Penile Emergencies

Jeffrey Dubin, MD, MBA*, Jonathan E. Davis, MD

KEYWORDS
- Penis
- Priapism
- Paraphimosis
- Fracture
- Entrapment
- Pain
- Emergency

The penis is a very sensitive organ and even minor injury or discomfort may cause a patient to seek emergency evaluation. Emergency practitioners must be most concerned with the entities that, if left untreated, can result in ischemia and necrosis of the penis: ischemic priapism, paraphimosis, and entrapment injury. Any penile trauma should be considered an emergency until proven otherwise. This article discusses emergent penile complaints in adults, with emphasis on the most serious and common conditions.

ANATOMY

The penis consists of the paired corpora cavernosa, or erectile bodies, that lie dorsal to the corpus spongiosum (Fig. 1). The corpus spongiosum surrounds the penile urethra. The corpora cavernosa and corpus spongiosum are wrapped in a thin connective tissue layer, the tunica albuginea. The glans is the distal head of the penis. The distal foreskin, or prepuce, in uncircumcised men lies over the glans and can be retracted proximally to expose the glans. The coronal sulcus distinguishes the glans penis from the penile shaft.

EMERGENT CONDITIONS

Priapism

Priapism is defined as prolonged erection of the penis, generally lasting more than 4 hours, in the absence of sexual desire or stimulation. This medical condition was named after Priapus, an ancient Greek god of fertility and horticulture who was endowed with oversized genitalia.1 Ironically, one cause of priapism is prolonged effects of erectile dysfunction medications, making a pleasurable emulation of Priapus a painful one. More than one-third of patients with severe priapism may experience permanent erectile dysfunction despite treatment, resulting in obvious infertility or other emotional or functional sequelae.2
Priapism can be divided into two main categories. Ischemic priapism, also known as low-flow priapism, is the most commonly seen variant and is caused by painful venous engorgement of the corpora cavernosa and requires emergency treatment. Nonischemic (high-flow) priapism is rare and is often painless. It is caused by increased arterial inflow to the penis from traumatic arterial-cavernosal fistulae and does not require urgent treatment.

Ischemic priapism can be considered a compartment syndrome of the penis.3 The corpora cavernosa become engorged with stagnant, oxygen-depleted venous blood from either an intraluminal obstruction of venous blood flow or an inability of the penile muscle tissue to adequately contract and augment venous outflow.2 The causes of ischemic priapism are multiple and varied (Table 1).

The corporal smooth muscle dysfunction resulting in ischemia is most frequently caused by vasoactive medications or nerve dysfunction. Erectile dysfunction treatments inhibit the contraction of the smooth muscles of the corpora cavernosa.3 Injectable drugs, such as papaverine, and oral medications, such as sildenafil citrate or similar, can potentially be “too much of a good thing” and may cause permanent erectile dysfunction. α-Adrenergic blocking agents such as tamsulosin can also affect the smooth muscles of the cavernosa, resulting in complete or even partial priapism. Segmental thrombosis of single corpus cavernosa causing focal and unilateral priapism has been reported as a result of tamsulosin use.4

Other antihypertensive drugs, such as prazosin and labetalol, have been associated with priapism through similar mechanisms.5 Antidepressant and antipsychotic medications, both older and newer, may cause ischemic priapism. Atypical antipsychotic drugs, such as ziprasidone, have been shown to cause ischemic priapism, presumably through the same α-receptor mechanism.6 Other drugs that have also been associated with priapism include anticoagulants, testosterone, immunosuppressants (eg, tacrolimus), recreational drugs (eg, cocaine, marijuana), and alcohol.3

