathy may be present. On examination, there may be a single lesion, most commonly on the labia majora, that appears as a plaque, ulcer, or mass (fleshy, nodular, or warty). The labia minora, perineum, clitoris, and mons are less frequently involved and less than 5% of cases have multifocal lesions.

Squamous cell carcinomas account for 90% of vulvar cancers, while melanoma is the second most common type. Smoking, chronic inflammatory conditions such as LS, and infection with HPV 16, 18, or 33 are risk factors for vulvar cancer.

Management and Disposition

No treatment is necessary in the ED. Refer all patients with suspicious vulvar lesions for outpatient gynecological evaluation. Definitive diagnosis is made by biopsy.

Pearl

1. Coexisting cervical neoplasia are found in more than 20% of patients with a vulvar malignancy.



FIGURE 10.25 ■ Squamous Cell Carcinoma—Vulvar. Lichen sclerosus, seen surrounding the erythematous squamous cell carcinoma, is a risk factor for this neoplasm. (Photo contributor: Hope Haefner, MD.)



FIGURE 10.26 ■ Squamous Cell Carcinoma—Vulvar. Vulvar neoplasms may be asymptomatic and identified incidentally during examination for other complaints. (Photo contributor: Hope Haefner, MD.)

Clinical Summary

Urethral prolapse is a rare condition presenting as a protrusion of the distal urethra through the distal meatus, typically seen as a donut-shaped mass at the anterior vaginal wall. It occurs most commonly in prepubertal black females and postmenopausal white women. Presenting signs (vaginal bleeding and urinary complaints) are uncommon in children but common in the postmenopausal woman. Diagnosis is made when the central opening in the prolapsed tissue is confirmed as the urethral meatus. Urethral catheterization may be required if direct observation during voiding is not possible. A large mucosa prolapse may become strangulated, resulting in pain, bleeding, and urinary symptoms.

Management and Disposition

Confirm the diagnosis and rule out urinary tract infection. Consult urology emergently for urethral strangulation. Medical therapy consists of sitz baths and topical estrogen cream applied two to three times to the urethra for 2 weeks. Surgical therapy is reserved for strangulation or failed medical therapy. Refer all patients with confirmed or suspected urethral prolapse to a urologist for follow-up as urethral masses may be misdiagnosed as urethral prolapse.



FIGURE 10.27 ■ Urethral Prolapse. Note the protrusion of the distal urethra, seen as a donut-shaped mass at the anterior vaginal wall. (Photo contributor: Lawrence B. Stack, MD.)

Pearls

1. Urethral prolapse is often associated with urinary tract infection.
2. Topical estrogen cream may be contraindicated in patients with a history of breast cancer.
3. Urethral prolapse in children may be mistaken for sexual abuse (see Chapter 15).



FIGURE 10.28 ■ Urethral Prolapse. Protrusion of the distal urethra is seen as a donut-shaped mass just superior to the vaginal introitus in a patient complaining of “vaginal bleeding.” (Photo contributor: Lawrence B. Stack, MD.)

Clinical Summary

Uterine prolapse is defined as the extrusion of the uterus through the pelvic floor or vaginal introitus. Prolapse is caused by weakened pelvic floor muscles and is common in older, multigravid women. Degrees of prolapse are identified by level of descent of uterine tissues. In first-degree prolapse, the cervix descends into the lower third of the vagina, while in second-degree the cervix usually protrudes through the introitus. Third-degree prolapse, or procidentia, is characterized by externalization of the entire uterus with eversion of the vagina. Symptoms include a sensation of inguinal traction, low back pain, urinary incontinence, and the presence of a vaginal mass. Uterine prolapse can occasionally be confused with a cystocele (discussed below), enterocele, or soft tissue tumor.

Management and Disposition

Refer patients with first- or second-degree prolapse to a gynecologist for pessary placement or surgical correction. With procidentia, manually reduce the uterus into the vaginal vault, place the patient on complete bed rest, and obtain urgent gynecologic consultation.

Pearls

1. With procidentia, the exposed uterus is prone to abrasion and possible secondary infection.
2. Prolapse, cystocele, and enterocele can often be enhanced or reproduced by having the patient perform a Valsalva maneuver.



FIGURE 10.29 ■ Third-Degree Uterine Prolapse. Note the protrusion of the entire uterus with the cervix visible through the vaginal introitus. (Photo contributor: Lawrence B. Stack, MD.)

Clinical Summary

A cystocele is a herniation of the posterior bladder wall and trigone through the anterior wall of the vagina caused by weakening of the pelvic floor during childbirth. Patients complain of vaginal bulging or fullness that is worsened with Valsalva and improved with recumbency. Cystoceles are often associated with urinary incontinence and incomplete emptying of the bladder. Rectoceles, uterine prolapse, and soft tissue tumors should also be considered.

Management and Disposition

Generally, ED care consists of reassurance and outpatient referral to a gynecologist for further evaluation and treatment. Advise the patient to avoid heavy lifting or straining. Definitive treatment for larger cystoceles or those associated with significant urinary symptoms, pain, or bothersome bulging may require pessary placement or surgery.

Pearl

1. Most cystoceles are asymptomatic and are detected incidentally at the time of pelvic examination.



FIGURE 10.30 ■ Cystocele. Cystocele with bulging of the posterior bladder wall into the vagina. (Photo contributor: Matthew Backer, Jr., MD.)



FIGURE 10.31 ■ Cystocele. Cystocele worsening with Valsalva. (Photo contributor: Matthew Backer, Jr., MD.)

Clinical Summary

A rectocele is the herniation of the rectum through the posterior vaginal wall. Most small rectoceles are completely asymptomatic, though symptoms of introital bulging, constipation, and incomplete rectal evacuation may occur. Bulging of the posterior vaginal wall through the introitus may be seen grossly on physical examination and will be enhanced with Valsalva. Vaginal examination reveals a thin-walled protrusion of the rectovaginal septum into the lower part of the vagina.

Management and Disposition

Supportive measures with hydration, laxatives, and stool softeners are generally all that is needed to relieve the patient's symptoms. Refer patients with large or symptomatic rectoceles to a gynecologist for possible surgical repair.



FIGURE 10.32 ■ Rectocele. This is characterized by bulging of the posterior vaginal wall at the introitus. (Photo contributor: Matthew Backer, Jr., MD.)

Pearl

1. Patients may complain of the need for manual reduction of the rectocele when defecating.

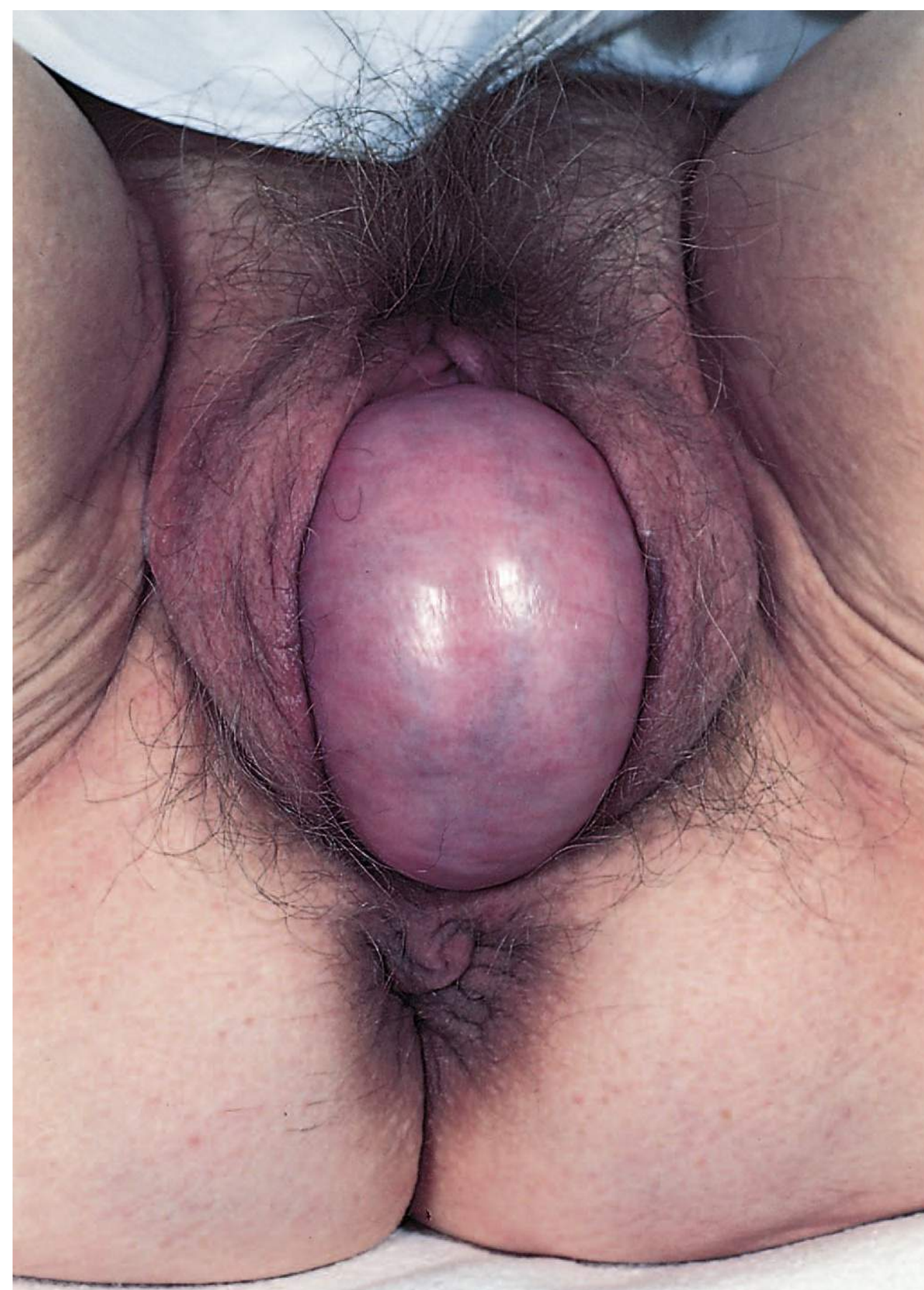


FIGURE 10.33 ■ Rectocele. Worsening of the rectocele with Valsalva. (Photo contributor: Matthew Backer, Jr., MD.)

Clinical Summary

The hymen is a membrane visible at the vaginal introitus that separates the vestibule externally from the vagina internally. Normally there is an opening in the hymen that allows for the passage of fluids. The congenital absence of a hymenal orifice is called an imperforate hymen. This condition may present in infants or young children as a smooth, glistening, membrane protruding from the introitus due to the buildup of vaginal secretions known as a mucocolpos. More commonly, it becomes evident in adolescent girls when it may present as a hematocolpos. Hematocolpos is due to the accumulation of menstrual blood and secretions behind the hymen which on physical examination is evident as a smooth, dome-shaped, bluish-red bulging membrane at the introitus. A large, smooth, cystic mass can often be palpated anteriorly on digital rectal examination. The fluid collection can become large enough to cause urinary retention by compressing the

bladder neck. Occasionally the accumulated blood may spill over through the fallopian tubes into the peritoneal cavity, resulting in free pelvic fluid and signs of peritonitis.

Management and Disposition

Imperforate hymen as well as other abnormalities of the vaginal outlet should be referred to a gynecologist for definitive treatment. This includes incision of the hymen to allow drainage of the hematocolpos. Those instances detected in pre-adolescence should ideally be referred to a practitioner who specializes in pediatric cases.

Pearl

1. An imperforate hymen commonly presents in adolescent girls with primary amenorrhea and recurrent abdominal pain.



FIGURE 10.34 ■ Imperforate Hymen. A bulging mass at the introitus is seen in this patient with abdominal distention and amenorrhea. The imperforate hymen was diagnosed, with subsequent incision and drainage of the hematocolpos. (Photo contributor: Mark Eich, MD.)

Clinical Summary

Ectopic pregnancy is the leading cause of first-trimester maternal obstetric morbidity. Presentations commonly include mild vaginal bleeding and lower abdominal pain, but patients can present in shock secondary to massive hemorrhage. Menstrual history may reveal a missed or recent abnormal menses. Pelvic examination may be normal or may include frank cervical motion tenderness or adnexal tenderness. Ectopic pregnancy is more common in women with a history of pelvic inflammatory disease or other causes of fallopian tube scarring.

The visualization of an IUP by US essentially excludes the diagnosis of ectopic pregnancy, the exception being a rare heterotopic pregnancy (both intrauterine and ectopic). The appearance of a gestational sac (GS) at about 5 weeks is the first significant finding on US suggestive of an IUP; however, definitive diagnosis of IUP should be deferred until a yolk sac is present. A fetal pole develops next and can be seen on part of the yolk sac. The double decidual sac sign is evidence of a true GS and should be differentiated from the single pseudogestational sac formed from a decidual cast in ectopic pregnancy. When no GS is visualized (“empty uterus”), ectopic pregnancy cannot be distinguished from an early IUP or from recently completed spontaneous abortion. Free fluid on US

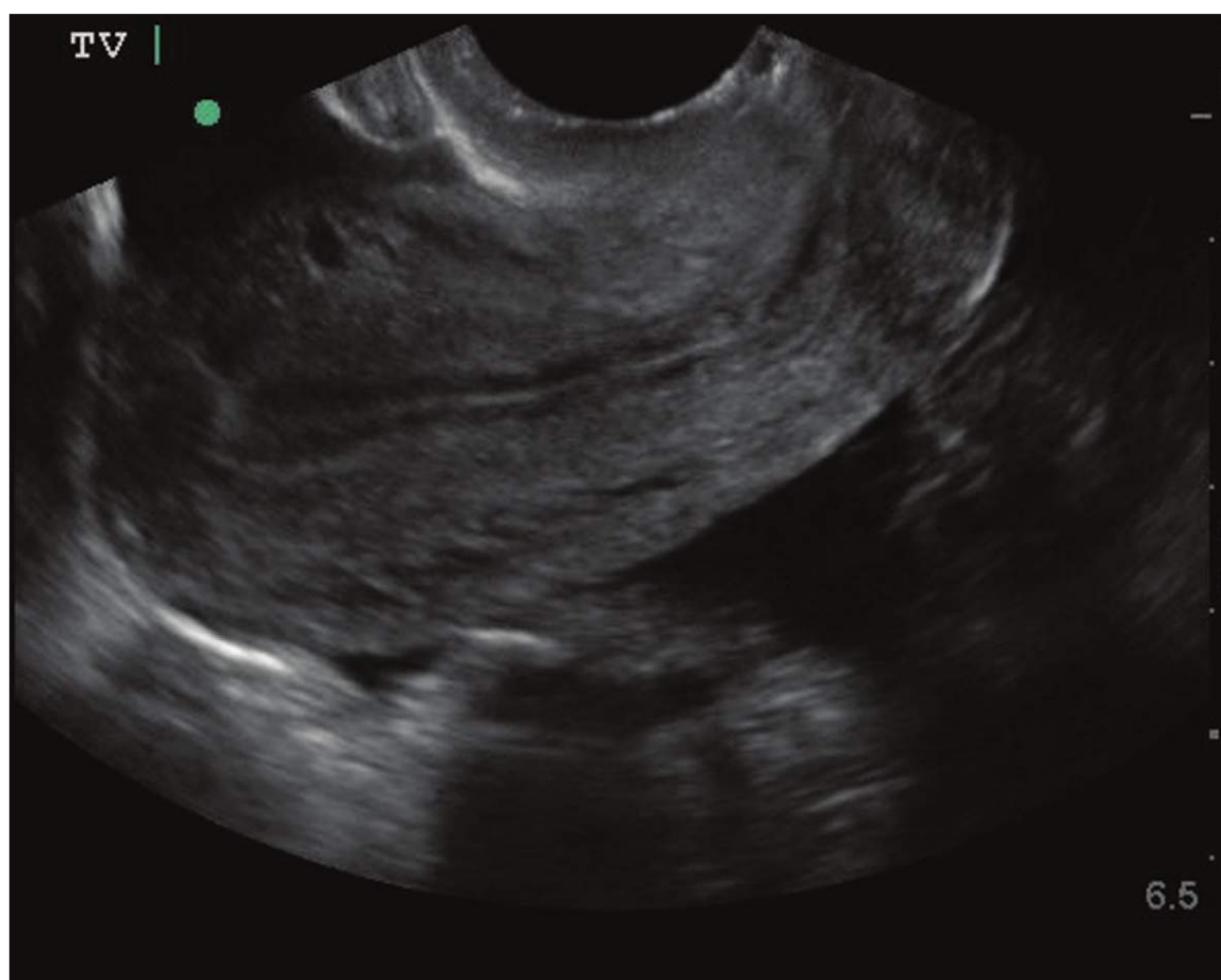


FIGURE 10.35 ■ Empty Uterus. Free fluid seen in the pelvis in this patient with an empty uterus is concerning if ectopic pregnancy is suspected. Ectopic pregnancy should be strongly suspected if a transvaginal ultrasound reveals an empty uterus in the setting of a serum quantitative hCG level above the institution’s discriminatory zone. (Photo contributor: Lauren Oliveira, DO.)

