Priapism: a medical emergency

JS Kalsi, M Arya, S Minhas, DJ Ralph

Priapism is defined as a prolonged penile erection that fails to subside despite orgasm. It is a medical emergency which should be diagnosed and treated early to preserve erectile function and avoid corporal fibrosis resulting from anoxia of the corporal tissue. Decompression is usually successful with no permanent damage if treatment is provided within 12 hours of onset.

Priapism is a distressing condition in which there is persistent penile erection that fails to subside. The two main types are low- and high-flow priapism. Low-flow priapism is more common and is caused by a decrease in venous outflow and vascular stasis which causes tissue hypoxia and acidosis. Ischaemia is present, and this can cause pain. High-flow priapism is less common. It is caused by an increase in arterial flow caused by a fistula between the cavernosal artery and corporal tissue. Blood flows in and out at incredible rates. There is no ischaemia in high-flow priapism and not usually any pain.

AETIOLOGY

There has been a considerable increase in the incidence of priapism since the introduction of intracavernosal injection therapy (prostaglandin E1 and papaverine) and oral therapy (sildenafil) for erectile dysfunction. These are the main causes of priapism, but other causes are summarized in *Table 1*.

DIAGNOSIS

It is important to differentiate low- and high-flow priapism from the history, examination and investigations performed in the emergency setting.

History

This is required to identify the presence of pain, underlying conditions, drug use or recent trauma.

Examination

General examination: To detect abdominal mass, enlarged lymph nodes or signs of trauma.

Penile examination: With low-flow priapism, the glans is usually soft and the corpus cavernosum 100% rigid. With high-flow priapism, there is usually 60–100% rigidity.

TABLE 1.
Aetiology of priapism

Low-flow priapism	Iatrogenic	Intracavernosal therapy most common cause. Incidence lower with prostaglandin E1 than with papaverine alone or in combination
	Idiopathic	30–50% of cases
	Sickle cell disease	38–42% of men with sickle cell disease have at least one episode of priapism in their lifetime (Fowler et al, 1991)
	Leukaemia	Most common type is chronic granulocytic leukaemia. It may result in hyperviscosity and sludging because of an increased number of white blood cells (Schreibman et al, 1974)
	Oral medications	The most common are antipsychotics (chlorpromazine, clozapine), antihypertensives (hydralazine, prazosin, guanethidine). The mechanism is considered secondary to α-adrenergic blockade
	Malignancy	Metastasis to penis causes obstruction of the venous outflow – bladder (30%), prostate (30%), rectal (16%) and renal (11%) (Powell et al, 1985)
	Neurological	Spinal cord injuries and spinal stenosis
	Others	Total parenteral nutrition contains 20% fat emulsion that may increase blood coagulants (Klein et al, 1985)
High-flow priapism	Penile or perineal trauma	This is the most common cause, resulting in a cavernosal artery to corporal tissue fistula (Brock et al, 1993)
	Idiopathic	

Mr JS Kalsi is Research Registrar, **Mr M Arya** is Research Registrar, **Mr S Minhas** is Specialist Registrar and **Mr DJ Ralph** is Senior Lecturer and Consultant Urologist, The Institute of Urology and Nephrology, University College London, London W1P 7NN

Correspondence to: Mr JS Kalsi

TABLE 2.
Management of priapism

Low-flow priapism	Conservative management	Aspiration with a non-heparinized syringe inserted into the base of one of the corpora cavernosa is the first-line treatment. If this fails, corporal instillation of a vasoconstrictive α-agonist drug, e.g. phenylephrine 100–200 mg/0.1 ml repeated at 5-minute intervals, is advised
		In priapism of sickle cell aetiology, hydration, alkalinization and hypertransfusion may be attempted initially. If this fails, corporal aspiration and instillation of α-adrenergic agents should be attempted
	Surgical management	This is used if above methods fail. The goal is to provide a shunt between the corpus cavernosum and the glans penis, corpus spongiosum or a vein so that the obstructed veno-occlusive mechanism is bypassed. Shunts between the corpora cavernosa and the glans are the most popular method because of their technical ease and low morbidity
		Penile prosthesis insertion. The fibrosis that ensues as a result of untreated priapism may be treated with a penile prosthesis so that coitus may be resumed (Kabalin, 1994)
High-flow priapism	Conservative management	Observation may be carried out to evaluate spontaneous detumescence
	Surgical management	The causative arterio-cavernosal fistula is identified (using arteriography or Doppler ultrasound) and obliterated by embolization with autologous blood clot or absorbable gelatin (Walker et al, 1990). This treatment is performed by an interventional radiologist
		Cavernosal artery ligation. Reserved for failures of embolization (Kim et al, 1996)