Neurologic causes of ischemic priapism are believed to include the inhibition or dysfunction of the autonomic smooth muscles of the corpora cavernosa. Spinal cord injuries, stroke, cauda equine syndrome, spinal disc disease, epidural anesthesia, and neurosyphilis have been known to cause priapism.3 Ischemic priapism has even been reported after hip arthroplasty, presumably caused by intraoperative nerve injury.7
Intraluminal obstruction is the cause most often seen in patients with sickle cell disease. Clumping of sickle cells causes venous outflow obstruction, leading to a painful, engorged penis. Over one-third of men with sickle cell anemia may develop ischemic priapism at least once during their lifetime.8 Additional conditions that cause ischemic priapism in a similar manner of hyperviscosity or red cell or platelet aggregation include other hemoglobinopathies and blood dyscrasias, parental nutrition, and heparin-induced thrombocytopenia.3 Obstruction of the venous outflow to the corpora cavernosa can also occur from local invasion of, or metastasis from, genitourinary and rectal cancers.9,10

A subtype of ischemic priapism is known as stuttering priapism. This entity is typically observed in patients with sickle cell disease. Patients experience recurrent episodes of priapism that often last less than 3 hours and often do not require emergency treatment unless symptoms become markedly prolonged.11

Whether from intraluminal vaso-occlusion or penile vascular bed smooth muscle dysfunction, the resulting ischemic priapism can quickly cause permanent damage to the penis if left untreated. However, even with effective treatment, future erectile dysfunction is still a possibility. After 4 hours of persistent priapism, a heightened release of inflammatory cytokines occurs in the acidic and hypoxic corpora cavernosa.

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### Table 1
Selected etiologies of ischemic (low-flow) priapism

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
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<tbody>
<tr>
<td>Medications</td>
<td></td>
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<tr>
<td>Impotence agents</td>
<td>Intracavernosal therapies (prostaglandin E1, papaverine, phentolamine)</td>
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<tr>
<td></td>
<td>Oral agents (ie, sildenafil)</td>
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<tr>
<td>Antihypertensives</td>
<td>Hydralazine, prazosin, doxazosin</td>
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<tr>
<td>Antidepressants</td>
<td>Trazadone, fluoxetine, sertraline, citalopram</td>
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<tr>
<td>Antipsychotics</td>
<td>Phenothiazines, atypical antipsychotics</td>
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<tr>
<td>Illicit substances</td>
<td>Cocaine, marijuana</td>
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<tr>
<td>General anesthetics</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>Hydroxyzine, metoclopramide, omeprazole, total parenteral nutrition</td>
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<tr>
<td>Hematologic disorders</td>
<td></td>
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<tr>
<td>Sickle cell disease</td>
<td></td>
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<tr>
<td>Leukemia</td>
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<td>Myeloma</td>
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<tr>
<td>Central nervous system</td>
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<tr>
<td>Brain</td>
<td>Cerebrovascular accident</td>
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<tr>
<td>Spinal cord</td>
<td>Spinal stenosis, spinal cord injury, lumbar disc herniation</td>
</tr>
<tr>
<td>Others</td>
<td></td>
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<tr>
<td>Infections</td>
<td>Malaria, rabies</td>
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<tr>
<td>Toxins</td>
<td>Black widow, scorpion</td>
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<tr>
<td>Carbon monoxide</td>
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<tr>
<td>Hypertriglyceridemia</td>
<td></td>
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<tr>
<td>Idiopathic</td>
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cavernosa. Inflammation may include smooth muscle changes, including cell death and fibrosis, which may cause permanent erectile dysfunction.\textsuperscript{12}

Evaluation of the patient with priapism may involve several steps before a final cause can be identified. Patient history can help differentiate between ischemic and nonischemic priapism. Ischemic priapism is painful, nontraumatic, and may be associated with a history of priapism, hemoglobinopathy, or vasoactive drug use, whereas nonischemic priapism is typically painless and caused by traumatic injury. Patients with ischemic priapism often present shortly after onset of symptoms because of pain, whereas patients with nonischemic priapism may present after several hours or days of symptoms. On physical examination, ischemic priapism will present with a rigid penile shaft but soft glans. Patients with nonischemic priapism will often have a partial erection, but the entire penis, including the glans, will be firm. The presence of the “peisis sign,” which is partial or complete resolution of the erection during compression of the perineum, may also help support the diagnosis of nonischemic priapism.\textsuperscript{13} Any patient presenting with the first episode of priapism and who is not known to have sickle cell disease should have a sickle cell preparation and a complete blood cell count, regardless of ethnicity.

