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PRIAPISM: WHAT EVERY NON-UROLOGIST SHOULD KNOW ABOUT?

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INTRODUCTION

The term priapism has its origin related to the Greek god Priapus, who was worshipped as a god of fertility, gardening and lust. Priapus is memorialized in sculptures for his giant phallus (1).

Priapism is defined as a persistent and painful erection of the penis or clitoris that is not associated with sexual stimulation or desire that continues for more than 4 hours beyond. Although non-ischemic priapism (NIP) is not an urgent urological problem, prolonged acute ischemic priapism (>4 hours), characterized by little or no cavernous blood flow and abnormal cavernous blood gas analysis, requires immediate treatment in order to preserve sexual function (2).

Some epidemiological studies have reported the incidence of priapism to be 0.3 to 1.0 per 100,000 males per year in United States (3). There is a bimodal peak distribution of incidence, occurring between 5 and 10 years in children and 20 to 50 years in adults. (4)

Priapism is relatively rare but can occur in all age groups and consists in a medical emergency. Given its time-dependent and progressive nature, it is a situation that both urologists and emergency medicine practitioners must be familiar with and comfortable managing. However, not all forms of priapism demand immediate intervention. The ischemic priapism represents a medical emergency and may lead to a progressive cavernosal fibrosis and subsequent erectile dysfunction, while non-ischemic priapism can only be observed and followed up (5,6).

Based on episode history and pathophysiology, priapism is classified into three subtypes: ischemic (venoocclusive, low-flow), non-ischemic (arterial, high-flow), and stuttering (intermittent) priapism.

Clinical manifestations

Normal penile erection begins with the relaxation of the smooth muscle of cavernosal arteries and corpora cavernosa, leading to increased arterial inflow, filling of sinusoidal spaces and decreased venous outflow. As intracorporal pressure rises, the inflow of blood ceases. If the erection is prolonged (> 4 hours), it means that there is no outflow of blood from the inside of the corpora cavernosa, which characterizes an acute ischemic priapism. The subjacent cause is not identified in most cases (idiopathic priapism), but medications and diseases have been correlated (secondary priapism). In adults, the use of intracavernosal injections is the most common cause, presented in 25% of the cases. (7). Table 1 summarizes the possible etiologies.

Early identification of the diagnosis, as well as the sub-type of priapism, allows for rapid initiation of treatment (8). Historical features, such as baseline erectile function, duration of erection, degree of pain, previous story of priapism, use of drugs, trauma, personal or family history of hematologic disorder, should be identified (9). The duration of priapism is strongly associated with subsequent erectile dysfunction, since 90% of men with an ischemic priapism lasting 24 hours do not regain the ability to have sexual intercourse (10). Tissue damage is believed to occur at the microscopic level as early as four to six hours after onset of erection (6).

In ischemic priapism, the patient typically presents with a painful and rigid erection. But, in non-ischemic priapism there is an association with a history of trauma (perineal or penile trauma, needle injection or urologic procedures) and an incomplete erection that is less painful.

Stuttering priapism (intermittent) characterizes a pattern of recurrence. The term has historically described recurrent unwanted and painful erections in men with sickle-cell disease (SCD) (11). Patients typically awaken with an erection that persists for several hours. Unfortunately, males with SCD may expe-

Table 1. Etiology of priapism. PDE5: phosphodiesterase type 5.

Primary (idiopathic)
Secondary
Hematologic – sickle cell disease, leukemia, thalassemia, multiple myeloma, thrombotic thrombocytopenic purpura
Neurologic – spinal shock, cauda equina syndrome, spinal anesthesia
Metastatic neoplasm – prostate, testis, urethra, bladder, rectal
Perineal, pelvic, or penile trauma
Drugs – anticoagulants, antihypertensives, antidepressants, PDE5 inhibitors, intracavernous injections, alpha-blockers, alcohol, cocaine, marijuana
Infection (toxin-mediated) – scorpion sting, spider bite, rabies, malaria
Metabolic disorders – amyloidosis, Fabry's disease, gout, hemodialysis, total parenteral nutrition with high lipid content

rience stuttering priapism from childhood; in these patients, the pattern of stuttering may increase in frequency and duration leading up to a full episode of unrelenting ischemic priapism. Unfortunately, any patient who has experienced an episode of ischemic priapism is also at risk for stuttering priapism (2).

The genitalia, perineum, and abdomen should be carefully examined for penile rigidity and signs of trauma or malignancy (12). With priapism, penile examination reveals engorged corpora cavernosa, but, in contrast to normal erections, the corpus spongiosum and glans penis can remain flaccid (9). Table 2 compares the findings for the evaluation of the types of priapism.