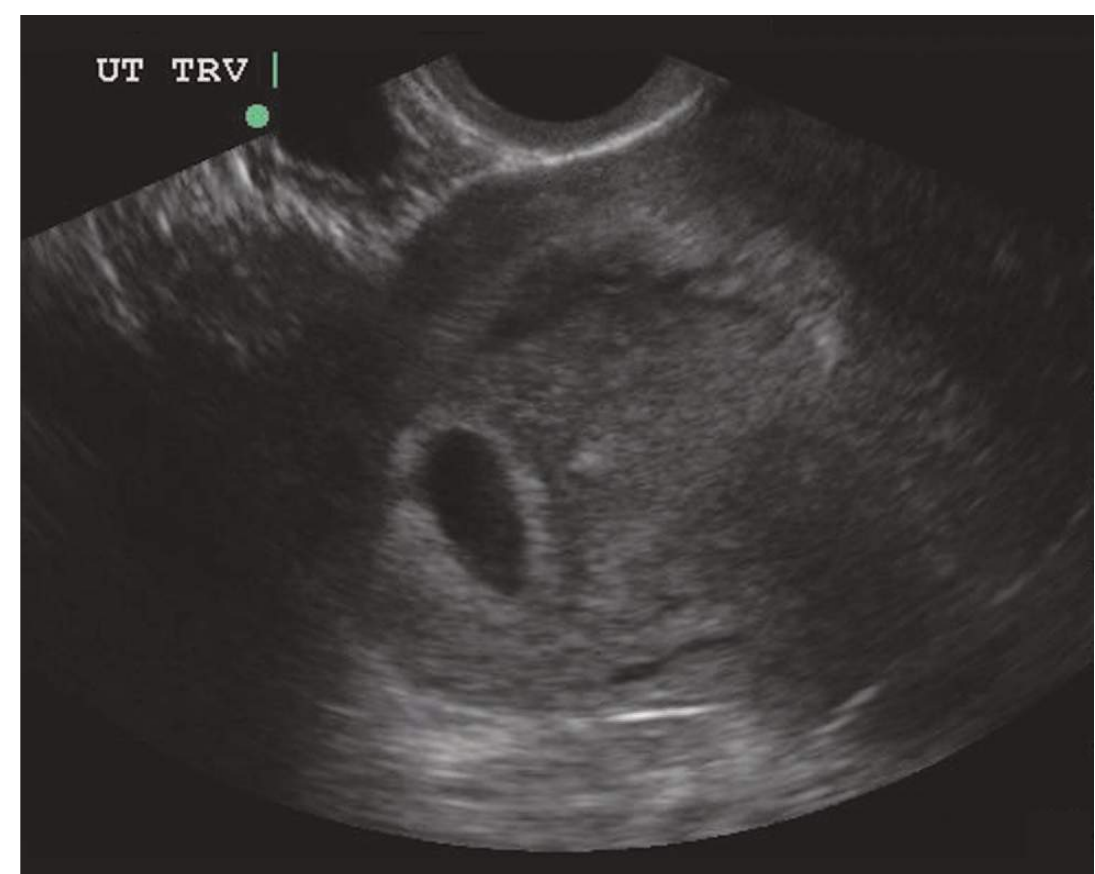


FIGURE 10.36 ■ Intrauterine Gestational Sac. Discrete ring of an intrauterine gestational sac seen on transvaginal ultrasound. No yolk sac is visualized. A double decidual sac sign is seen, lending evidence of a true gestational sac versus a pseudogestational sac formed from a decidual cast in ectopic pregnancy. A thorough look in the adnexa is important in diagnosing ectopic pregnancy when a gestational sac is the only finding. (Photo contributor: Lauren Oliveira, DO.)

is nonspecific, but concerning if present with a clinical suspicion for ectopic pregnancy.

Management and Disposition

Unstable patients require aggressive resuscitation with fluid and blood followed by surgery. Stable patients with a US

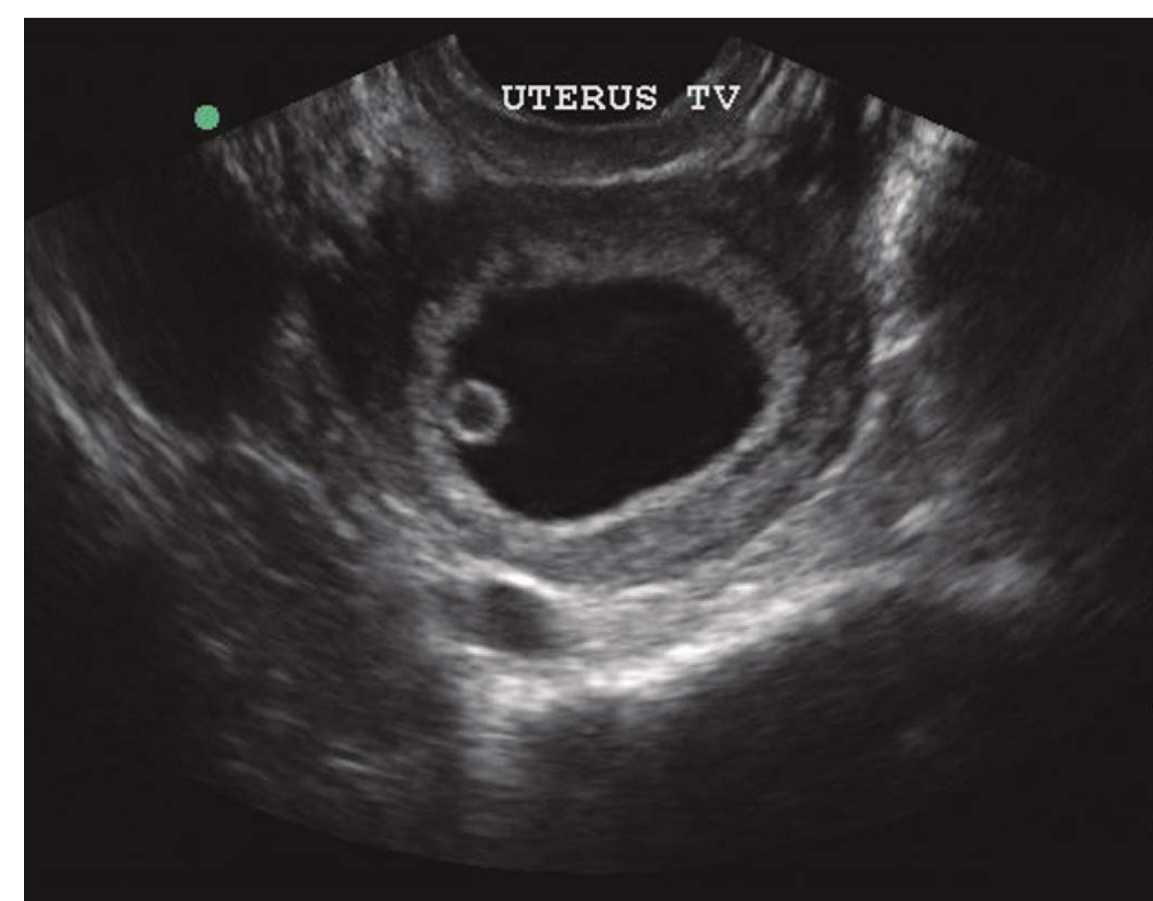


FIGURE 10.37 ■ Intrauterine Yolk Sac. Discrete ring of an intrauterine yolk sac within the gestational sac seen on transvaginal ultrasound. Definitive diagnosis of IUP can be made once a yolk sac is seen. A double decidual sac sign is also seen. (Photo contributor: Lauren Oliveira, DO.)

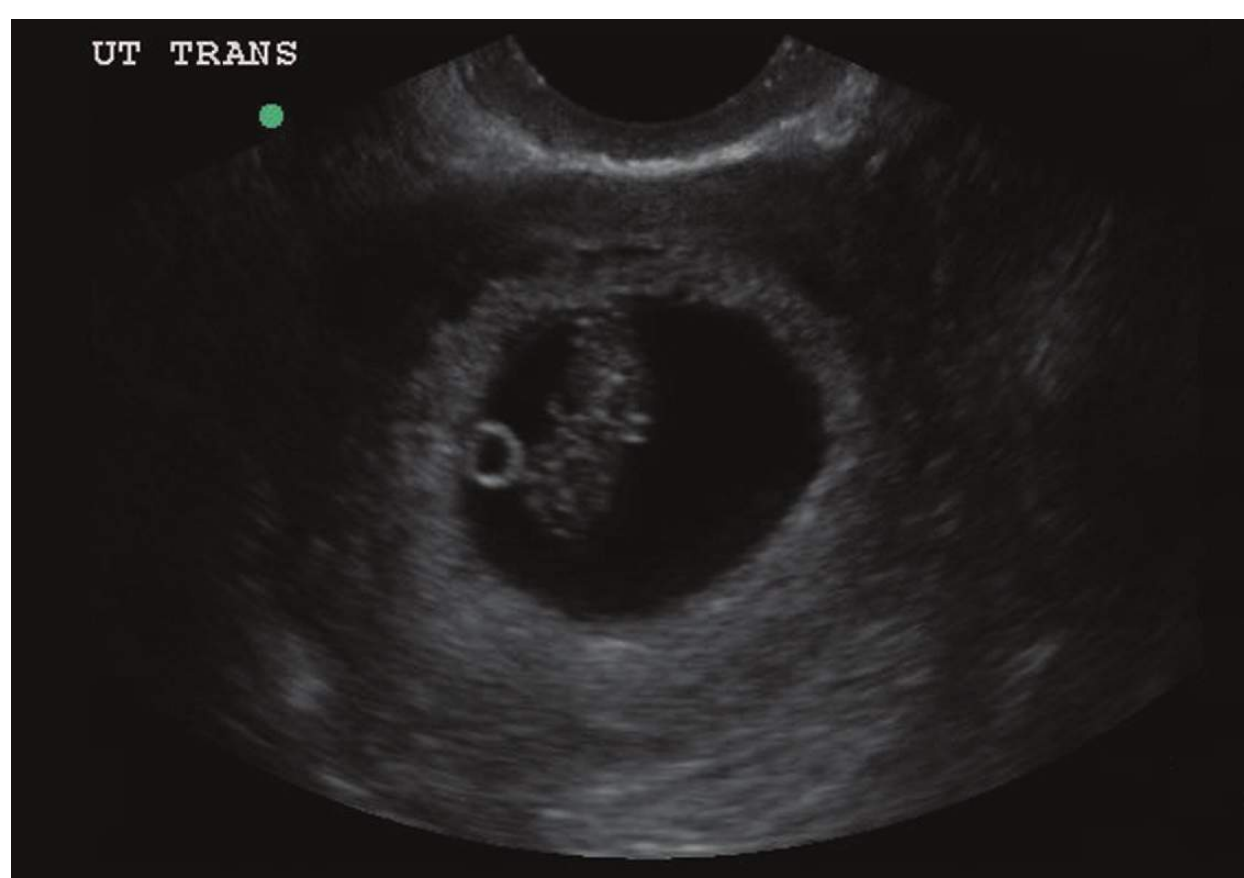


FIGURE 10.38 ■ Intrauterine Fetal Pole. Ultrasound image of an intrauterine pregnancy with a fetal pole seen adjacent to a yolk sac. (Photo contributor: Lauren Oliveira, DO.)



FIGURE 10.39 ■ Ectopic Pregnancy. A large ectopic pregnancy is seen adjacent to the uterus. (Photo contributor: Lauren Oliveira, DO.)

diagnosis consistent with ectopic pregnancy warrant immediate gynecologic consultation. Definitive therapeutic options range from observation (in an asymptomatic patient with declining hCG levels), to pharmacologic therapy with methotrexate, to surgery. US has diminished diagnostic accuracy at lower hCG levels (up to half of ectopic pregnancies have a serum hCG level <2000 mIU/mL, and ectopic pregnancy has been observed at hCG level less than 100). Therefore, obtain gynecologic consultation if there is a clinical suspicion for

ectopic pregnancy regardless of the US findings or hCG level. Those patients in whom a normal IUP is visualized can be safely discharged with early outpatient follow-up.

Pearls

1. Ectopic pregnancy should be considered in all women of reproductive age presenting with syncope, vaginal bleeding, abdominal pain or tenderness, and/or a missed menstrual period.

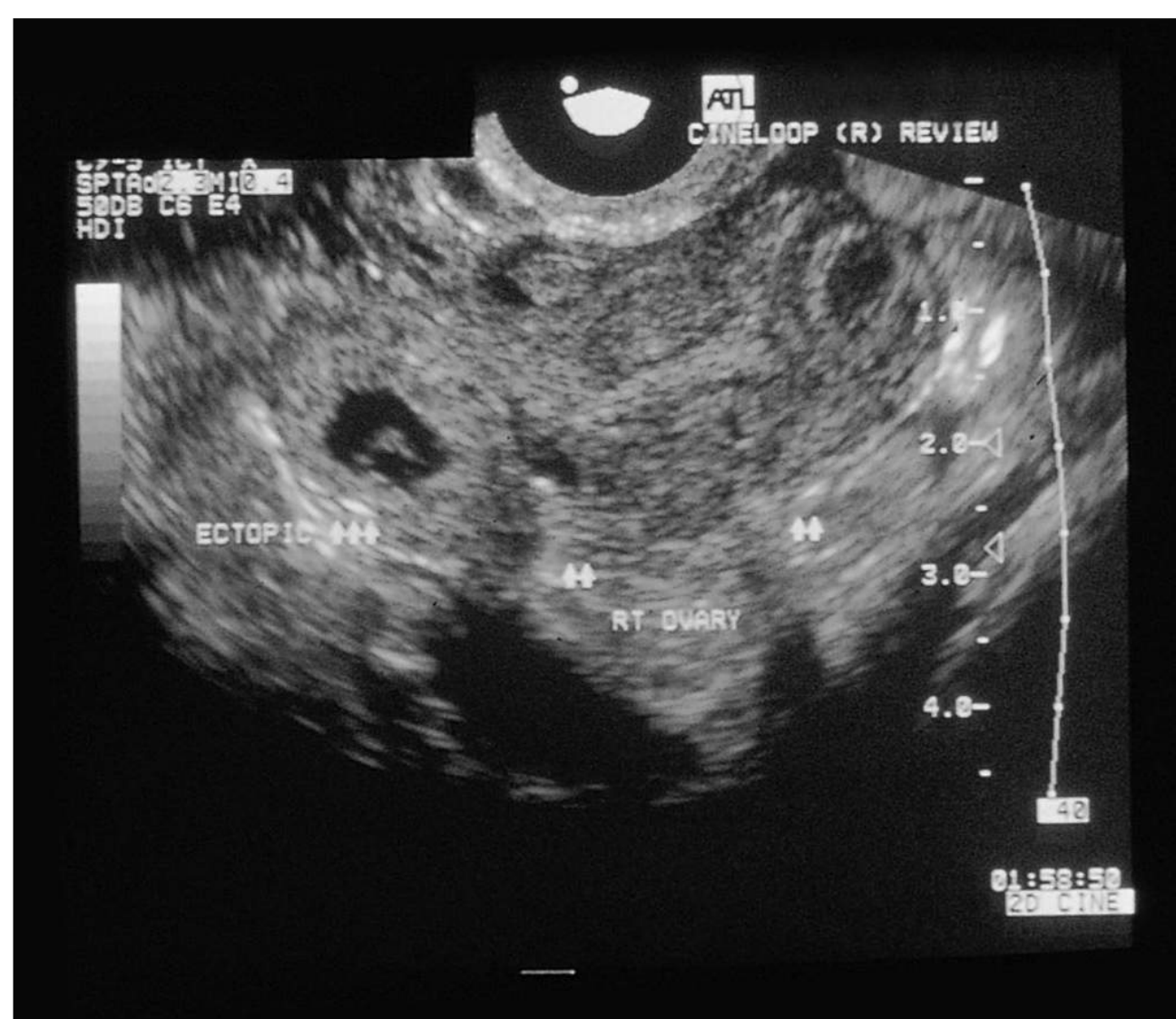
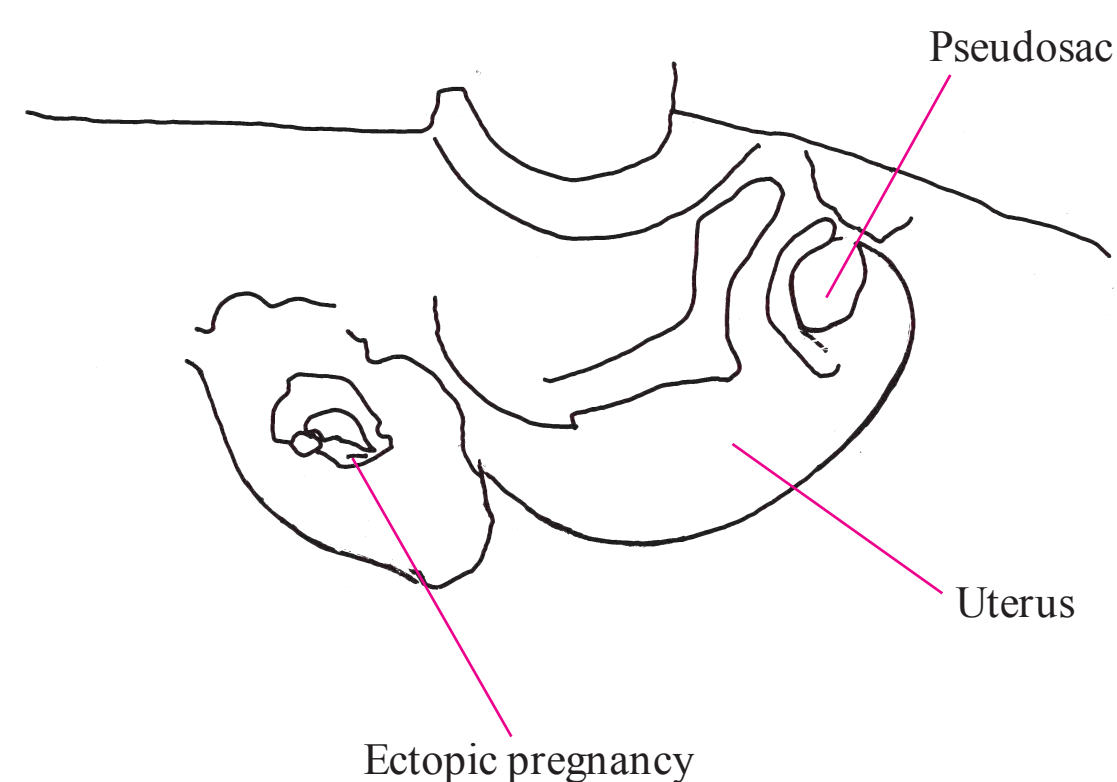