Aspiration of the corpora cavernosa is helpful in distinguishing ischemic from nonischemic priapism. The blood gas of ischemic priapism will be grossly dark in color and have a pH less than 7.25, a PaO\textsubscript{2} less than 30 mm Hg, and a PaCO\textsubscript{2} greater than 60 mm Hg. In contrast, corporal blood gas from nonischemic priapism will appear much closer to normal arterial blood gas, typically with a pH greater than 7.30, PaO\textsubscript{2} greater than 50, and PaCO\textsubscript{2} less than 40. Finally, color duplex ultrasound of the penis and perineum may be useful in assessing for the presence or absence of blood flow through the cavernosal arteries. Absent blood flow will confirm the diagnosis of ischemic priapism. Normal or increased blood flow will support the diagnosis of nonischemic priapism. Arteriography may be indicated for nonischemic priapism, but it is often performed when embolization treatment is planned rather than as an initial diagnostic modality.\textsuperscript{2,3}

A urologic surgeon typically manages treatment of acute priapism. However, treatment for ischemic priapism will frequently need to be initiated in the emergency setting while awaiting specialty consultation. The classic teaching is that the initial treatment—oral (or subcutaneous) terbutaline—is the same regardless of inciting cause, although its efficacy is debated.\textsuperscript{14–16} Terbutaline, a ß\textsubscript{2}-adrenergic agonist, is thought to increase venous outflow from the engorged corpora through relaxation of venous sinusoidal smooth muscle. Terbutaline has an unproven benefit; however, given its limited propensity for adverse effects, a trial is reasonable in select circumstances while awaiting specialty consultation.\textsuperscript{17}

If terbutaline fails to work rapidly, the next step in the treatment of priapism is corporal blood aspiration, saline irrigation, and injection of an \( \alpha \)-adrenergic receptor agonist such as dilute phenylephrine. Phenylephrine should be diluted in normal saline to a concentration of 0.1 to 0.5 mg/mL, and 1-mL injections made every 3 to 5 minutes for 1 hour. Lower concentrations in smaller volumes should be used in children and patients with severe cardiovascular disease.\textsuperscript{16} Use of a preprocedure penile block is essential.

In addition to the treatment directed at acutely relieving the tumescence, other underlying causes, if they exist, should be treated. For example, patients with sickle cell disease may benefit from intravenous fluids and supplemental inhaled oxygen. However, recent literature debunks prior recommendations regarding blood transfusion for patients with priapism caused by sickle cell anemia, and thus routine transfusion is no longer recommended.\textsuperscript{18} Certainly any potentially offending
medications should be discontinued, if possible, and in rare cases of priapism caused by malignancy, further treatment such as local radiation should be considered. Treatment of stuttering priapism includes preventative daily antiandrogen therapy, such as cyproterone acetate, or gonadotropin-releasing hormone drugs, such as leuprolide, which paradoxically reduce the frequency of priapism but do not inhibit sexual activity. A promising new treatment is daily treatment with low-dose inhibitors of the enzyme phosphodiesterase type 5. These agents may reduce cellular nitric oxide action and decrease vasodilation, thus reducing erection duration. However, even patients with stuttering priapism may require emergency treatment for typical ischemic priapism in the setting of particularly severe symptoms or a markedly prolonged erection.11

Regardless of the precipitating cause of ischemic priapism, surgical shunt procedures are used as a last resort in patients with low-flow priapism unresponsive to the aforementioned treatments.2,3