Diagnosis: laboratory analysis and penile imaging

Blood gas testing is the most common diagnostic method of distinguishing ischemic from non-ischemic priapism. Blood is aspirated from one side of the corpus cavernosum. The color of the aspirated sample is black in patients with ischemic priapism, and shows hypoxemia, hypercarbia and acidemia. On the other hand, the color is red in patients with non-ischemic priapism, and reveal normal levels of oxygen, carbon dioxide and pH. Table 3 summarizes the main findings on blood gas analysis (2). Laboratory testing should include a complete blood count, platelet count and coagulation profile testing. Further laboratory testing should be directed by history, clinical examination and may include specific tests such as hemoglobin electrophoresis. (13)

Radiologic imaging studies have demonstrated utility in the evaluation and management of priapism, this is largely outside of the acute phase of presentation. As such, imaging studies should not be incorporated into the acute evaluation and management of priapism in the emergency department.

Furthermore, imaging may be used to differentiate types of priapism, for example, a penile duplex doppler ultrasonography will demonstrate a bilateral absence of flow thought the cavernosal arteries in ischemic priapism. Therefore, in non-ischemic priapism it could

Table 2. Findings in the evaluation of priapism. O: seldom present; S: sometimes present; U: usually present

Finding	Ischemic priapism	Nonischemic priapism
Corpora cavernosa fully rigid	U	O
Penile pain	U	O
Abnormal cavernous blood gases	U	O
Hemoglobinopathy	S	O
Intracavernosal drug injections	S	O
Well-tolerated tumescence without fully rigid	O	U
Perineal trauma	O	S

Table 3. Typical blood gas findings.

	PO2 (mmHg)	PCO2 (mmHg)	pH
Ischemic	< 30	>60	<7,25
Normal arterial blood	>90	<40	7,40
Normal venous blood	40	50	7.35

identify anatomical abnormalities, such as arterial fistula or pseudoaneurysm (14). Penile MRI can be used in the diagnostic evaluation of priapism and may be helpful to assess the viability of the corpora cavernosa and the presence of penile fibrosis. In a prospective study of thirty-eight patients with ischemic priapism, the sensitivity of MRI in predicting non-viable smooth muscle was 100%, when correlated with corpus cavernosum biopsies. (15).

RESULTS

Management

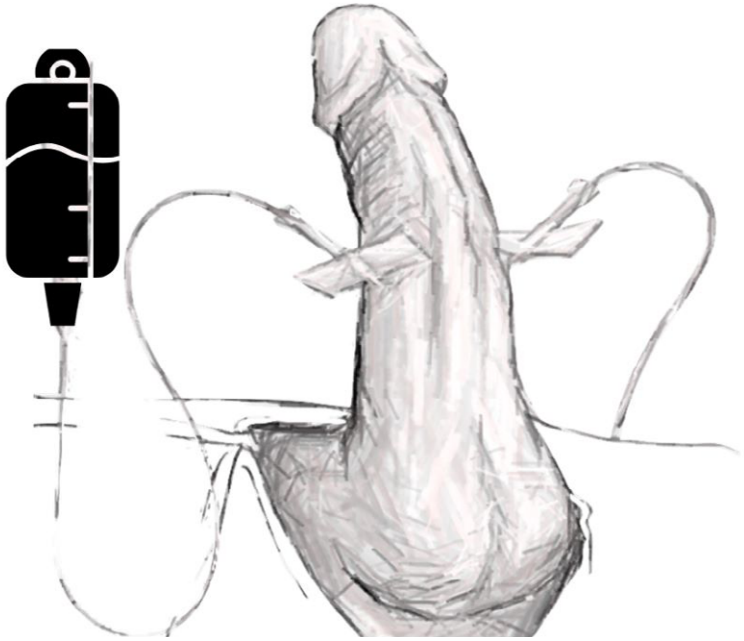
Most evidence is derived from case reports or case series, as there are no randomized controlled trials. The goal of clinical management for priapism is to make the continuous and painful erection fade away and preserve the capacity to have erections. Initially, the differentiation can be made based on the patient`s history and physical examination. After, confirmation must be obtained with cavernous blood gas. A penile Doppler ultrasound may be realized if arterial priapism is suspected (16).

Although primarily managed by urologists, emergency medicine clinicians may be the first-line providers and should be capable of applying the initial management of priapism. Those providing emergency medical care in low-resource areas should know how to utilize interdisciplinary collaboration with urologists and be familiar with techniques of aspiration, irrigation, phenylephrine injections, and T shunts. (8).

For patients with ischemic priapism, a 19G butterfly should be introduced into one of the corpora cavernosa to allow blood to outflow and decrease intracavernous pressure. We can also put another 19G butterfly in the contralateral corpus cavernosum and irrigate with saline. If priapism persists, an intracavernosal injection of a sympathomimetic drug, such as phenylephrine, combined with irrigation is considered the optimal treatment, after the decrease in intracavernous pressure (17,18) In adults, phenylephrine should be diluted with normal saline to provide a final concentration of approximately 100 to 500 mcg per mL. One mL of this solution is administered intracavernous every three to five minutes until resolution. (19). If patients do not respond, shunt surgery is the next treatment option (20). Figure 1 exemplifies the drainage technique.