FIGURE 10.40 ■ Ectopic Pregnancy. Transvaginal ultrasound image of a right ectopic pregnancy with a decidual reaction in the uterus resembling a gestational sac, or “pseudosac.” Visualization of a pseudogestational, or “single,” sac sign could be consistent with an early gestational sac or an ectopic pregnancy with a uterine decidual cast. (Photo contributor: Janice Underwood.)



2. Failure to visualize an intrauterine pregnancy by transvaginal ultrasonography when the serum hCG level is above the discriminatory zone of the machine and examiner (typically 1500-2000 mIU/mL) is highly suggestive of ectopic pregnancy.
3. The double decidual sac sign is not considered reliable to confirm an IUP. A yolk sac must be present.
4. Visualization of the adnexa on US may reveal tubal ectopic pregnancy, but failure to show this does not necessarily rule out the diagnosis.

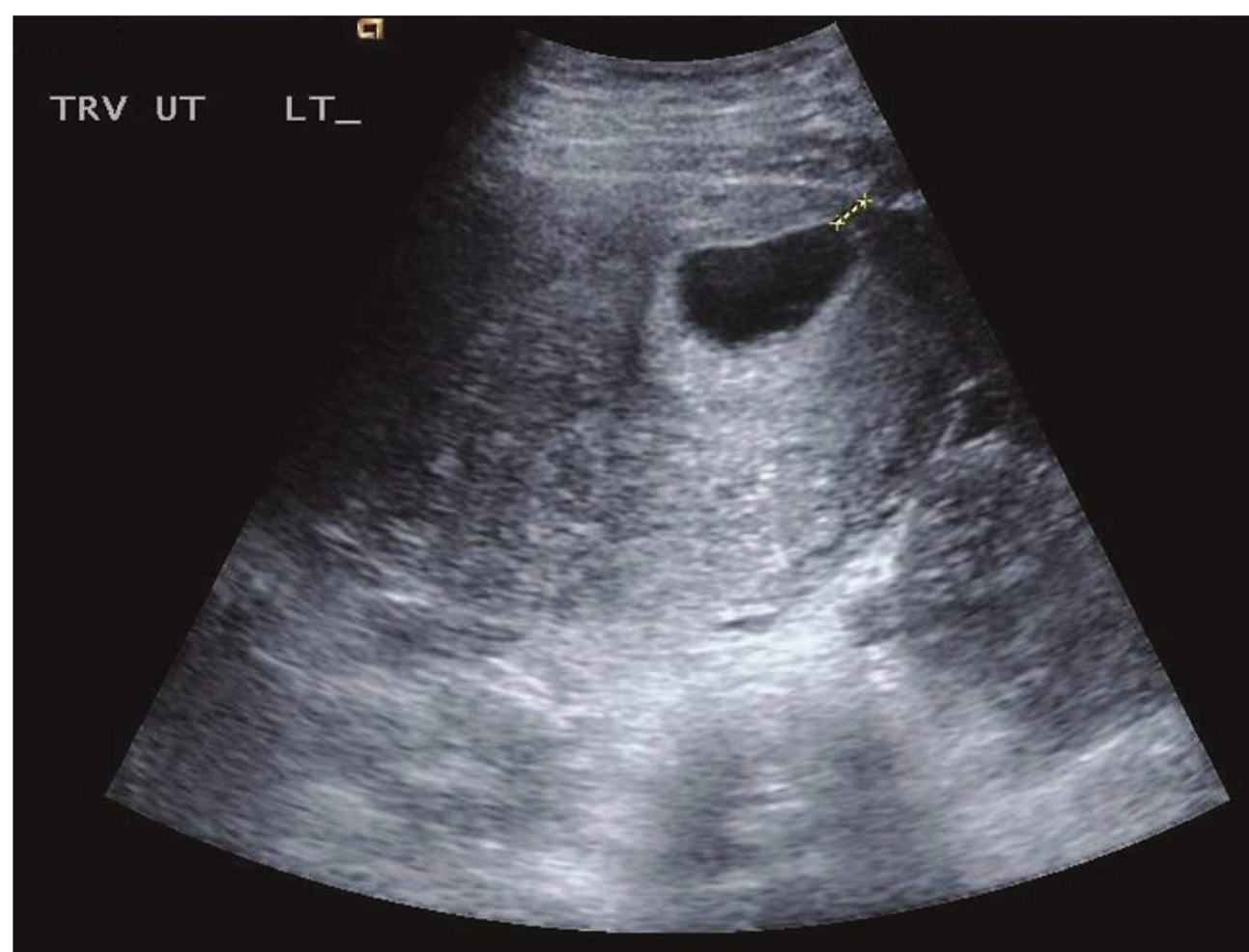


FIGURE 10.41 ■ Interstitial Ectopic. An interstitial ectopic exists when the gestational sac is less than 5 mm away from the uterine wall. This formal ultrasound confirmed a bicornate uterus and viable pregnancy with a distance 6.1 mm, enough endometrium to support normal pregnancy. (Photo contributor: Lauren Oliveira, DO.)

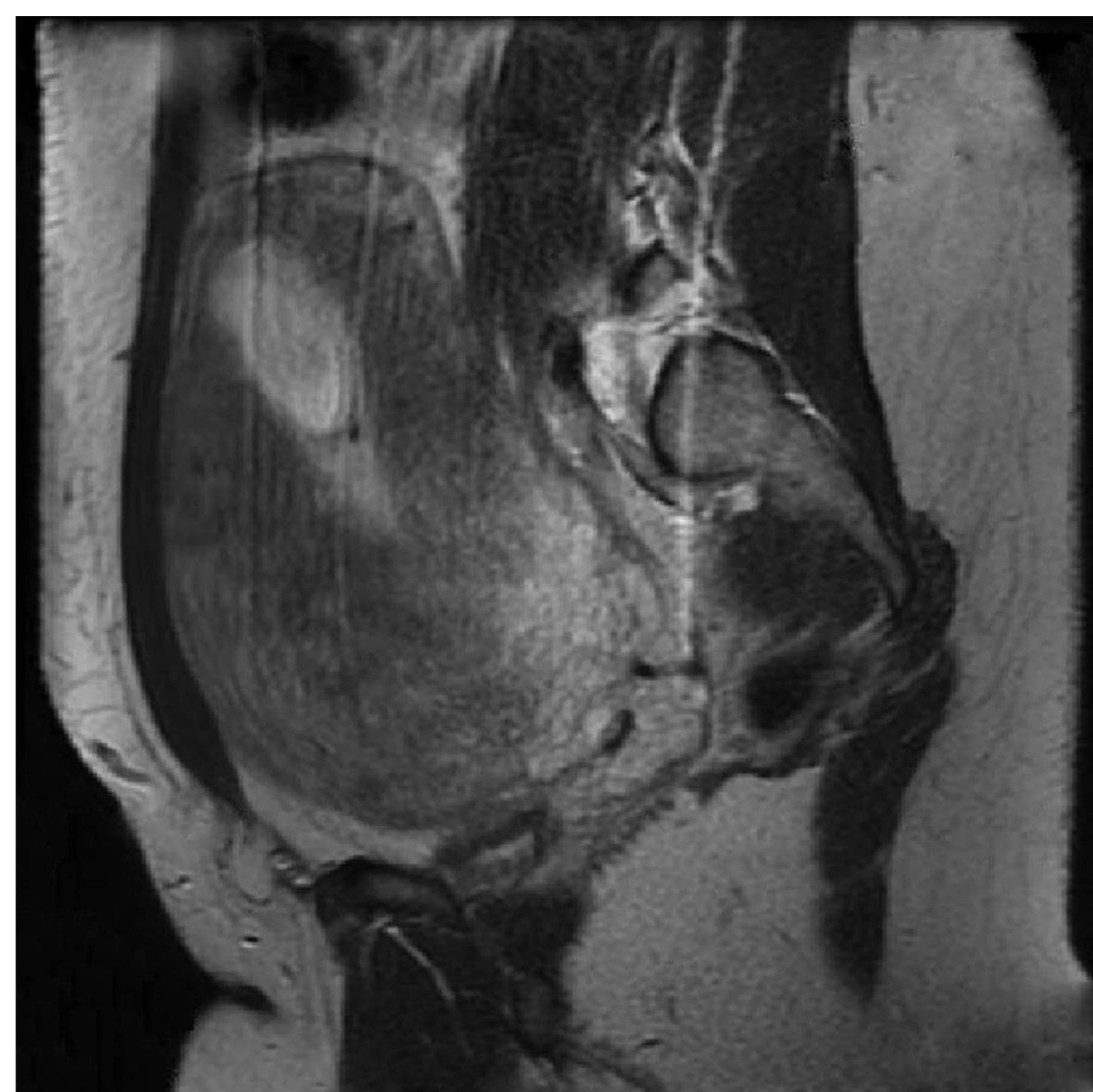


FIGURE 10.42 ■ Interstitial Ectopic. This MRI confirmed a formal ultrasound of an interstitial ectopic. (Photo contributor: Lauren Oliveira, DO.)

Clinical Summary

Molar pregnancy is part of a spectrum of gestational trophoblastic tumors that include benign hydatidiform moles, locally invasive moles, and choriocarcinoma. The classic clinical presentation is painless first-trimester or early second-trimester vaginal bleeding with a uterine size larger than the estimated gestational age based on the last menstrual period. Signs of preeclampsia (hypertension, headache, proteinuria, and edema) in the first trimester or early second trimester are highly suggestive of this diagnosis as well. Hyperthyroidism can be found in roughly 5% of cases. Acute respiratory distress may occur due to embolization of trophoblastic tissue into the pulmonary vasculature, thyrotoxicosis, or simple fluid overload.

Management and Disposition

Obtain gynecologic consultation for dilatation and curettage in all cases. Close outpatient monitoring of serum hCG levels is required to rule out the presence of malignant gestational trophoblastic disease.

Pearls

1. All patients with pregnancies of less than 20 weeks' gestation with clinical findings of preeclampsia should have gestational trophoblastic disease ruled out.
2. A “snowstorm” pattern on ultrasonography (demonstrating multiple intrauterine echoes with no fetus) coupled with a high hCG level is typical of molar pregnancy.
3. “Moles” commonly produce serum hCG levels greater than 100,000 mIU/mL.



FIGURE 10.43 ■ Molar Pregnancy. “Snowstorm” pattern demonstrating multiple intrauterine echoes with no fetus seen on transvaginal ultrasonography in a patient with a molar pregnancy. Serum β -hCG was greater than 180,000 mIU/mL. (Photo contributor: Robin Marshall, MD.)



FIGURE 10.44 ■ Molar Pregnancy. Transabdominal study showing molar pregnancy. These are exceedingly difficult to identify and diagnose by ultrasound. They can be easily mistaken for nonspecific intrauterine findings (eg, missed abortion, fibroid). (Photo contributor: Lauren Oliveira, DO.)

Clinical Summary

Fetal viability may be in question for some pregnant patients presenting to the ED. Conservative diagnostic criteria for nonviable pregnancy are based upon transvaginal US imaging and include: a crown-rump length of 7 mm with no cardiac activity; a mean GS diameter of ≥ 25 mm and no visible embryo; no heartbeat ≥ 2 weeks after a visualized GS without a yolk sac; and no heartbeat ≥ 11 days after a prior documented GS with a yolk sac. Findings that approximate these criteria may be suspicious for, but are not diagnostic, of a failed pregnancy.

Management and Disposition

The emergency physician must ensure that any criteria used to diagnose failed IUP minimize the possibility of a false positive finding (ie, incorrectly diagnosing nonviability). Consider obtaining a formal US to confirm ED besides US findings. Arrange a follow-up US in 7 to 10 days for patients with findings suspicious for but not meeting criteria for a failed IUP.

Pearls

1. Obtain gynecologic consultation and follow-up to confirm ED findings for patients whose fetal viability is in question.