Treatment of nonischemic priapism requires less urgency. No risk of long-term damage is associated with the absence of immediate treatment and, although the condition is distressing, pain is not a prominent feature. Conservative therapies, such as rest, ice packs, and observation for several days, will help resolve the inciting arteriovenous fistulae in more than 60% of cases; however, of those who improve (detumescence), nearly one-third may still experience erectile dysfunction.19 If conservative management fails or is otherwise nonfeasible, embolization is the next step. Embolization has a greater than 90% success rate in treating priapism, but still nearly 10% of patients may have erectile dysfunction after this procedure.20 Surgical ligation of the cavernosal artery or ligation of the fistula may be required if embolism fails.21 However, after ligation, close to half of patients experience erectile dysfunction.19 Alternative methods to treat nonischemic priapism include injection of thrombin or methylene blue into the corpora cavernosa in an effort to occlude the arteriovenous fistula, but these should be considered less favored alternatives to embolization.3

Paraphimosis

Paraphimosis is the inability to completely reduce the penile foreskin distally back to its natural position overlying the glans penis. This condition occurs in uncircumcised men. The entrapped distal foreskin forms a constricting band on the penile shaft. Compression inhibits venous drainage of the glans and results in a vicious circle of progressive glans edema that further prevents reduction foreskin distally. Glans edema may become so severe that arterial inflow is compromised and may result in necrosis and gangrene of the glans, which rarely may even be complicated by the development of necrotizing fasciitis.22 Patients will present with a red, painful, and swollen glans penis associated with an edematous, proximally retracted foreskin that forms a circumferential constricting band. The penile shaft proximal to the constricting band is typically soft.

Paraphimosis often occurs in the extremes of life. It may commonly occur in elderly patients after urinary catheterization or medical examination if the foreskin is not returned to its natural location over the glans, termed iatrogenic paraphimosis. Poor hygiene and balanoposthitis (see later sections on Balanitis and Posthitis) at any age are also associated with development of paraphimosis. Inflammation can result in contracture of the distal foreskin. Later when the foreskin is retracted proximally over the compressible glans, the contracted foreskin forms a constrictive band and gets “stuck” in the retracted position. One theory regarding the predisposition of elderly men to paraphimosis is decreased frequency of erections from dysfunction,
reduced libido, or other factors causes natural dilation of the preputial orifice to occur less frequently, elevating the entrapment risk.23 Paraphimosis may also occur after intercourse or other sexual activity.24 Paraphimosis has even been observed after prolonged erections experienced during cultural celebrations involving many hours of erotic dancing.25 Uncircumcised men must be vigilant about foreskin replacement after sexual activity, and should be instructed to seek care immediately if a paraphimosis develops.26 Trauma and purposeful and accidental tourniquets may cause paraphimosis (see later section on Penile Trauma, Entrapment, and Foreign Body). Some uncommon causes of paraphimosis include genital piercings,27 plasmodium falciparum,28 chancroid,29 lichen sclerosis, and contact dermatitis.30 Special consideration should be given to the care and evaluation of developmentally disabled men who require assistance with genital hygiene. Patients and their caregivers may be unaware of the potential for or the development of paraphimosis and the need to treat it emergently.30

Paraphimosis is a urologic emergency that must be treated promptly to prevent glans necrosis. Paraphimosis can frequently be managed in the emergency department without the need for emergent specialty consultation. Many methods for successful paraphimosis reduction have been reported; however, the most commonly used initial maneuver involves manual compression of the distal glans penis to decrease edema, followed by reduction of the glans penis back through the proximal constricting band of foreskin.31

Glans edema must be reduced so that the edematous foreskin can be moved distally, back to its natural position. Typically this is performed with manual pressure on the glans to decrease the edema; the foreskin may then be pulled distally into the normal position (Fig. 2). This technique can be difficult and painful, and therefore many adjunctive methods have been reported to first help reduce glans swelling. Routinely used maneuvers include the application of ice packs (filling the tip of an examining glove with ice is often recommended) or wrapping the glans in compressive bandages. Alternatively, techniques focusing on reducing foreskin edema have been advocated. The Dundee technique involves making multiple micropunctures of the edematous foreskin and then squeezing out the edema fluid.32

