Post traumatic high-flow arterial priapism

The need for increased awareness among health care professionals

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ABSTRACT

High flow arterial priapism is a rare urological emergency. Presentation, diagnosis and institution of definitive management are often delayed. We describe our experience with this diagnostic entity and reviewed the literature to define possible reasons for the delayed diagnosis and management. We report two patients (10 years and 35 years old) that presented following blunt perineal trauma. The presentation and diagnosis of arterial priapism were delayed in both patients. Selective angiogram of the internal pudendal artery revealed arteriocavernous fistula in each patient. Embolization of the fistulae by gel foam was carried out at the same sitting. Penile detumescence was noted in both patients at the conclusion of the angiographic embolization. Both patients regained erectile function 3 and 6 weeks post treatment. Awareness of the various etiologic factors in priapism is of paramount importance to establish the correct diagnosis and institute the appropriate treatment modalities. Absence of pain and preservation of potency in patients with arterial priapism are among factors that contribute to the delayed presentation, diagnosis and treatment. We reiterate the valuable role for selective internal pudendal artery angiography as a single investigation that provides both diagnostic and therapeutic means of management.

Keywords: Penis, perineum, penile erection, priapism, wounds, injuries.

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Priapism is a state of prolonged erection in the absence of sexual stimulation.[1] The most common form of priapism is the veno-occlusive type that is associated with a low blood flow state. Veno-occlusive priapism results from corporeal smooth muscle relaxation that is precipitated by drug abuse, pharmacological or neurogenic factors, it is also seen with intra-vascular obstruction resulting from hematological conditions such as sickle cell anemia, hyper-coagulable states and metastatic neoplasms.[2] The other less common form of priapism is secondary to high arterial flow in association with blunt perineal trauma.[2,3] Needle injury in patients with erectile dysfunction using intracavernosal injections of papaverine or prostaglandin is another rare cause of arterial priapism.[3] Blood from the injured cavernosal artery pools directly into the lacunar spaces of the cavernous bodies escaping regulation by the helicine arteries. Venous occlusion is not complete and a high flow non ischemic state ensues. It is not uncommon for patients with arterial priapism to present with long standing history and to have their definitive treatment delayed.[3,4] It is true that delayed treatment in cases of arterial priapism is not harmful. Spycher and Hauri demonstrated no change in the histological features of the cavernosal

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tissues on electron microscopy even after prolonged periods of priapism.[5] We feel nevertheless that early diagnosis and treatment are needed in patients with arterial priapism to restore normal physiological erectile mechanisms and to alleviate the anxiety that might accompany prolonged unrelenting erections. We describe our experience with the diagnosis and management of post traumatic arterial priapism. We reviewed the literature to identify factors that contribute to the delayed diagnosis of this urological emergency.

Case Report.

Patient 1. A 30 year old worker was brought to accident and emergency following a fall from a scaphold while at work. He sustained blunt trauma to the perineum and presented with painless erection of few hours duration that started immediately following the fall. Local physical examination revealed turgidity of both corpora cavernosa with no tenderness. The corpus spongiosum and glans were soft. No evidence of bruising was noted in the perineum and there was no evidence of other associated injuries. Local measures including aspiration of blood and manual cavernosal irrigation with normal saline failed to effect detumescence. Angiography via super-selective catheterization of the internal pudendal artery was performed via right transfemoral artery puncture using 4F cobra catheter and 0.025" hydrophilic polymer coated guide wire (Terumo, Terumo, Tokyo, Japan). Arteriocavernous fistula was evident on the left side. Superselective embolization using absorbable gelatin sponge (Gelfoam, Upjohn, Kalamazoo, Mich) was carried out at the same sitting. Radiological evidence of the fistula occlusion was confirmed angiographically at the end of the procedure.

Patient 2. A 12 year-old boy presented with an 8 day history of sustained painless erection which started following a kick to the perineum while playing football at school. He had no urinary symptoms. Past medical history was not particularly significant; there was no history of hematological disorders nor use of drugs. The patient was seen by the family general practitioner and 2 consultant pediatricians who failed to reach a diagnosis, the child and his family were advised on local measures including ice packs to help resolve the priapism. Local physical examination revealed turgidity of both corpora cavernosa with no tenderness. The corpus spongiosum and glans were soft. No evidence of bruising was noted in the perineum and there was no evidence of other associated injuries. Our diagnosis of post traumatic arterial priapism was based on the clinical presentation. Superselective angiography with embolization techniques identical to the first patient were performed. Arteriocavernous fistula was evident on the left side (Figure 1). Occlusion of the fistula by gel foam was successful (Figure 2).

Complete detumescence was noted at the time of angiography in both patients and they were discharged home on the first day post embolization. The parents of the young boy noted nocturnal penile erections 3 weeks following discharge from the hospital and he remains well after 18 months of follow up. The young man reported normal erectile function 6 weeks post embolization, further follow up was not available.

Discussion.