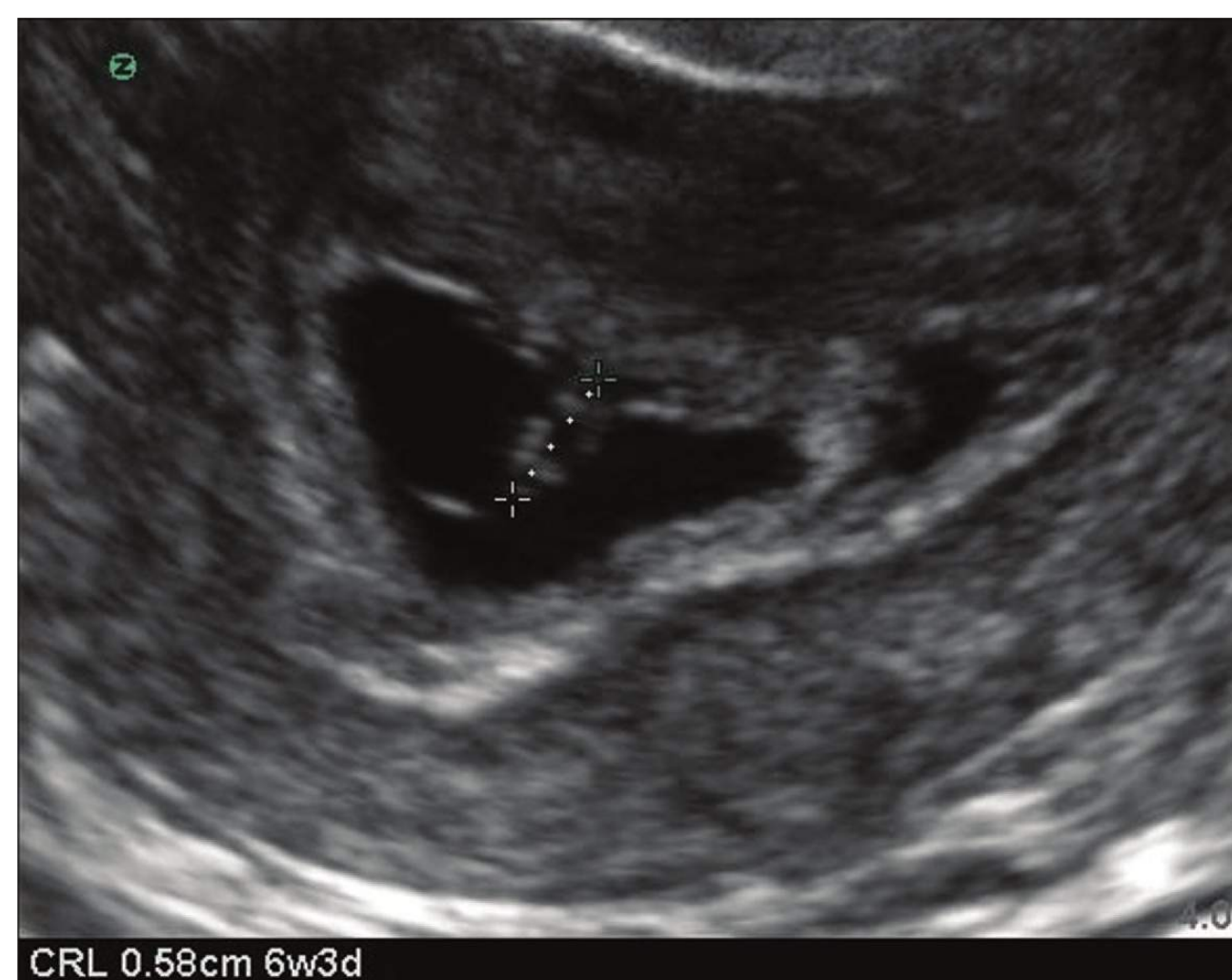


FIGURE 10.45 ■ Indeterminate Viability. This fetal pole with a crown-rump length of 5.8 mm and no cardiac activity is consistent with indeterminate viability versus a failed IUP which is diagnosed if crown-rump length is ≥ 7 mm and no cardiac activity. (Photo contributor: Kevin J. Knoop, MD.)

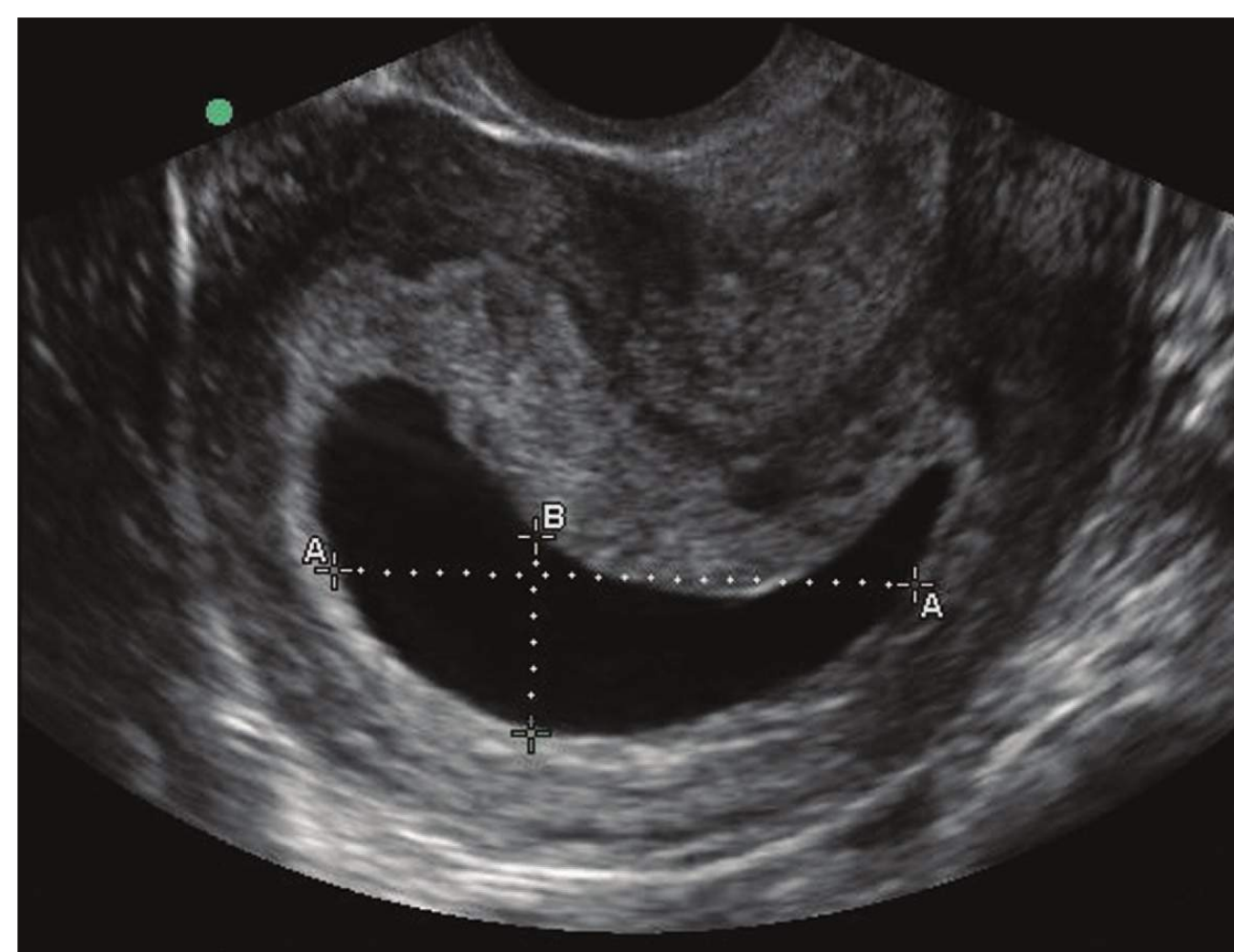


FIGURE 10.46 ■ Failed Intrauterine Pregnancy. This enlarged gestational sac with no visible cardiac activity is consistent with a failed IUP if the mean gestational sac diameter is ≥ 25 mm. (Photo contributor: Lauren Oliveira, DO.)

Clinical Summary

Trauma is a major cause of maternal and fetal mortality. In addition to the common injuries to solid organs and/or hollow viscus associated with blunt abdominal trauma, special consideration should be given to the possibility of preterm labor, fetal-maternal hemorrhage, uterine rupture, and, most importantly, abruptio placentae. Abruptio placentae is defined as the premature separation of the placenta from the site of uterine implantation. It is found in up to 50% of major blunt trauma patients and up to 5% of those with apparent minor injuries. There are generally signs of uterine hyperactivity and fetal distress when significant placental detachment occurs. Most patients have vaginal bleeding, but up to 20% will present with little or no external bleeding when the margins of detachment are above the cervical os.

Electronic fetal monitoring for a minimum of 4 hours is indicated in all cases of significant trauma in patients beyond 20 weeks' gestation. As the pregnancy progresses toward term, a normal fetal heart rate averages between 120 and 160 bpm. Rapid, frequent fluctuations in the baseline are characteristic of normal "reactivity." The loss of this reactivity can occur during a normal fetal sleep cycle, following narcotic administration, or, most importantly, in the setting of fetal hypoxia or distress. Significant transient decelerations in fetal heart rate are classified as early, late, or variable depending on how they correlate with uterine contractions (via tocometry).

Management and Disposition

In addition to performing a standard trauma evaluation, immediately consult an obstetrician in all pregnant trauma patients beyond 20 weeks' gestation. Obtain blood for type- and cross-matching, CBC, prothrombin time (PT), partial thromboplastin time (PTT), fibrinogen, and fibrin degradation products or d-dimer. It is generally recommended that patients undergo continuous tocometric and fetal heart rate monitoring for a minimum of 4 hours to rule out preterm labor or fetal distress. US is essential in visualizing placental abruption, and differentiates this from vaginal bleeding due to placenta previa. Indications for emergency cesarean section include placental abruption, signs of ongoing fetal distress, or uncontrolled maternal hemorrhage.

Pearls

1. Ecchymotic markings from blunt force are not always present on a gravid abdomen; thus, a careful history of the mechanism of trauma and complaints is essential.
2. Anti-Rh immunoglobulin should be administered for all cases of significant third-trimester blunt abdominal trauma if the mother is Rh-negative.
3. Laboratory evidence of a consumptive coagulopathy may be seen with significant abruption.

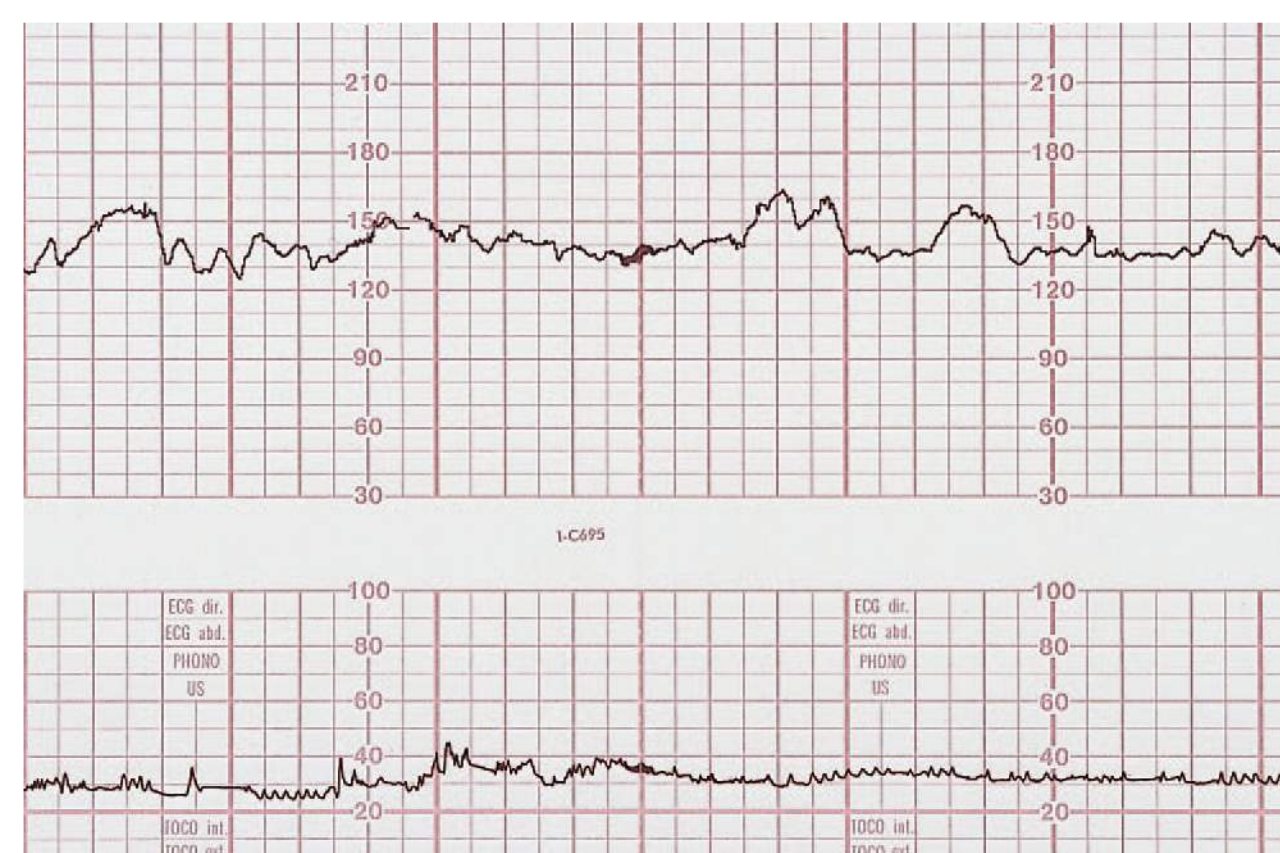


FIGURE 10.47 ■ Normal Beat-to-Beat Variability (BBV). A normal reactive fetal monitor strip showing a baseline heart rate between 120 and 160 bpm with fluctuations in the short- and long-term heart rate. (Photo contributor: Timothy Jahn, MD.)

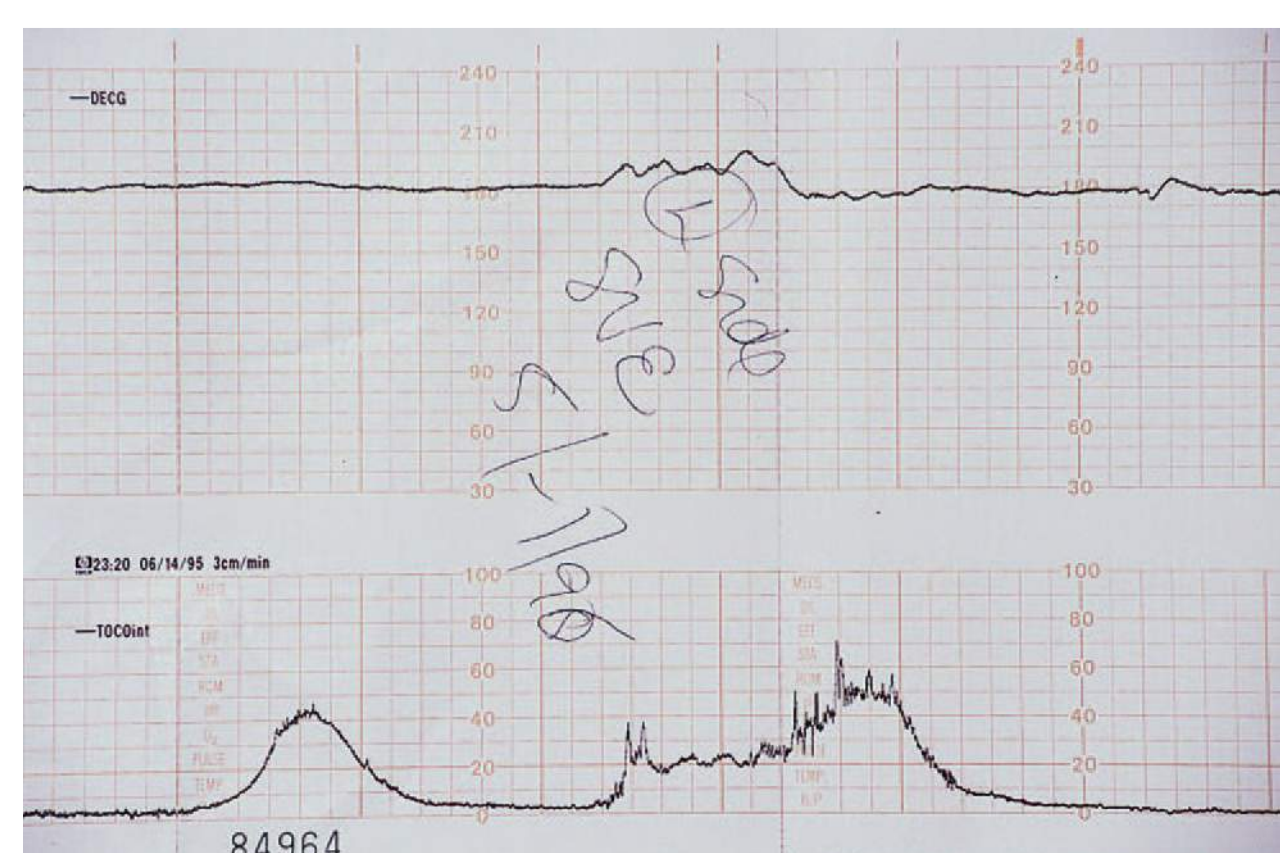


FIGURE 10.48 ■ Loss of BBV. Loss of beat-to-beat variability (BBV) in the fetal heart rate, which may forewarn of fetal distress. This same pattern may also be seen during a normal fetal sleep cycle or following maternal narcotic administration. (Photo contributor: Gerard Van Houdt, MD.)