Hyaluronidase has been reported to result in rapid reduction of prepuce edema, which facilitates manual reduction of the foreskin. This enzyme, when injected into

Fig. 2. Paraphimosis reduction. (From Barone JG, Fleisher MH. Treatment of paraphimosis using the “puncture” technique. Ped Emerg Care 1993;9(5):299; with permission.)
the swollen retracted foreskin, causes hydrolysis of hyaluronic acid that in turn increases tissue permeability so that the edema in the foreskin is diffused out into the surrounding tissue of the penis.\textsuperscript{33} There have even been advocates of a completely noninvasive way to reduce the foreskin edema through applying granulated sugar to the penis. This sugar forms an osmotic gradient that draws out the fluid to reduce the edema, but this may take several hours.\textsuperscript{34} Publications on these procedures are generally observational in design and involve small numbers of patients, such as case reports. No large studies of comparative effectiveness have been conducted, and therefore recommending any one method over another is difficult.\textsuperscript{35}

Despite these various minimally or noninvasive methods to treat paraphimosis, sometimes a dorsal slit procedure or even formal circumcision is required emergently for resistant cases.\textsuperscript{31} Referral to a urologic surgeon for routine follow-up is prudent after successful paraphimosis reduction, because patients may benefit from elective circumcision to prevent recurrence. A condition of chronic paraphimosis was recently described, in which patients present 1 week or more after the onset of paraphimosis.\textsuperscript{36} A mildly constricting yet irreducible fibrous band of foreskin is present, but glans edema or necrosis is absent. Pain only develops with erections, and therefore treatment is frequently delayed. Patients diagnosed with chronic paraphimosis require modified or formal circumcision for treatment.\textsuperscript{36}

**Penile Trauma, Entrapment, and Foreign Body**

Penile trauma, entrapment, and foreign bodies are frequently painful and distressing conditions for patients. Genitourinary injury or trauma should be considered an emergency requiring urologic surgical consultation until proven otherwise. Significant trauma, such as penile amputation, deep laceration, or urethral injury, frequently requires emergent surgical evaluation and management. However, most minor injuries can be safely managed in the emergency setting without the need for subspecialty consultation.

Burns to the penis require referral to a dedicated burn unit with experience in treating these injuries.\textsuperscript{37} With appropriate care, even deep partial-thickness penile burn injuries can have favorable functional outcomes without deep scarring and contractions. Skin matrix substitutes placed after burn debridement function as scaffolding for new dermis growth before skin grafting and may serve as an effective barrier to infection.\textsuperscript{38}

Zipper injuries are more common in children than adults. Often the patient is uncircumcised and the foreskin gets caught and crushed when the zipper is closed. Lubricants such as mineral oil can be used to free the skin from the zipper, but this does not always work. Cutting the median bar of the zipper will separate the zipper, allowing the two sides of the zipper to fall apart. The median bar is the small piece of metal that connects the anterior and posterior plates of the zipper. A bone or wire cutter is needed to divide the median bar (Fig. 3).\textsuperscript{39} If these tools are unavailable, another method is to grasp opposite sides of the zipper, one inferior and one superior to the site of zipper entrapment, and slowly separate the teeth by pulling in opposite directions. Local anesthesia is recommended before using this method.\textsuperscript{40} If these methods fail to release the entrapped foreskin, emergent partial or complete circumcision to separate the prepuce from the zipper may be necessary.