The concept of high arterial inflow priapism based on increased flow through the helicine arteries was first suggested by Hauri and associates.[6] This explanation of the pathogenesis was challenged, it appears that injury to the cavernosal arteries leads to unregulated flow of blood directly into the lacunar spaces of the corpus cavernosum escaping the regulatory effects of the helicine arteries.[2] Furthermore, in the absence of neurological

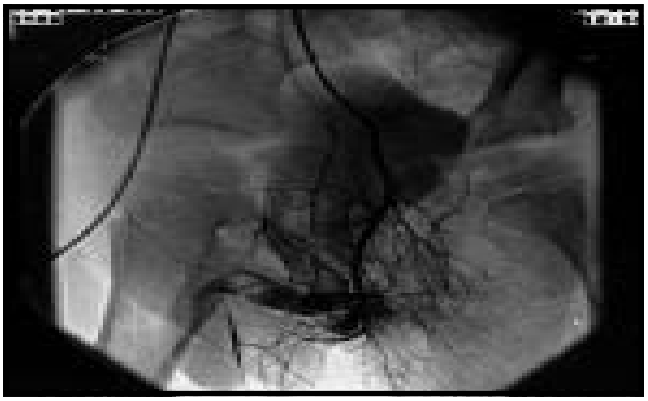

Figure 1 - Arteriocavernous fistula in a 12-year-old boy. Arrow indicates site of blood leak into cavernous tissue.

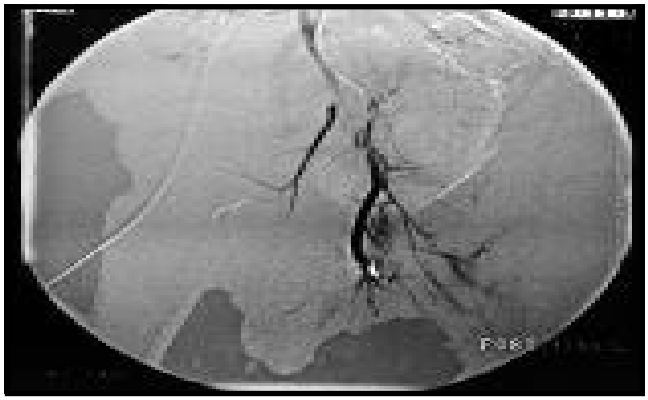

Figure 2 - Occlusion of the fistula is evident on post emblotherapy angiographic examination.

stimulation, there is no compression of the sutunical venules against the tunica albugines allowing escape of blood from lacunar spaces. This prevents obstruction of the arterial inflow, congestion and ischemia. This pathophysiological mechanism may also explain the lack of pain in these patients. History taking is important since the presentation of high flow arterial priapism is typical. Almost always, a history of blunt trauma to the perineum or penis can be elucidated except when the presentation is in a very young child where detailed history taking might not be possible.[7] The erection is painless and persistent over a long period.[2,3] Physical examination reveals non tender turgid cavernosal bodies and soft glans penis.[2,3,7] Although both patients reported here had classical history and physical findings of arterial priapism, the diagnosis in both patients was delayed. Many reports in the literature describe patients presenting with long standing history extending into years in some cases.[3,4] The lack of pain and the maintenance of erectile function, in cases of arterial priapism, are reassuring signs to both the patient and the treating physician and may contribute to the delayed presentation and management of these cases. Furthermore, the institution of conservative forms of treatment in patients with arterial priapism will also contribute to delays in definitive therapy. The conservative management including aspiration of blood and manual irrigation of cavernosal bodies or the use of α-adrenergic agents are not effective in cases of high flow priapism. It is not evident from the literature review why conservative management is so frequently employed albeit ineffective. Physicians are aware of the more common entity of veno-oclusive priapism and direct their management to such a diagnosis.[2] We and others feel that lack of clinical recognition of the less common entity of high flow arterial priapism plays a role in delaying the definitive management of this form of priapism.[4] The Medline search for articles in English language between 1966 and 1999 revealed 39 publications that describe forms of arterial priapism similar to our patients.[1-39] Fifty four percent (21/39) of these articles were published in the last 5 years. Twenty six articles (67%) were published in the urological literature, 8 (20.5%) in radiological journals and one (2.5%) in the trauma journal. Only 4 articles (10%) were published in General medical journals. Urologists and interventional radiologists are expected to be aware of the high flow arterial priapism since most of the current literature is directed mainly to publications in these sub-specialty journals. Increased awareness by other medical professionals who are likely to be in the first encounter with arterial priapism patients including general practitioners, emergency room physicians and pediatricians is therefore needed. The awareness of practicing clinicians will obviate repeated attempts of corporeal irrigation and other therapeutic measures.[38] Several investigations have been proposed to confirm the diagnosis of arterial priapism. Gas analysis of aspirated blood from corporeal bodies will show arterial saturation and help in exclusion of the more common type of venous priapism.[4] Ultrasound duplex examination of the cavernosal arteries is being used more frequently and is becoming the investigation of choice in cases with arterial priapism.[23,39] The ultrasound duplex is non invasive and should substitute blood aspiration from the corpus cavernosum for gas analysis. It also helps in localizing the laterality of the arterial lesion for planning the approach of embolization.[7] We did not perform duplex scanning in our patients because it was not available at the time of presentation. The diagnosis of arterio-cavernous fistula was accomplished using selective internal artery angiography. Superselective internal pudendal artery canulation provides a simultaneous diagnostic and therapeutic tool using embolization agents at the same sitting. Embolization is regarded as the treatment of choice for high flow priapism.[39]

In conclusion, we feel that awareness of the various etiologic factors in priapism is of paramount importance to establish the correct diagnosis and institute appropriate treatment modalities. Absence of pain and preservation of potency in patients with arterial priapism are among factors that contribute to the delayed presentation, diagnosis and treatment. We reiterate the valuable role for selective internal pudendal artery angiography as a single investigation that provides both diagnostic and therapeutic means of management.

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