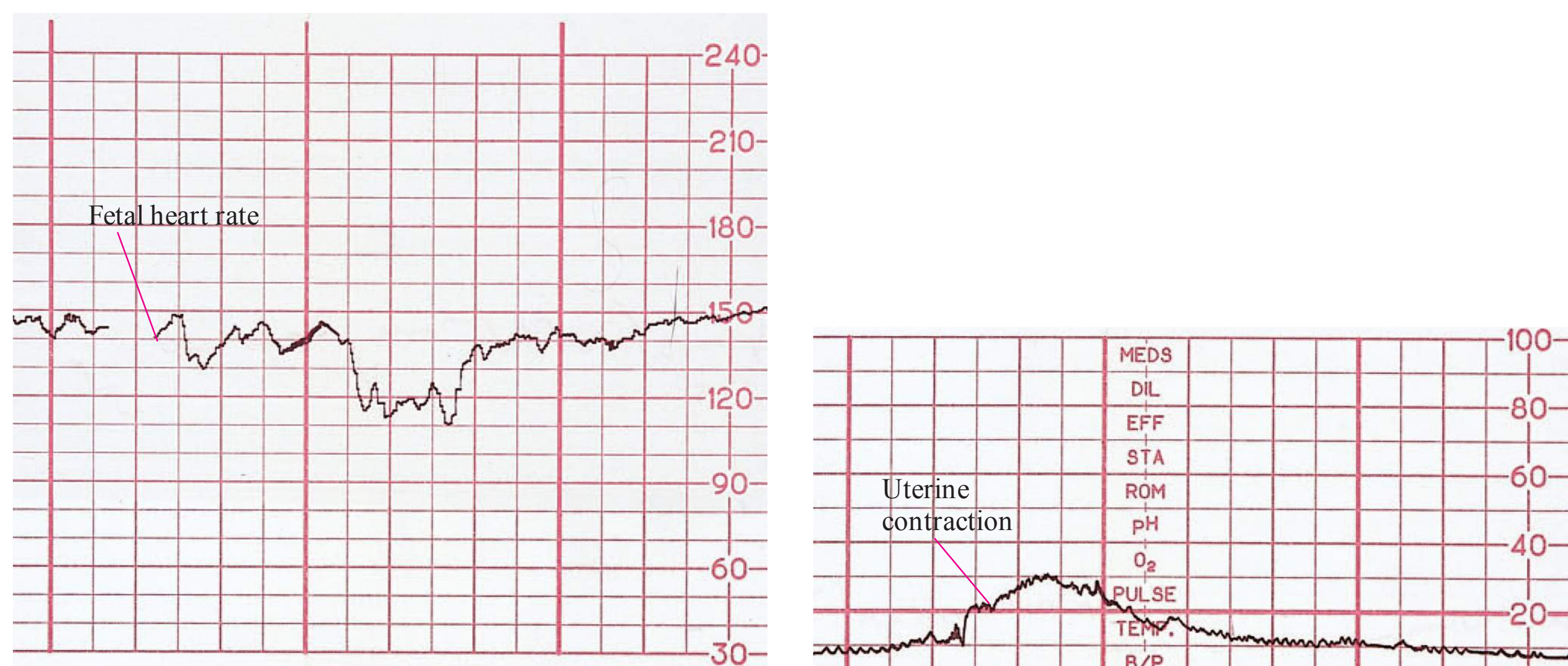


FIGURE 10.49 ■ Late Deceleration. The nadir of a late deceleration always follows the peak of the uterine contraction with the heart rate approaching the baseline after the completion of the uterine contraction; this is suggestive of hypoxia. (Photo contributor: James Palombaro, MD.)

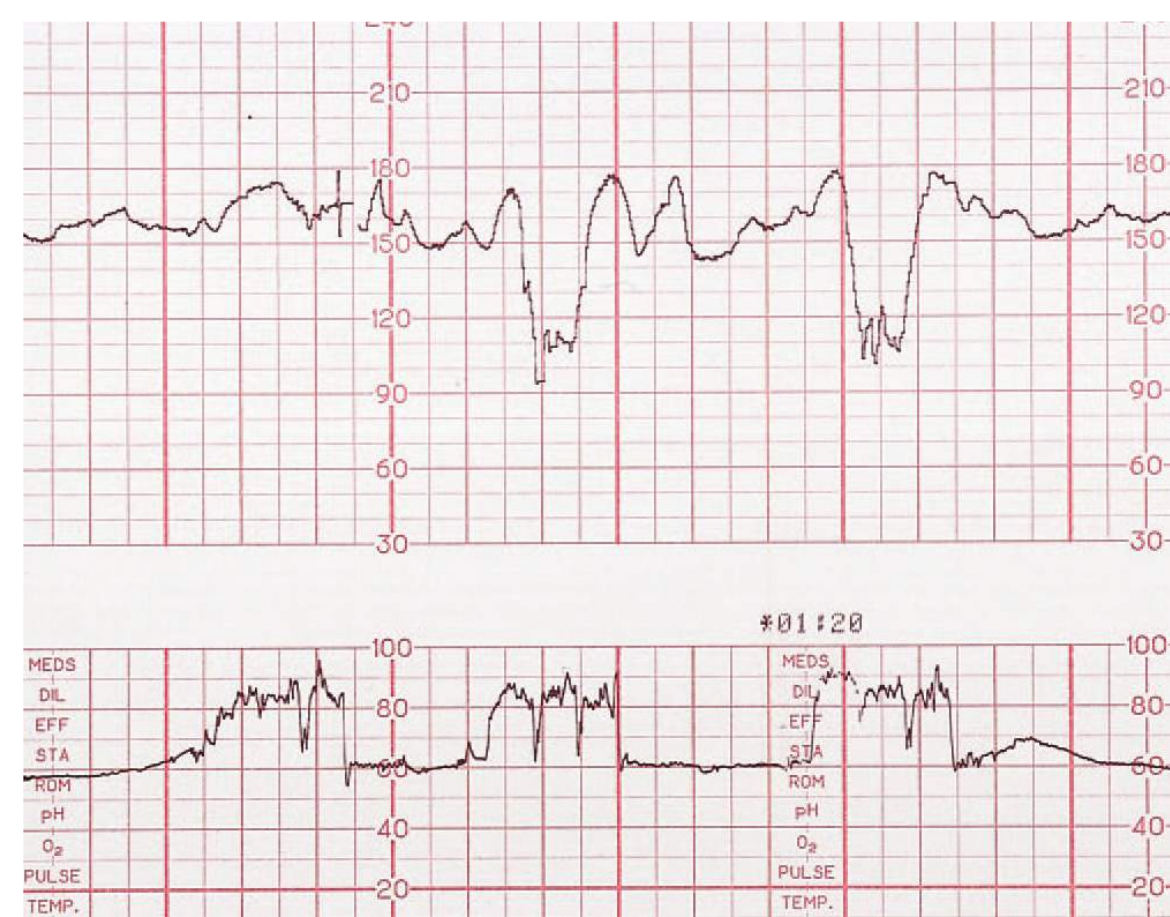


FIGURE 10.50 ■ Variable Deceleration. Variable decelerations are due to cord compression. They are characterized by a rapid onset and recovery and may occur slightly before, during, or after the onset of the contraction. They often include “peaks” on either side of the central deceleration. (Photo contributor: John O’Boyle, MD.)



FIGURE 10.51 ■ Gravid Abdomen. A third-trimester gravid abdomen with ecchymotic markings imparted by a significant blunt force. Fetal assessment should occur simultaneously with maternal resuscitation. (Photo contributor: John Fildes, MD.)

TABLE 10.2 ■ CHARACTERISTICS OF FETAL HEART RATE DECELERATIONS

Deceleration Type	Timing of Deceleration	Characteristics	Significance
Early	Starts after and ends before contraction	Coincides and “nadirs” with contraction peaks	Normal finding
Variable	Varies	Deep (even to <100 bpm), broad, often have “shoulders”	May indicate cord compression or may be normal finding
Late	Starts and ends after contraction	Prolonged, nadir comes after contraction peaks	Fetal hypoxia

Clinical Summary

The second stage of labor begins when the cervix is fully dilated, allowing for the gradual descent of the fetal head toward the vaginal outlet. As the head approaches the perineum, the labia begin to separate with each contraction and recede once the contraction subsides. Crowning is the term applied when the head separates the labial margins without receding at the end of the contraction. The appearance of crowning heralds imminent vaginal delivery.

Management and Disposition

Bring equipment for delivery and neonatal resuscitation to the bedside immediately. Begin continuous fetal monitoring if feasible and notify available obstetric and pediatric teams while making preparations for ED delivery. Alert the obstetric and pediatric teams to the presence of any meconium (greenish brown leakage) detected before delivery.

Support the maternal perineum with your hand and a clean, dry cloth to slow rapid fetal descent and reduce the risk of significant birth trauma to the mother. As soon as the head

is delivered, check to ensure the umbilical cord is not wrapped around the fetal neck. Nuchal cord wrapping can lead to disruption of uterine blood flow during contractions, which may lead to variable decelerations in fetal heart rate and may impede delivery.

Pearls

1. Primigravida patients may still require many contractions and pushing to expel the head through the vaginal outlet; however, once crowning is present, be prepared for imminent delivery regardless of gravida status.
2. A nuchal cord should be pulled over the child's head where possible. If impeding delivery, it can be clamped and ligated on the perineum, followed by the immediate delivery of the shoulders and body.
3. If meconium secretions are detected well before delivery, continuous electronic toco fetal monitoring should be begun and the obstetric and pediatric consultants notified.
4. Avoid strong traction on the cord during or after delivery as this can tear the placenta and result in fetal or maternal hemorrhage.



FIGURE 10.52 ■ Crowning. Descent of the fetal head with separation of the labia is known as crowning and heralds imminent vertex delivery. (Photo contributor: William Leininger, MD.)

Clinical Summary

A gravid woman may present in any stage of labor. Those with regular forceful contractions and the urge to push are in active labor and may be near delivery. Crowning may be present and heralds imminent vaginal delivery. Important historical questions include the number of previous pregnancies, a diagnosis of twin/multiple gestations, and whether there is a history of prenatal care or complications. The presence of meconium (greenish brown fetal stool) is associated with fetal hypoxia and is a clinical indicator of fetal distress. Associated signs of fetal distress such as fetal bradycardia or late decelerations may also be present.

Management and Disposition

Immediately obtain maternal intravenous access, start oxygen, and prepare equipment for delivery and neonatal resuscitation (suction, oxygen, warming light, etc) for the impending delivery. Notify both obstetrics and pediatrics consultants of imminent ED delivery.

Delivery of the Head

As the point of the head passes through the vaginal outlet, extension of the head occurs, followed by the appearance of the face. Extension and delivery of the fetal head can be facilitated by applying gentle pressure upward on the chin through

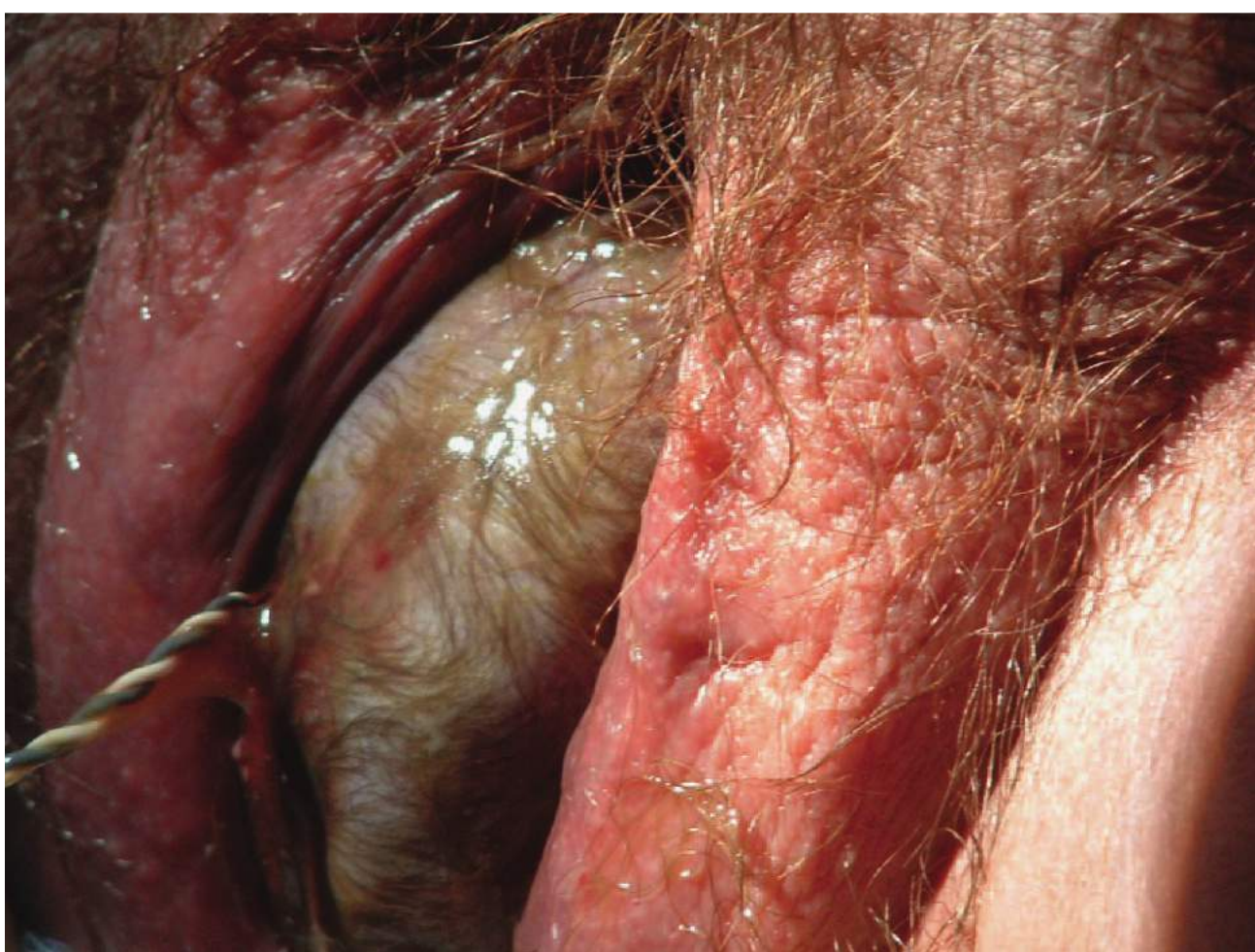


FIGURE 10.53 ■ Meconium. Meconium (greenish brown fetal stool), seen covering the scalp and perineum, is associated with fetal hypoxia and is a clinical indicator of fetal distress. Fetal bradycardia or late decelerations may be present and are also evidence of fetal distress. (Photo contributor: William Leininger, MD.)



FIGURE 10.54 ■ Modified Ritgen Maneuver. Modified Ritgen maneuver: upward pressure is applied on the fetal chin through the perineum. (Photo contributor: William Leininger, MD.)

the perineum (modified Ritgen maneuver). Simultaneously elevate the scalp to help extend the head with the fingers of the other hand. Once the head has been delivered, the occiput promptly rotates toward a left or right lateral position. At this stage, sweep the infant's neck to detect the presence of the umbilical cord. If a nuchal cord is identified, slip it over the infant's head. If the cord is wrapped too tightly, it can be clamped and ligated on the perineum, followed by the immediate delivery of the shoulders and body.

Delivery of the Shoulders

Before delivery of the shoulders, suction the nasopharynx with a bulb syringe to clear away blood or debris. If thick



FIGURE 10.55 ■ Anterior Shoulder Delivery. Delivery of the anterior shoulder is facilitated with gentle downward traction. (Photo contributor: William Leininger, MD.)