Glans edema mimicking paraphimosis can occur in circumcised or uncircumcised men in penile entrapment injuries. In these instances, external objects may constrict the mid to distal shaft, leading to the same pathophysiologic derangements seen
with paraphimosis. Objects may either be placed intentionally for sexual stimulation or may occur sporadically, as in the case of a hair tourniquet in male infants. Hair tourniquets may be particularly difficult to diagnose, because the offending hair may be nearly invisible within an engorged and edematous coronal sulcus. An occult hair tourniquet should be considered, along with testicular torsion, in male infants who are crying inconsolably.

In adolescent or adult men, rings or other constricting bands may be used for self-stimulation or to maintain an erection. Depending on the object and degree of entrapment and distal edema, release may be challenging. Occasionally, constricting objects may be removed without the need for cutting or sawing. One method is the string method. Similar to that used to remove a ring from a finger, a flat string is passed under the ring so that it protrudes proximally. Then the distal end of the string is wound around the penis and when the proximal end of the string is pulled up and distally, with luck the ring will move distally, little by little, until it is removed. Glass saws may be helpful for removing glass bottles, but plastic bottles are not easily cut by a glass saw or scalpel. Rather, an oscillating cast saw is recommended for an entrapped plastic bottle. Using a splint device, such as a wooden tongue depressor blade, between the bottle and the skin of the penis is recommended.

Metal devices may be removed with ring cutters, but may require heavy equipment such as pneumatic saws used by fire department personnel to extricate victims from crushed automobiles. One challenge in using these machines is that the skin entrapped under the device must be protected from the blade. In some cases, aspiration of blood from the entrapped corpora cavernosa may relieve enough edema so that a protective device can be placed before engaging the saw. Because a great deal of heat is often generated from these saws, continuous irrigation of the area with cold water or saline is also necessary to protect the penis from thermal injury. Time is critical when removing entrapped objects. With prolonged duration of entrapment, ischemia or gangrene of the distal penis may occur, in the most severe cases placing the penis at risk for possible amputation.
In addition to foreign bodies placed around the penis shaft, foreign bodies are sometimes placed in the urethra or directly into the penis or scrotum. These objects are not always placed for sexual gratification. In one reported case, an elderly man was seen after complications occurred from placing a bean in his urethra as a plug to treat incontinence.47 When faced with a urethral foreign body, the object may be grasped with a needle holder or clamp and removed with gentle traction. However, the goal is to remove the object without causing further damage and propelling the object further proximally. If the object cannot be readily removed, then specialty consultation will be necessary. A retrograde urethrogram is often unnecessary if the object is smooth and can be readily visualized at the meatus.48 Foreign bodies identified in the penile shaft or scrotum should not be assumed to be the only embedded objects, because patients who place items in their genitalia may have multiple foreign bodies from prior insertions.49 Patients with foreign bodies in their penis may present early because of pain and bleeding or late as a result of infection. Men may inject items such as petroleum jelly, oil, silicon, or paraffin directly into the penile shaft in an attempt to enlarge the penis or enhance sexual stimulation. Unfortunately, these patients may seek emergency care for pain or infection. Injections may result in chronic abscesses and fistulas, pain with erection, swelling, or phimosis. A granulomatous reaction to the foreign material can occur, often necessitating surgery to remove the injected substances.50 This surgical cure is invasive and skin grafting is frequently necessary to close the wounds.51

OTHER CONDITIONS

Phimosis

Phimosis is a condition in which the prepuce cannot be retracted proximally over the glans. Similar to paraphimosis, phimosis occurs in uncircumcised men. However, unlike paraphimosis, it seldom requires emergency treatment. Phimosis is typically a chronic condition that may present acutely when a patient is unable to void spontaneously as a result of distal urethral obstruction. Phimosis occurs naturally in newborns and is caused by physiologic adherence between the epithelial lining of the glans and distal foreskin, leading to a nonretractile foreskin. By 3 years of age, fewer than 10% of foreskins remain nonretractile, with nearly all becoming retractile by late adolescence.52