Generally, penile shunt surgery aims to produce an outflow for ischemic blood from the corpus cavernous into the corpus spongiosum, thereby allowing restoration of normal circulation within these structures (21). Four categories of shunt have been reported and can be divided in percutaneous distal shunts, for example Winter's procedure, Ebbehoj`s technique and T-shunt (22,23,24), open distal shunts, such as Al-Ghorab`s procedure, Burnett`s technique (25,26), open proximal shunts, as Quackles`s technique (27) and vein anastomoses shunts, like Grayhack's procedure (28). Surgeon preference and familiarity may dictate the selection of shunt procedure, although conventional practice has shown

Figure 1



that distal shunts are typically done first, whereas proximal shunts are performed in situations of distal shunt failures.

Implantation of a penile prosthesis at the time of the decompression surgery has been suggested for patients with prolonged erection lasting more than 48 hours, because of the prognosis for sexual function is poor. (29,30).

Furthermore, non-ischemic priapism is not a medical emergency condition and observation is recommended as the initial management. If the patient prefers an intervention rather than observation, arteriography with embolization of the fistula may be indicated (31). Resolution of nonischemic priapism with arterial embolization can be as high as 89%. (32).

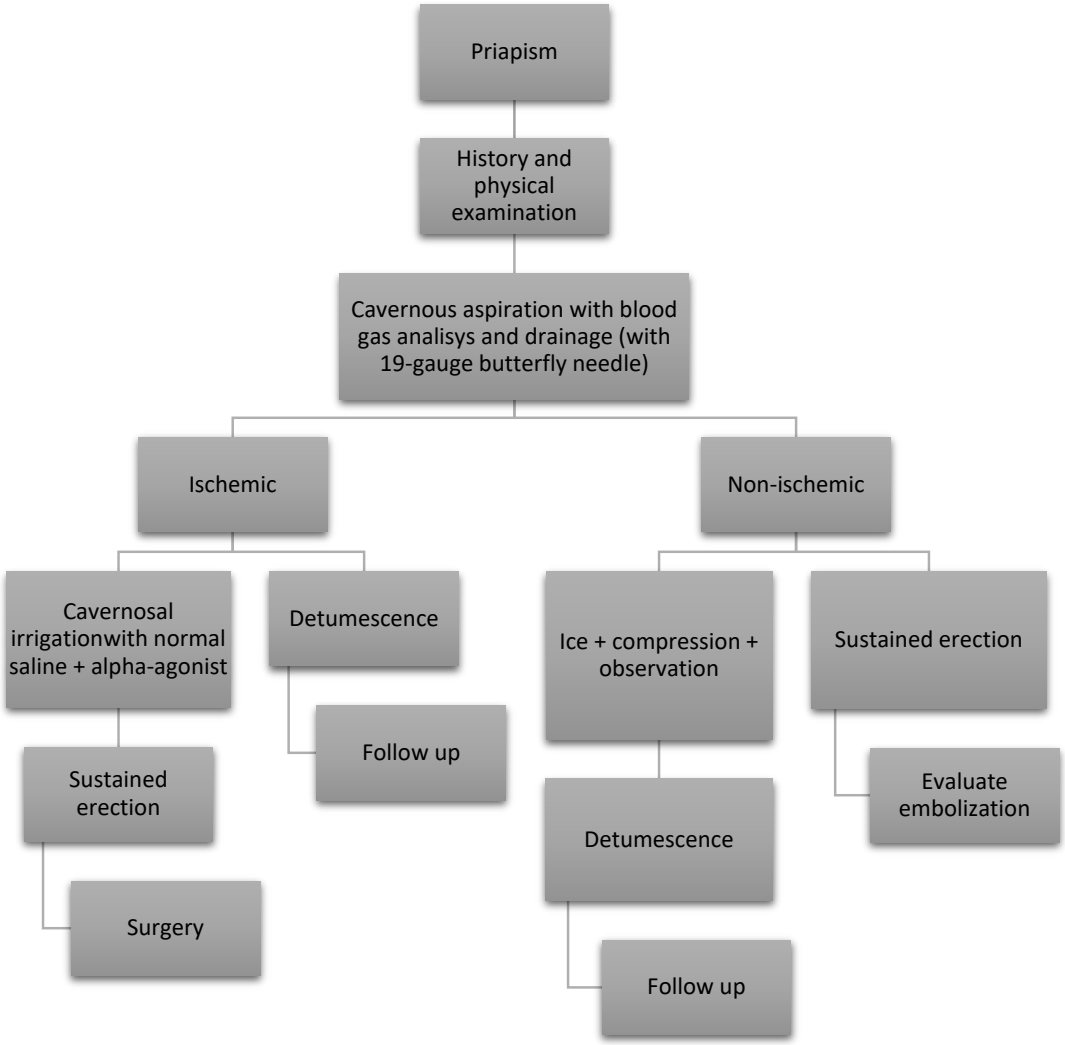
The algorithm below summarizes the treatment of priapism.

CONCLUSION

The aim of the management of priapism is to achieve detumescence of persistent and painful penile erection and preserve erectile function, after resolution of the case. However, in locates that do not have a service of urology, it is important that emergency medicine clinicians are capable to identify and treat cases of priapism.

CONFLICT OF INTERESTS

None declared.



Management algorithm for priapism.

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