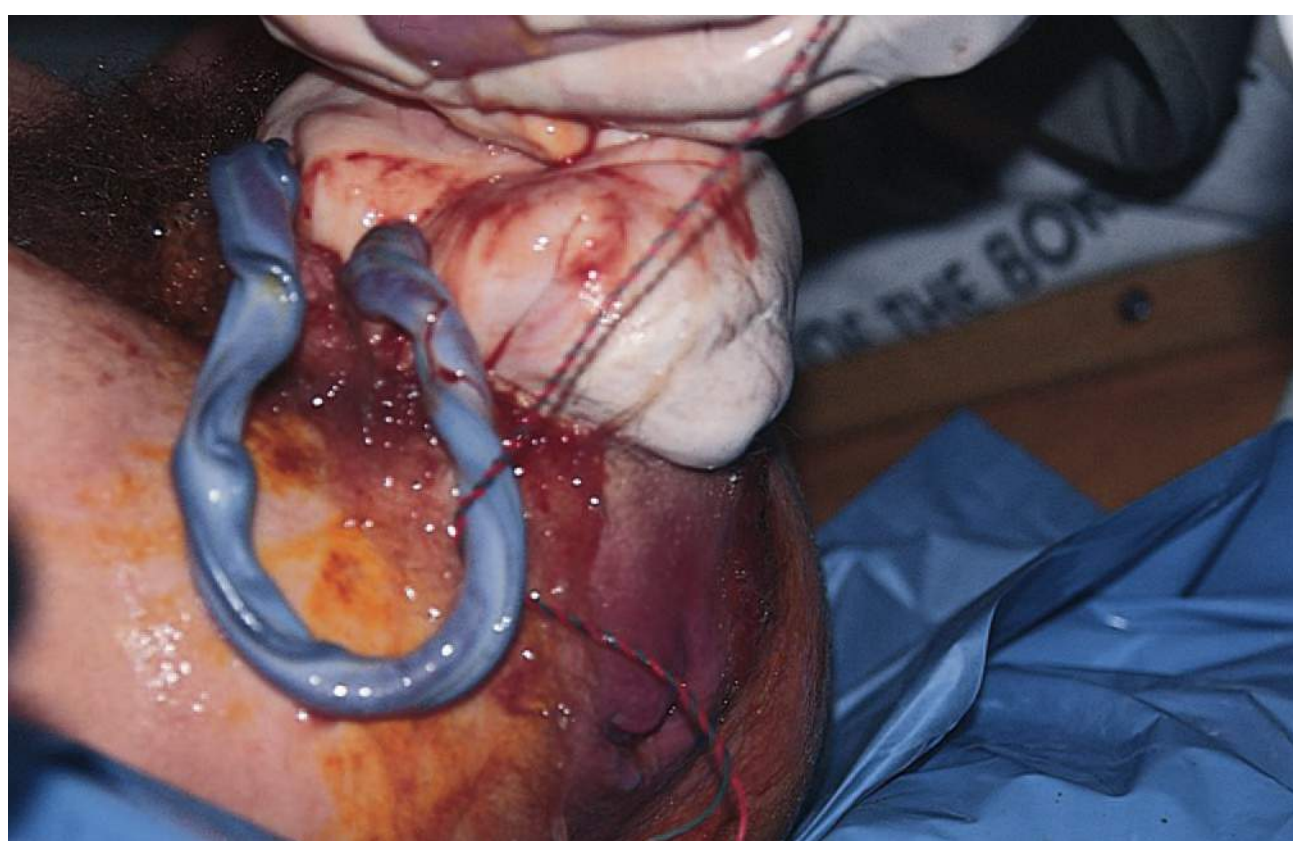


FIGURE 10.56 ■ Posterior Shoulder Delivery. Delivery of the posterior shoulder with gentle upward traction. (Photo contributor: William Leininger, MD.)

meconium is present, use a mechanical suction trap to obtain deeper and more thorough suctioning of the posterior pharynx and glottic region. Aspiration of thick meconium can lead to pneumonitis and hypoxia in the neonate. Delivery of the shoulders generally occurs spontaneously with little manipulation. Occasionally, gentle downward traction applied by grasping the sides of the head with two hands eases the delivery of the anterior shoulder. The head can then be directed upward to permit the delivery of the posterior shoulder. Following delivery of both shoulders, the body and legs are easily delivered. Attention is then directed toward the immediate care of the newborn. The cord is doubly clamped and ligated and inspected for three vessels: two umbilical arteries and one umbilical vein. The pediatrician should be notified of a two-vessel umbilical cord. The newborn is immediately



FIGURE 10.57 ■ Clamping the Cord. The cord is clamped immediately after delivery. (Photo contributor: William Leininger, MD.)

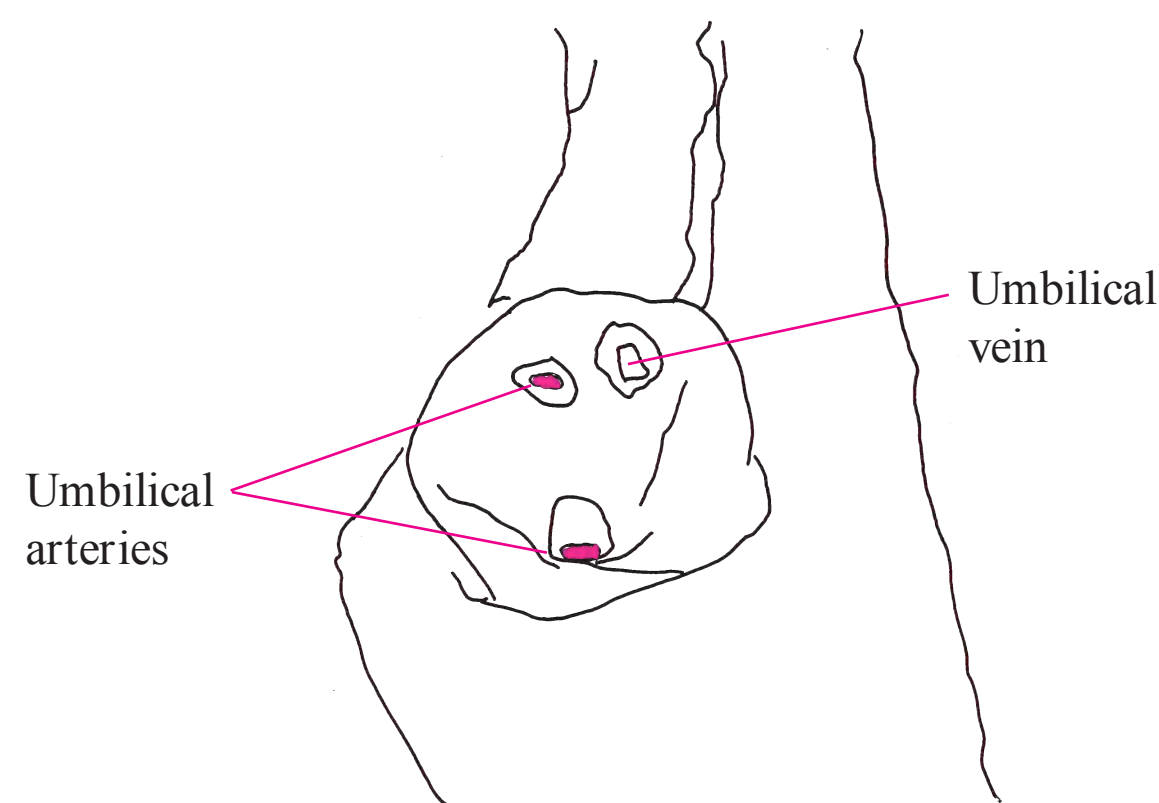
placed under a warming lamp for drying and gentle stimulation while being observed for signs of distress (heart rate <100 , limp muscle tone, poor color, or weak cry).

Delivery of the Placenta

Following delivery, gentle traction can be placed on the cord while your opposite hand is used to firmly massage the uterine fundus. The placenta is generally delivered within 20 minutes and should be grossly inspected for evidence of a missing segment or satellite placenta. Notify the obstetrician of these findings as retained placental fragments may warrant manual exploration of the uterus, especially with persistent postpartum bleeding. Unusual placental vasculature, such as a velamentous placenta, should also be communicated to obstetrician and pediatric consultants.



FIGURE 10.58 ■ Normal Umbilical Cord. Cross-sectional view of the two arteries and single vein of a normal three-vessel umbilical cord. (Photo contributor: Jennifer Jagoe, MD.)



Pearls

1. Maternal oxygen administration may help to alleviate fetal distress as seen on heart rate monitoring (see Third-Trimester Blunt Abdominal Trauma).
2. Nuchal cord occurs in about 20% of all deliveries. Occasionally two coils are identified.
3. A two-vessel cord (rare) is associated with an increased incidence of congenital defects.
4. Retained placental fragments may cause postpartum hemorrhage or endometritis.



FIGURE 10.59 ■ Placenta Delivery. Gentle traction is applied to the cord while the opposite hand massages the uterus. (Photo contributor: William Leininger, MD.)



FIGURE 10.60 ■ Placenta Delivery. Delivery of the placenta. (Photo contributor: William Leininger, MD.)

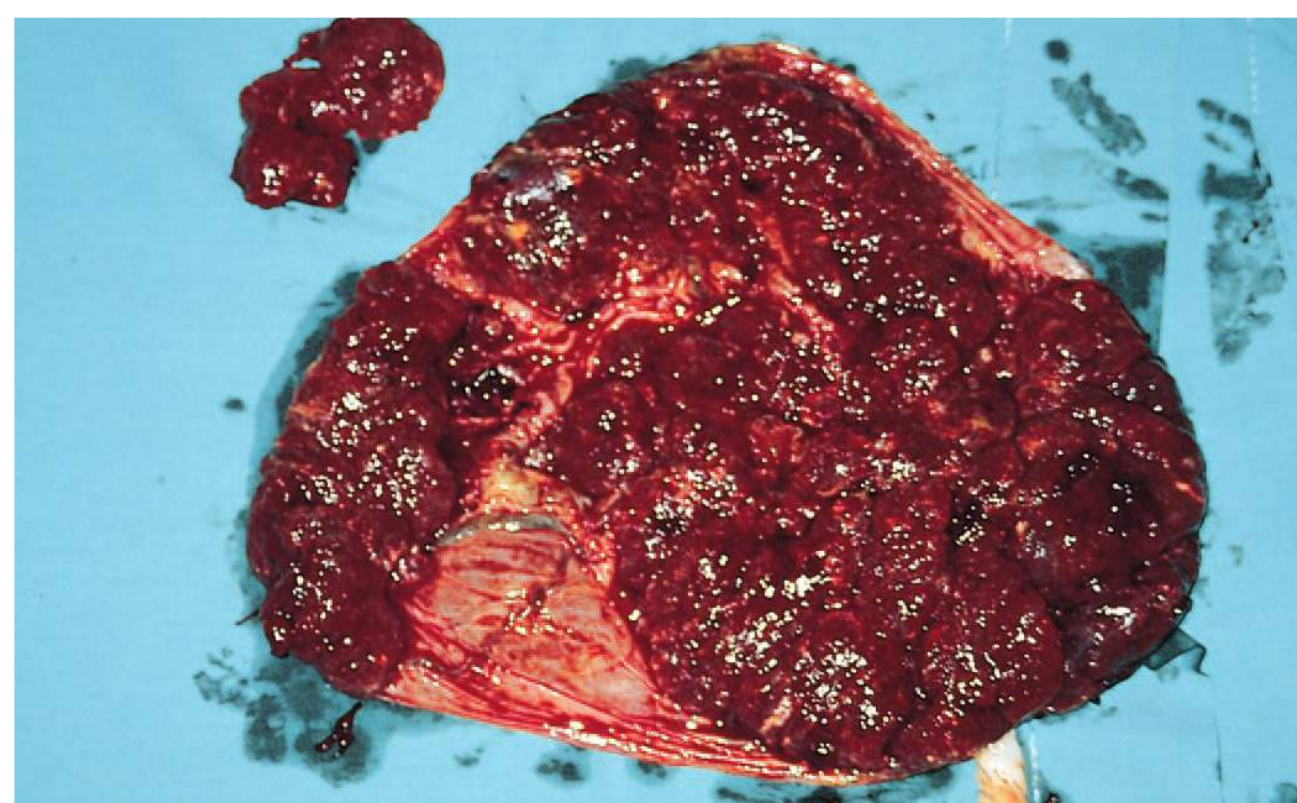
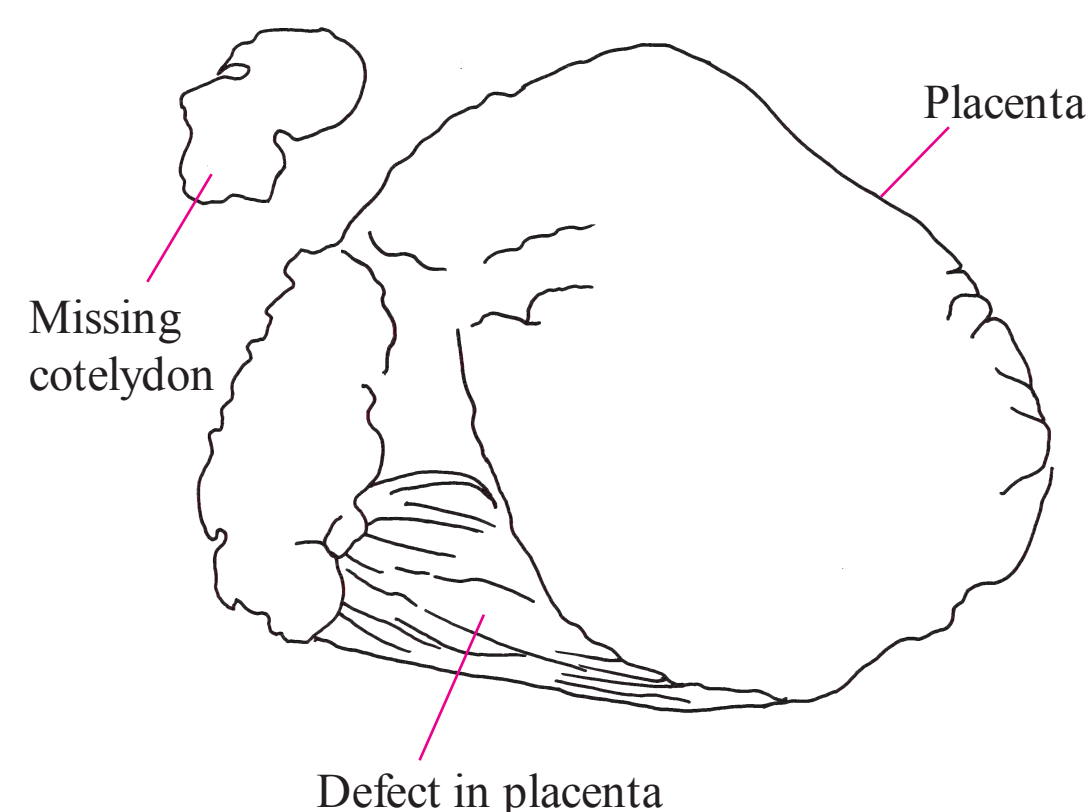


FIGURE 10.61 ■ Placenta. Placenta with a missing segment or cotyledon. The missing placental tissue can be seen in the upper left-hand corner of the photograph. (Photo contributor: John O'Boyle, MD.)



Clinical Summary

The incidence of singleton breech presentation is low (~3%) but increases (>20%) in preterm infants weighing less than 2 kg. In a frank breech, both hips are flexed and both knees extended. In a complete breech, both hips and knees are flexed. In both of these, the infant's buttocks are the usual presenting body part at the perineum. A footling breech has one or both legs extended below the buttocks and a foot is the presenting part. Frank breech is most common in full-term deliveries, whereas footling presentation can be found in up to half of all preterm deliveries. Breech deliveries carry a much higher neonatal mortality rate than normal deliveries. Complications of breech delivery include umbilical cord prolapse, nuchal arm obstruction, and difficulty in delivery of the head.

Management and Disposition

The specific maneuvers for breech extraction are beyond the scope of this text. If breech delivery appears imminent, prepare for ED delivery as in the previous section. Obtain immediate obstetric and pediatric consultation in all breech deliveries. During delivery, support the infant's parts and apply gentle traction as they spontaneously pass through the vaginal outlet. Keep in mind that the head diameter is greater than either the hip or shoulder diameter and may become entrapped by the cervix if it is not adequately dilated.

Pearl

1. Whenever possible and delivery is not imminent, immediately transfer stable breech laboring patients to an appropriate labor and delivery setting.



FIGURE 10.62 ■ Breech Delivery. Footling breech vaginal delivery of the following head. (Photo contributor: John O'Boyle, MD.)

Clinical Summary

In an overt cord prolapse, a loop of umbilical cord is visualized either at the introitus or on sterile speculum examination following membrane rupture. Alternatively, a small loop of cord may be palpated at the cervical os. In a “funic” cord prolapse, a loop of umbilical cord is palpated directly through intact fetal membranes. Occult prolapse occurs when the umbilical cord descends between the presenting part and the lower uterine segment, but is not visible or palpable on examination. Intermittent compression of the umbilical cord with each uterine contraction may be detected by the presence of variable decelerations of the fetal monitor. Fetal hypoxia may ensue if cord compression is sustained beyond the duration of the contraction, which often happens with overt prolapse.

