

High-flow priapism treated with selective embolization of a helicine branch of the penile artery: A case report and selected review of the literature

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Abstract

High-flow, or nonischemic, priapism occurs in <5% of observed clinical presentations of all priapism and is characterized by prolonged, painless erection in the context of pelvic and genitourinary trauma. While conservative management can be safely attempted for many cases of high-flow priapism (HFP), selective embolization is becoming the preferred approach as it allows for rapid resolution. We, herein, present a case of a 42-year-old male patient who presented with trauma-induced HFP treated with selective embolization and briefly review the current literature regarding the management of HFP.

Keywords: High-flow priapism, nonischemic priapism, selective arterial embolization

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INTRODUCTION

High-flow priapism (HFP) occurs when a fistula forms between the cavernosal artery or one of its helicine branches and the sinusoidal spaces of the corpora cavernosa. This is due to an arterial laceration from injury to the crura of the corpora.^[1] Causative injuries can be divided into blunt or penetrating trauma. The continuous influx of arterial blood, combined with intact venous drainage, prevents ischemia and yields normal arterial blood gas levels. These levels in conjunction with unregulated and turbulent blood flow seen on color Doppler ultrasonography can be used for aid diagnosis.^[2,3] Our case highlights the increasingly important role of early superselective arterial embolization for the management of HFP, in a shift away from an initial trial of conservative management.

CASE REPORT

A 42-year-old truck driver presented to urology after referral for microhematuria. Additional history was subsequently provided by his wife, who reported that he had sustained a blunt impact to his penis while unloading his truck a few days prior to presentation and had a sustained erection since. He was directed to a local emergency room, where he was noted to have an erect penis with the absence of pain. Penile irrigation with alpha-adrenergic agents was attempted but ultimately unsuccessful. External urologic consultation was sought, and a diagnosis of high-flow priapism was discussed.

Penile angiography was performed, confirming a large arteriovenous malformation (AVM) supplied by a unilateral

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helicine branch, with minimal flow through the distal cavernosal artery [Figure 1]. A microcatheter was placed into the AVM which was partially embolized, resulting in improved flow to the cavernosal branch [Figure 2]. The AVM was subsequently completely obliterated using Gelfoam, resulting in full resolution of flow throughout the cavernosal artery and its distal branches [Figure 3]. The patient achieved immediate de-tumescence postprocedure, and at 2-week follow-up, he remained recurrence free. However, he reported erectile dysfunction (ED) which is expected to resolve after resorption of the Gelfoam used for the procedure.

DISCUSSION

Conservative management results in spontaneous resolution of 60%–70% of HFP cases. However, on long-term follow-up, ED occurs in 30% of conservatively managed patients.^[3] If initial conservative measures are unsuccessful, diagnostic angiography combined with selective arterial embolization of the fistula can be performed, as it preserves a high level of pre-morbid erectile function (EF).^[4] Certain authors, however, recommend earlier intervention with selective embolization, particularly in cases of trauma-induced HFP. This is believed to help minimize fibrosis within the distal corpora, which results from prolonged ischemia.^[5-7]

Selective temporary embolization is generally done using an autologous clot or Gelfoam, whereas permanent embolization is accomplished with coiling or acrylic glue.^[3] Repeat embolization is common, as recurrence rates of 30%–40% have been reported for high-flow priapism treated by selective embolization.^[8] Recurrence can result when temporary occlusive agents dissolve before endothelial damage has healed.^[9] While both temporary and permanent agents achieve a 75% resolution rate, temporary agents are preferred due to a lower incidence of subsequent ED.^[3,7,8] We utilized Gelfoam in our patient, given its expected transience, which contributes to its superior safety in comparison to permanent agents. However, permanent agents can alternatively be used for cases that fail to respond to repeated temporary embolization.^[3]

One of the main adverse effects of selective arterial embolization is loss of EF [Table 1]. While the contributing factors to time until EF recovery warrant further investigation, a 2018 study found a 90% resolution rate of HFP with preservation of long-term EF following temporary selective arterial embolization.^[15] This further suggests excellent long-term outcomes for patients receiving selective embolization.



Figure 1: Large helicine branch supplying arteriovenous malformation (arrow) with minimal cavernosal flow



Figure 2: Arteriovenous malformation partially embolized, with improved flow to the cavernosal branch (arrow)



Figure 3: Arteriovenous malformation completely embolized, with full resolution of flow throughout the cavernosal artery and its distal branches

Finally, surgical management with transcorporal fistula ligation is reserved for cases, in which repeated embolization

Table 1: Selected literature review of erectile dysfunction in high-flow priapism case reports

Author (years)	Study (n)	Mechanism of injury	Treated with selective arterial embolization	Patients with resolved ED (%)	Average time to resolution of ED (months)
Alvarez Gonzalez <i>et al.</i> (1994) ^[10]	2	Blunt perineal trauma	2	100	27
Bastuba <i>et al.</i> (1994) ^[11]	7	Perineal or penile trauma	7	85.7	N/A
Wu and Lue (2012) ^[12]	3	Blunt perineal injury (n=2) (skateboard, motorcycle accident) Drug-induced with trazodone (n=1)	2 (1 with ketoconazole)	66.7	4.5
Rados <i>et al.</i> (2010) ^[13]	1	Perineal trauma	1	100	8
Sánchez-López <i>et al.</i> (2017) ^[9]	1	Bicycle-induced straddle injury	1	100	0.5
Benko <i>et al.</i> (2009) ^[14]	1	Blunt perineal injury (soccer match)	1	100	1
Chick <i>et al.</i> (2018) ^[15]	20	Conversion from ischemic (n=8) Penile trauma (n=7) AVF of unknown origin (n=2) High flow without apparent trauma (n=2) High arterial flow related to Fabry's disease (n=1)	20	90	N/A

ED: Erectile dysfunction, NA: Not available, AVF: Arteriovenous fistula

has failed. While invasive methods like this can offer a more immediate resolution, complications of surgical management are high. ED occurs in as many as 50% of cases. Other documented complications include penile gangrene, gluteal ischemia, purulent cavernositis, and perineal abscesses.^[8,9]

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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