Investigations

- Full blood count and test for sickle cell disease or electrophoresis (where applicable)
- Blood aspiration from the corpus cavernosum. Aspirated blood pH<7.25 and aspirated blood gas values of PO_2<30 mmHg and PCO_2>60 mmHg are associated with ischaemic or low-flow states (Broderick and Lue, 1988)
- Doppler ultrasound may confirm high-flow priapism (Hakim et al, 1996)
- Angiography can conclusively show high-flow states, but it is rarely used.

PRINCIPLES OF MANAGEMENT

Low-flow priapism

- Treat without delay by increasing the outflow of cavernous blood
- Persistence of priapism for less than 12 hours is associated with insignificant tissue changes
- Persistent priapism for between 12–24 hours results in endothelial and trabecular destruction
- By 48 hours, widespread smooth muscle necrosis will result in eventual penile fibrosis and impotence (Spycher and Hauri, 1986).

High-flow priapism

This is not an emergency, as the penis is not ischaemic. Potency may be maintained even if the priapism persists for some time. Further management is discussed in *Table 2*.

CONCLUSIONS

Priapism should be considered a medical emergency, and patients with this disorder should be seen and investigated immediately. The maintenance of erectile function is dependent on early diagnosis and prompt treatment, particularly if the priapism is of the low-flow type. HM

Conflict of interest: none.

Brock G, Breza J, Lue TF, Tanagho EA (1993) High flow priapism. A spectrum of disease. *J Urol* **150:** 968–71

Broderick GA, Lue TF (1988) *Priapism and the Physiology of Erection*. AUA update series; vol VII, lesson 29. American Urology Association, Baltimore

Fowler JE Jr, Koshy M, Strub M, Chinn SK (1991) Priapism associated with sickle cell haemoglobinopathies: prevalence, natural history sequelae. *J Urol* **145:** 65–8

Hakim LS, Kulaksizoglu H, Mulligan R, Greenfield A, Goldstein I (1996) Evolving concepts in the diagnosis and treatment of arterial high flow priapism. *J Urol* **155:** 541–8

Kabalin JN (1994) Corporeal fibrosis as a result of priapism prohibiting function of self-contained inflatable penile prosthesis. *Urology* **43:** 401–3

Kim SC, Park SH, Young SH (1996) Treatment of post-traumatic chronic high flow priapisms by superselective embolization of cavernous artery with autologous clot. *J Trauma* **40:** 462–5

Klein EA, Montague DK, Steiger E (1985) Priapism associated with the use of intravenous fat emulsion: case reports and postulated pathogenesis. *J Urol* **133:** 857–9

Powell BL, Craig JB, Muss HB (1985) Secondary malignancies of the penis and epididymis: case report and review of the literature. *J Clin Oncol* **3:** 110–5

Schreibman SM, Gee TS, Grabstald H (1974) Management of priapism in patients with chronic granulocytic leukaemia. *J Urol* **111:** 786–8

Spycher MA, Hauri D (1986) The ultrastructure of erectile tissue in priapism. *J Urol* **135:** 142–7

Walker TG, Grant PW, Goldstein I, Krane RJ, Greenfield AJ (1990) High flow priapism: treatment with super-selective transcatheter embolization. *Radiology* **174:** 1053–4

KEY POINTS

- Priapism should be considered a medical emergency.
- Low-flow priapism is much more likely to result in tissue ischaemia than high-flow priapism, with prompt treatment within 12 hours being essential.
- Priapism may be caused by a variety of medical disorders, but the most common aetiology is intracavernosal and oral therapy for erectile dysfunction.
- Aspiration of blood with a syringe inserted into the base of one of the corpora cavernosa is the first-line treatment.
- If aspiration fails, corporal installation of a vasoconstrictive α-agonist drug, *e.g.* phenylephrine, is advised. Surgery is used if these methods fail.