Management and Disposition

Prolapse of the umbilical cord presents an immediate threat to the fetal circulation and constitutes a true obstetrical

emergency. If an overt prolapse is detected in the ED, do not attempt vaginal delivery. Immediately place the patient in a knee-chest position and apply continuous upward pressure with the examining hand to relieve the pressure of the presenting part on the lower uterine segment and cord. Immediately consult an obstetrician and transport the patient directly to the operating room for cesarean delivery. Maintain continuous upward pressure to the presenting part of the fetus at all times during transport. Resuscitative equipment should be available in anticipation of a hypoxic infant. If a funic prolapse is appreciated in the ED, notify an obstetrician and prepare the patient for cesarean delivery. Rupture of intact membranes may cause or worsen cord prolapse, and should never be performed in cases of suspected cord prolapse.

Pearl

1. Pelvic examination to exclude umbilical cord prolapse should be performed immediately following rupture of membranes, the appearance of new variable decelerations, or the detection of fetal bradycardia.



FIGURE 10.63 ■ Umbilical Cord Prolapse. Prolapsed umbilical cord visible at the vaginal introitus in a patient with twin gestations. (Photo contributor: Kevin J. Knoop, MD, MS.)

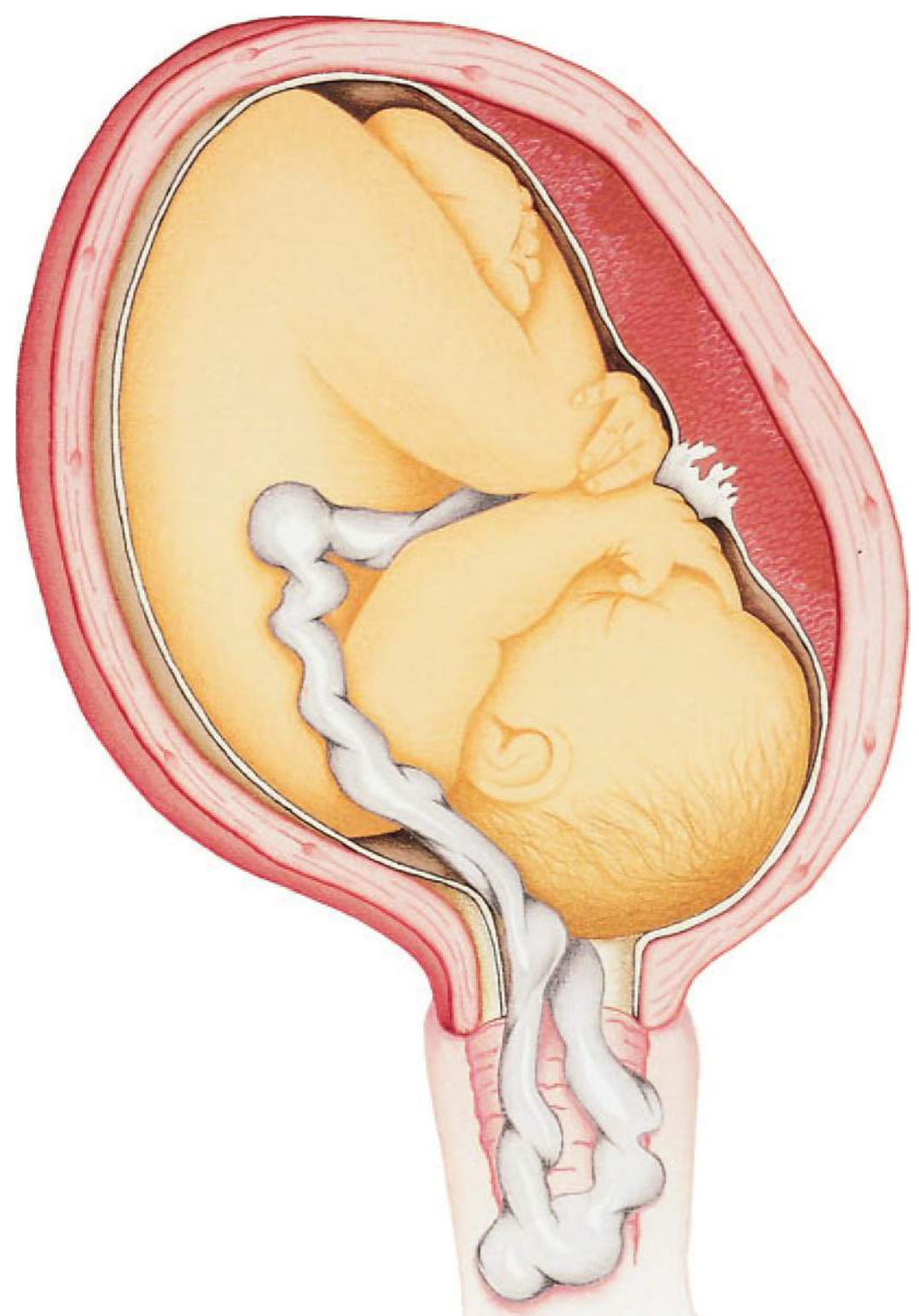


FIGURE 10.64 ■ Umbilical Cord Prolapse. Schematic drawing of an overt prolapse of the umbilical cord through a partially dilated cervical os. (Photo contributor: Judy Christensen.)

Clinical Summary

The circumferential wrapping of the umbilical cord around the child's neck occurs in about 20% of all deliveries. Tight approximation of the cord around the infant's neck can lead to transient disruption of uterine blood flow during contractions, leading to variable decelerations noted on the fetal heart rate monitor (Fig. 10.50); it may also impede delivery once the head passes through the introitus.

Emergency Department Treatment and Disposition

Once a cord is identified around the neck, it should be slipped over the head using the index and middle fingers. Occasionally two coils are identified.

Pearl

1. A loosely applied cord should be pulled over the child's head. If the cord is wrapped too tightly, it can be clamped and ligated on the perineum, followed by the immediate delivery of the shoulders and body.



FIGURE 10.65 ■ Nuchal Cord. A loose nuchal cord is seen around the neck. (Photo contributor: William Leininger, MD.)

Clinical Summary

Shoulder dystocia is defined as failure to deliver the fetal shoulders following delivery of the head. Dystocia is caused by impaction of the fetal shoulders against the pelvic outlet. Often, it is diagnosed by retraction of the fetal head against the perineum after delivery (“turtle sign”). Risk factors include gestational diabetes, prior shoulder dystocia or delivery of large infants, and postterm delivery.

Management and Disposition

Shoulder dystocia is an acute obstetric emergency with the immediate threat being fetal asphyxia from compression of cord and chest. Request emergent obstetric and pediatric consultation. Prepare equipment for delivery, possible episiotomy, and neonatal resuscitation. Upon identification of a shoulder dystocia, attempt McRobert maneuver (the least invasive procedure). This maneuver involves flexing the mother’s knees toward and past her chest in an extreme dorsal lithotomy position while simultaneously applying firm suprapubic pressure in an attempt to disengage the infant’s shoulder from the pelvic rim. Do not apply fundic pressure

as this may worsen the fetal lodging against the pubic bone. If McRobert maneuver is unsuccessful, a Woods screw maneuver can be attempted by hooking two fingers behind the infant’s posterior scapula and rotating the entire body. As the anterior shoulder rotates downward, it can generally be delivered past the symphysis pubis. If the Woods maneuver fails to deliver the anterior shoulder, delivery of the posterior arm may be attempted by inserting two fingers into the sacral fossa and delivering the entire posterior arm by flexing it at the elbow. The remaining shoulder should then deliver spontaneously or following rotation into the oblique position to facilitate its delivery. In extreme cases, emergency caesarian may be necessary.

Pearls

1. Shoulder dystocia is an acute obstetric emergency that requires quick action.
2. After delivery, look for fractures of the infant’s clavicle or humerus and evidence of a brachial plexus injury. Damage to the fifth and sixth cervical nerve roots with resultant Erb palsy is the most common injury.



FIGURE 10.66 ■ Shoulder Dystocia. Firm approximation of the fetal head against the vaginal outlet consistent with shoulder dystocia. (Photo contributor: William Leininger, MD.)

Clinical Summary

Lacerations to the perineum commonly occur following a rapid, uncontrolled delivery of the fetal head. Postpartum perineal lacerations range from minor to severe and are categorized into four groups. First-degree lacerations are limited to the mucosa, skin, superficial subcutaneous, and submucosal tissues. Second-degree lacerations penetrate deeper into the superficial fascia and transverse perineal musculature. Third-degree lacerations extend through deeper tissues and disrupt the anal sphincter, while fourth-degree lacerations extend through rectal mucosa. These injuries can be associated with significant maternal blood loss and multiple long-term complications.

Management and Disposition

In ED deliveries, the repair of the episiotomy and/or perineal lacerations can be deferred to an obstetrician, the details of repair being beyond the scope of this book. If maternal blood loss is significant, apply pressure to control bleeding while awaiting definitive repair.



FIGURE 10.67 ■ First-Degree Laceration. First-degree laceration limited to the mucosa, skin, and superficial subcutaneous and submucosal tissues. There is no involvement of the underlying fascia and muscle. (Photo contributor: Jerry Van Houdt, MD.)

Pearls

1. Warm perineal compresses and manual perineal support reduce the risk of significant vaginal trauma from birth.
2. Perineal laceration repair fundamentally involves the sequential anatomic reapproximation of the rectal mucosa, anal sphincter, transverse perineal musculature, vaginal mucosa, and skin using absorbable suture material.

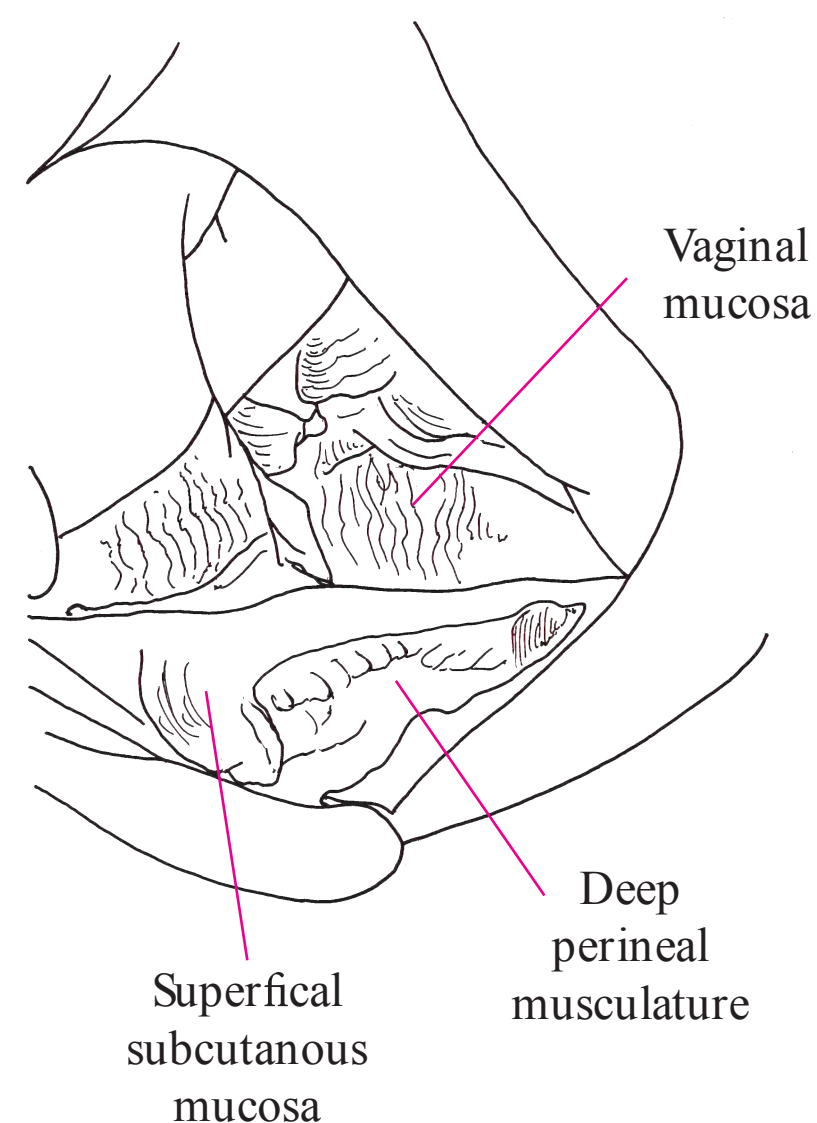
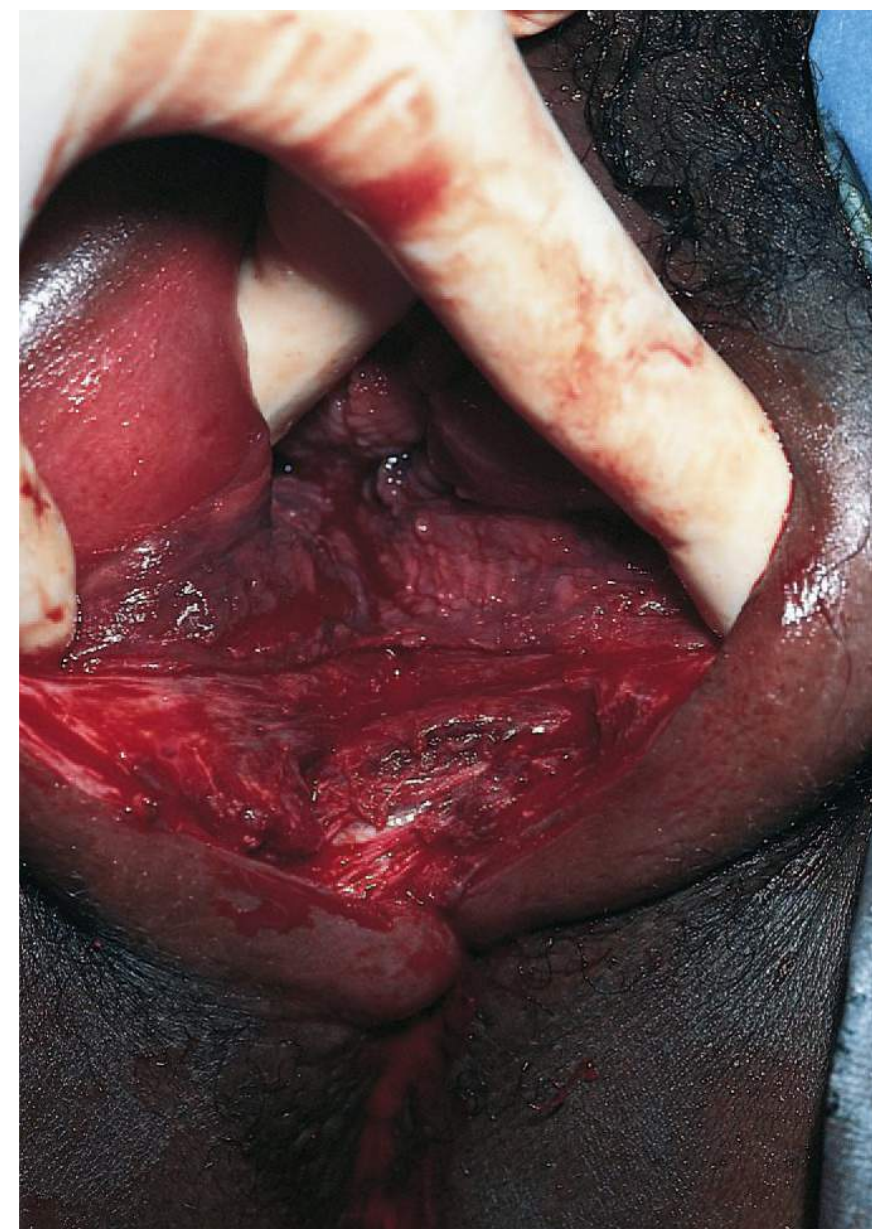


FIGURE 10.68 ■ Second-Degree Laceration. There is disruption of the hymenal ring and the deep perineal musculature, extending into the vaginal mucosa and transversalis fascia, but no involvement of the anal sphincter or mucosa. (Photo contributor: Pamela Ambroz, MD.)



FIGURE 10.69 ■ Fourth-Degree Laceration. Fourth-degree perineal laceration revealing wide separation of the perineal fascia and anal sphincter. The examiner's small finger is in the rectal lumen, showing extension of the tear proximally. (Photo contributor: Timothy Jahn, MD.)