Pathologic phimosis exists when the failure to retract results from distal scarring of the prepuce. A white fibrous band may even be visible around the distal preputial orifice.53 Severe balanitis and posthitis may result in pathologic phimosis. Complications of phimosis include preputial stone formation or urine obstruction, which may require emergency treatment with a dorsal slit procedure to allow for free urine flow.54

Balanitis and Posthitis

Balanitis is inflammation of the glans penis, and posthitis is inflammation of the penile foreskin. Often both the glans and foreskin are inflamed, termed balanoposthitis. Glans or prepuce inflammation is often caused by infection. Uncircumcised men are at risk for developing infection because the tight foreskin, together with poor hygiene and smegma buildup, creates an environment conducive to the development of inflammation. Patients with this condition typically complain of a red, edematous glans or foreskin, often with discharge. Determining the causal agent may be challenging. Candida albicans is the causal agent in nearly one-third of balanitis cases.55 The typical findings of candidiasis are erythema and papules with “satellite” lesions. Burning and pruritis may also be present. Candida can be contracted from sexual activity with an infected
partner. Diabetics or other immunosuppressed patients are at risk for candidal balanitis or posthitis. Treatment with topical azole antifungal agents and effective hygiene typically is sufficient, but in severe cases a single oral dose of 150 mg of fluconazole may be necessary.\textsuperscript{55} Other common infectious causes include streptococcal and staphylococcal species, which typically require oral antimicrobial treatment. Sexually transmitted diseases, including chlamydia and syphilis, may also cause balanitis and posthitis. Therefore, cultures or other diagnostic testing for suspected causal agents may be necessary to help guide treatment.\textsuperscript{56} Balanoposthitis may be complicated by phimosis, cellulitis of the penile shaft, or abscess formation.\textsuperscript{57}

Noninfectious causes of balanoposthitis occur less frequently overall, yet remain important considerations.\textsuperscript{58} Contact dermatitis may occur from condoms, spermicidal, or lubricating gels associated with condom use.\textsuperscript{59} Lichen planus is an inflammatory dermatosis that affects only the glans (balanitis), causing itchy red and whitish plaques. It is treated with high-potency topical steroids.\textsuperscript{60} Balanitis xerotica obliterans is a rare condition of unknown origin that causes chronic inflammation of the glans, dry skin, and pruritis, and may be associated with endarteritis.\textsuperscript{61}

**Sexually Transmitted Disease**

Several sexually transmitted diseases are associated with penile findings or discomfort. Urethritis may result in symptoms of dysuria, penile discharge, and urethral pruritus. Confirmatory testing is helpful in targeting treatment. Alternatively, empiric treatment for both gonorrhea and chlamydia is an accepted common practice. Current Centers for Disease Control and Prevention treatment recommendations are for 250 mg of ceftriaxone intramuscularly for gonorrhea treatment, plus 1 g of azithromycin orally or 100 mg of doxycycline orally twice daily for 7 days for chlamydia treatment. Patients should be encouraged to notify all sexually partners, because contacts also require evaluation and treatment.\textsuperscript{62}

Chancroid is caused by infection with *Haemophilus ducreyi* and results in a painful, friable, nonindurated, necrotic ulcer that may form anywhere on the penis. Chancroid ulceration on the prepucce may result in balanoposthitis or phimosis. Treatment involves 1 g of azithromycin orally or 250 mg of ceftriaxone intramuscularly. Although primary syphilis can cause a genital ulcer (chancre), it is often a painless lesion in contrast to chancroid.\textsuperscript{63}

Herpes simplex virus (HSV) types 1 and 2 cause lifelong recurrent infections. HSV-2 is the causal agent in nearly all outbreaks of genital herpes. Crops of papules or vesicles, progressing to pustules or ulcers, characterize this painful condition. A burning sensation or pruritis with genital herpes may be present, and patients with initial infection may develop urinary retention. Empiric treatment should not be delayed while awaiting results of confirmatory diagnostic studies. Treatment for the first outbreak of genital herpes is 400 mg of acyclovir orally 3 times daily for 7 to 10 days. For recurrent herpes, the treatment is shortened to five days.\textsuperscript{42,64}