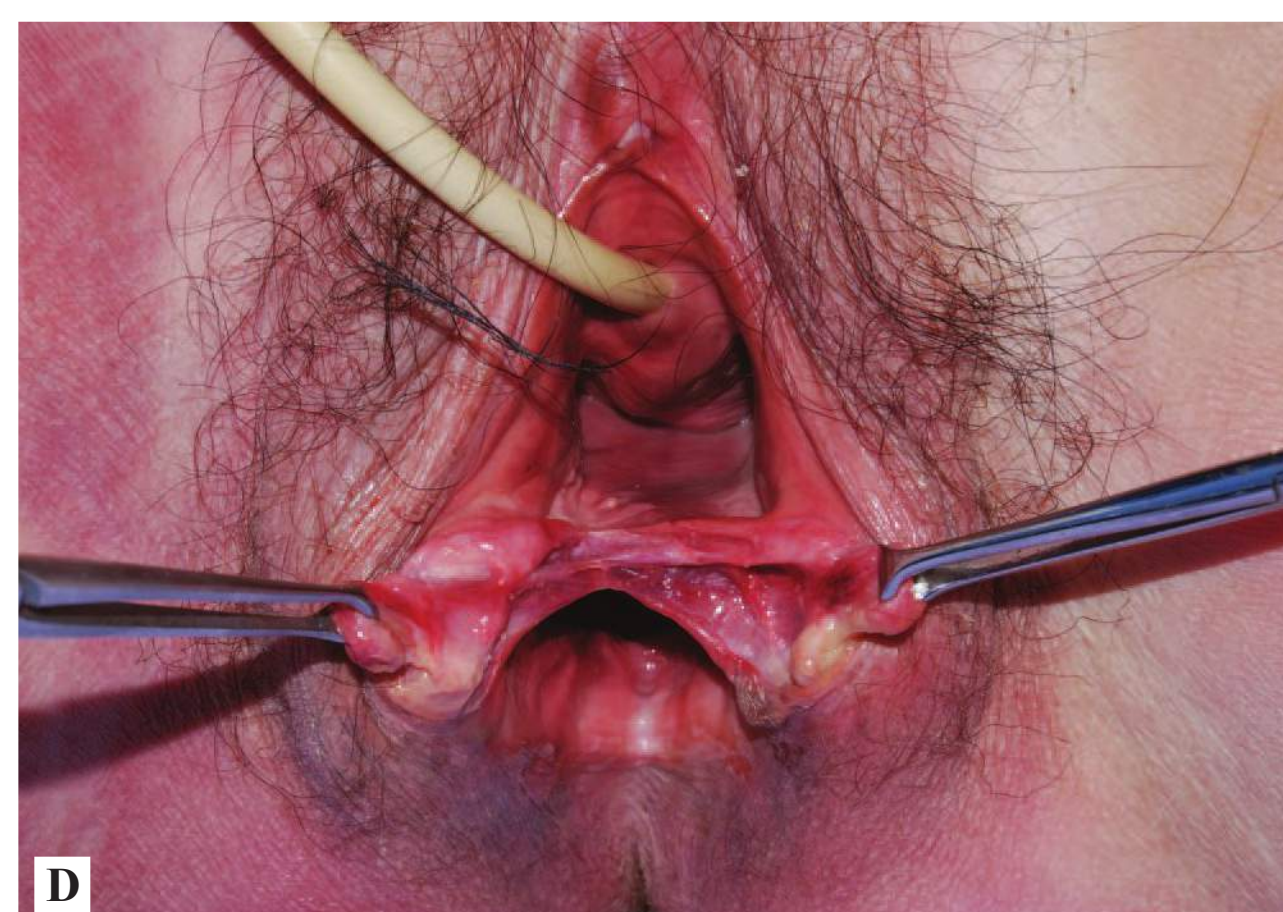
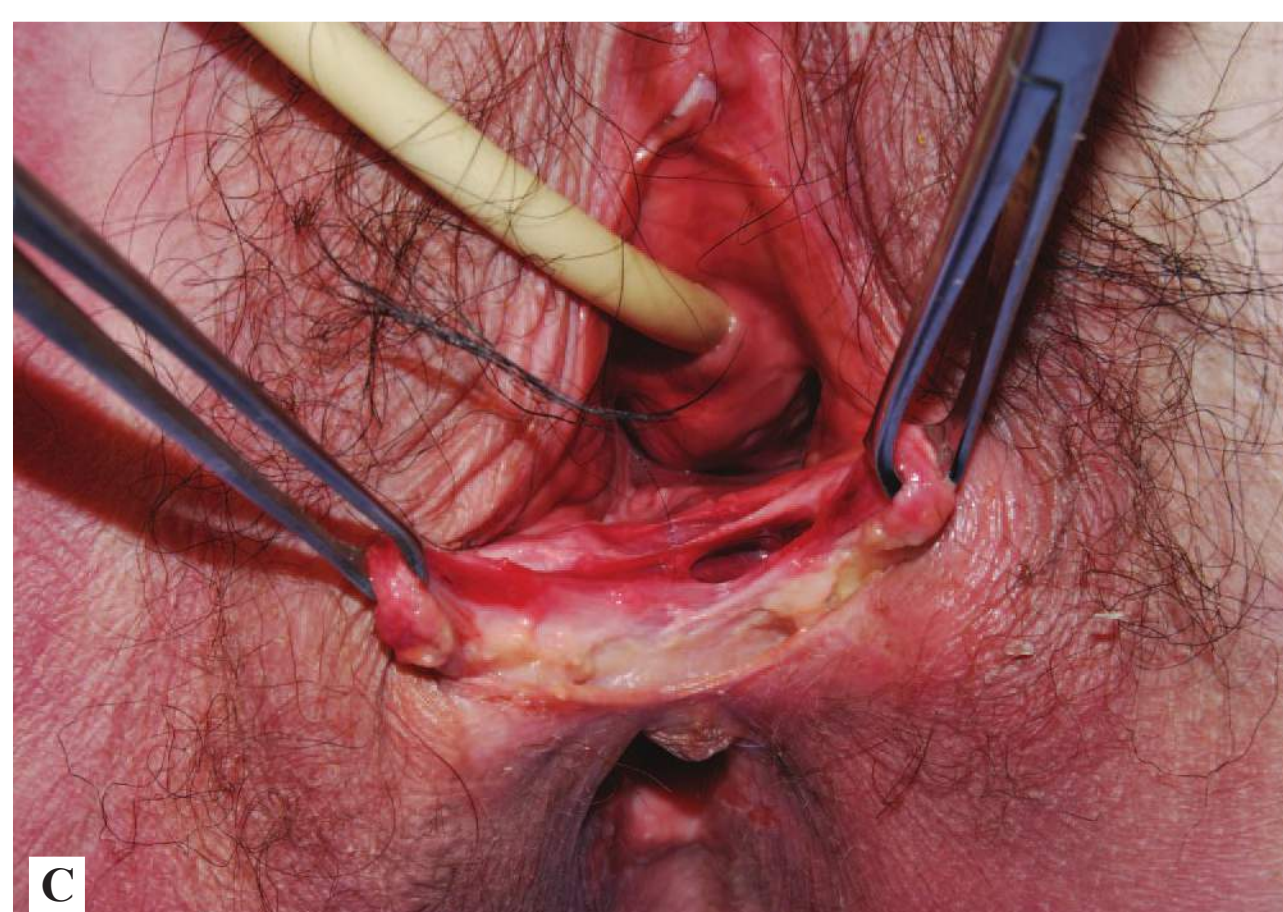
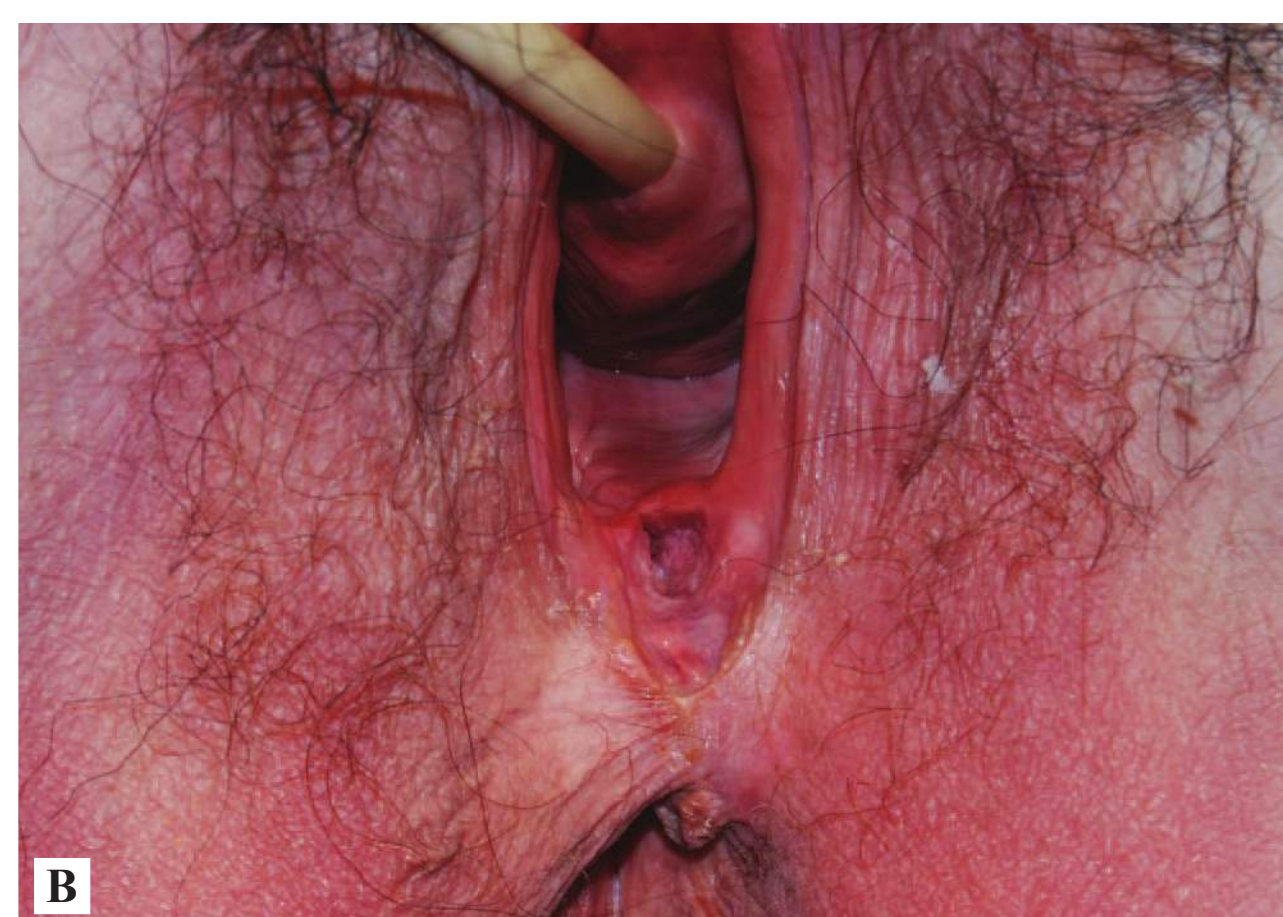
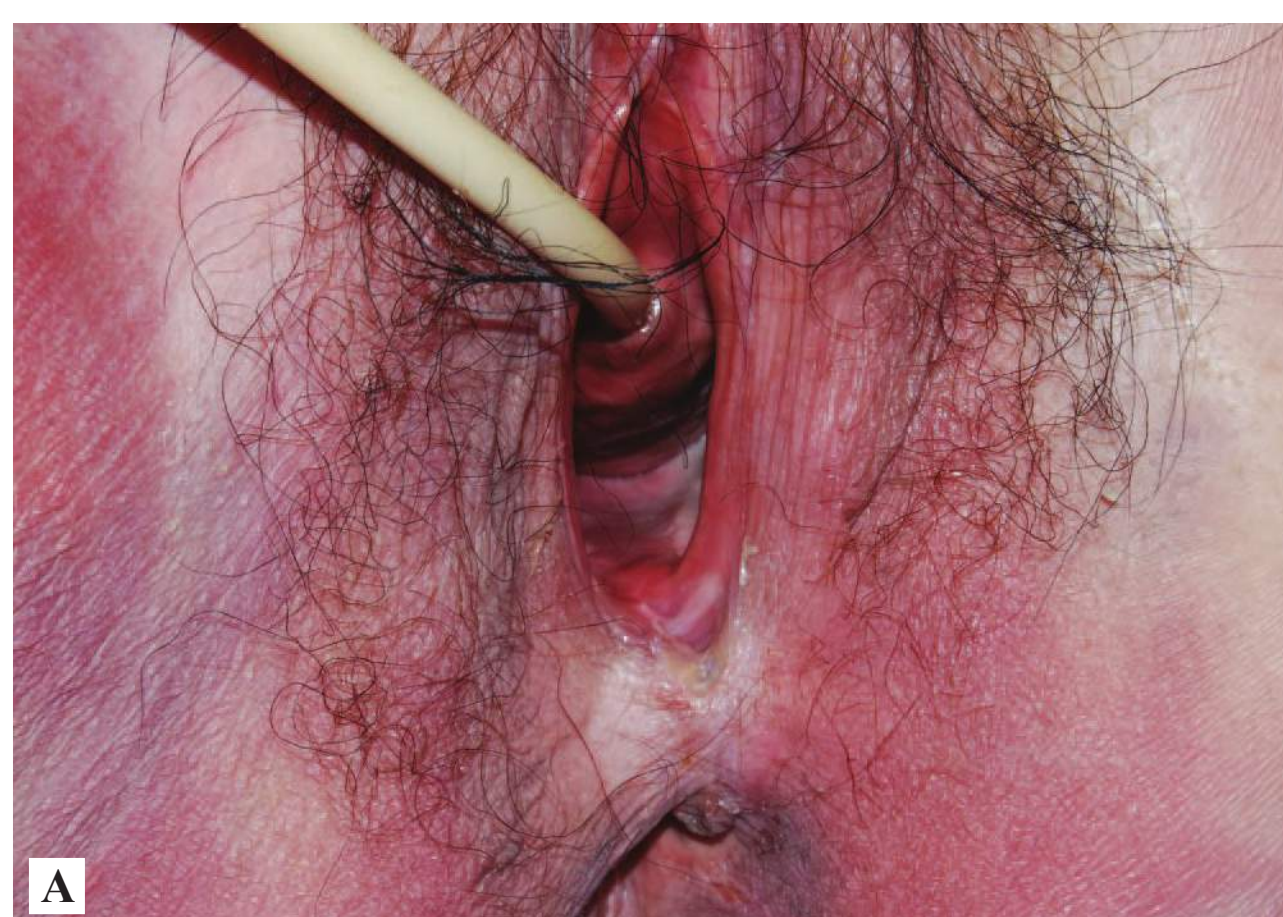


FIGURE 10.70 ■ Postpartum Perineal Lacerations. These cadaveric photographs illustrate the defining anatomy for first- through fourth-degree perineal lacerations. (A) First, (B) second, (C) third, and (D) fourth. (Photo contributor: Barbara Hoffman, MD.)

Clinical Summary

Intrauterine fetal demise (IUFD) refers to fetal death prior to delivery and may occur at any time prior to delivery. The timing of the IUFD is important for the ED physician to appreciate both for consoling and advising the parents and for anticipating the likelihood of successful neonatal resuscitation after delivery. The appearance of the fetus at delivery can be used to estimate whether the fetal demise occurred antepartum or peripartum.

The process of tissue degeneration (maceration) is due to the effects of autolytic enzymes on the fetus in a sterile environment. Lysis occurs at the epidermal-dermal junction with subtle changes in the gross appearance of the fetus (skin desquamation, positive Nikolsky sign) seen as early as 6 hours. Further changes involve desquamation and bullae formation of the face, back, or abdomen by 12 hours, at least 5% of the body surface at 18 hours, and generalized skin desquamation at 24 hours. Sloughing of skin from a large area indicates a

prolonged interval between death and delivery. Mummification occurs after approximately 2 weeks.

Management and Disposition

Anticipate and prepare for a normal delivery unless information regarding the condition of the fetus is known. Obtain obstetric consultation immediately as for any emergency delivery. The presence of fetal heart tracings during delivery or a normal appearing infant without significant skin changes indicates peripartum demise and neonatal resuscitation should be attempted. If signs of maceration are present, no resuscitative efforts are indicated.

Pearl

1. Desquamation and/or sloughing of skin from large or numerous areas in an unresponsive fetus indicate antepartum IUFD.



FIGURE 10.71 ■ Intrauterine Fetal Demise. Desquamation of the entire skin surface, with sloughing of the abdominal and scrotal skin, is seen in this IUFD. (Photo contributor: Lawrence B. Stack, MD).