**Penis Fracture**

Fracture of the penis is a rare urologic emergency. Injury to the corpus cavernosum typically occurs during vigorous sexual intercourse when the penis may slip out and be pushed against the partner’s perineum, during masturbation, or rarely from rolling over in bed with an erect penis.\textsuperscript{65} Penis fracture during masturbation may occur if an erect penis is forcefully bent in attempt to quickly reduce the erection.\textsuperscript{66} Classic historical features of penile fracture include a cracking sound followed by pain, rapid detumescence, swelling, and ecchymosis. The penis will often be deformed and bent in the direction of the uninjured corpora cavernosum.\textsuperscript{67} The injury is caused by an acute tear
of the tunica albuginea, which becomes very thin during erection and is easily torn with sudden bending. Usually one corpora cavernosa is torn, but bilateral cavernosal injuries may occur simultaneously. Potential coexisting injuries include those to the penile urethra, corpus spongiosum, or dorsal vein of the penis. The dorsal vein of the penis becomes stretched during erection and may tear in a similar manner to the tunica albuginea. In isolated dorsal vein injury, pain and ecchymosis will be present, but the classic cracking sound and sudden detumescence will be absent. Patients with urethral injuries are at risk for developing urethral strictures.

Emergency surgical exploration and repair are recommended to treat penile fractures. However, the option of delaying surgical repair for 7 to 12 days has been suggested, particularly in patients presenting more than 24 hours after fracture and without coexisting urethral injury. If blood is present at the urethral meatus, a preoperative urethrogram should be performed. Alternatively, the urethra can be explored during surgery. Some authors recommend MRI before surgery to delineate the extent of injury and help direct where the incision should be made. In some cases, MRI may prevent unnecessary surgery if imaging shows only a hematoma rather than a tear of the tunica albuginea. Most patients recover well after surgical repair, but roughly 10% will have permanent curvature of the penis and some will experience pain during intercourse. Erectile dysfunction after repair is rare. One long-term follow-up study showed that fewer than 2% of patients become impotent.

**Peyronie’s Disease**

Peyronie’s disease was first reported in 1743. It is a connective tissue disorder in which plaques or scars form in the tunica albuginea, resulting in penile pain, induration, palpable plaques on the shaft that cause abnormal curvature of the erect penis, and ultimately erectile dysfunction. The characteristic scar formation can occur after major trauma and minor “microtrauma” during intercourse. In many cases, patients will not recall any distinct precipitating traumatic event. Patients with Peyronie’s disease are thought to have a genetic predisposition for abnormal scar formation. Patients should be referred for nonurgent urologic surgery follow-up. Typical therapies range from tocopherol (vitamin E) pills to plaque injections with interferon α.

**Penile Calciphylaxis**

Penile calciphylaxis is a rare disorder. Patients may present with severe penile pain from ischemia caused by calcification and fibrosis of the penile arteries. In its most extreme form, it may progress to gangrene, requiring penectomy. The underlying cause is often secondary hyperparathyroidism associated with end stage renal disease. Affected patients may also have concurrent calciphylaxis of the limbs. Emergency urologic surgical consultation is needed for infection or necrosis requiring debridement.

**SUMMARY**

Of the various penile conditions discussed, emergency practitioners must be most concerned with the entities that, if left untreated, can result in ischemia and necrosis of the penis, namely ischemic priapism, paraphimosis, and entrapment injuries. In addition, any penile trauma should be considered an emergency until proven otherwise. Emergency clinicians must be able to recognize these emergent conditions, begin treatment, and obtain timely urology consultation if necessary. Many other
penile conditions can be safely and effectively managed without the need for emergent specialty consultation, and thus can be referred for urgent outpatient follow-up.

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