

MANAGEMENT OF POST-TRAUMATIC PRIAPISM BY SUPERSELECTIVE EMBOLIZATION

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ABSTRACT:

Priapism is a prolonged penile erection not associated with sexual arousal. Two types of priapism have been described: the more common one is the "veno-occlusive" priapism and can be frequently observed as the consequence of an intracavernosal injection of vaso-active drugs for the treatment of erectile dysfunction. The less common type of priapism is known as "high flow" priapism. The most frequent cause of high-flow priapism is penile or perineal closed trauma with laceration of the cavernous artery and the formation of an arterial-lacunar fistula. We present a 23 year old male with high-flow priapism due to closed perineal trauma and damage to the right cavernous artery which was completely resolved following super-selective angiography and embolization treatment.

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القسوح هو إحدى الاضطرابات المختلفة للانتصاب والتي يحدث بدون إثارة جنسية، هناك نوعان من القسوح، الأكثر شيوعاً هو قسوح انسداد الوريد والذي يمكن ملاحظته بشكل متكرر نتيجة لحقن تنشيط الأوعية المستخدمة في علاج الضعف الجنسي و ضعف الانتصاب. النوع الأقل شيوعاً هو المعروف بالقسوح ذو التدفق العالي. إن السبب الرئيسي لهذا النوع من القسوح هو العجان المغلق أو تهتك في الشريان الكهفي وتكون ناسور في الشريان الجوفي. نحن نقدم هنا حالة شاب يبلغ من العمر 23 عاماً مصاب بالقسوح ذو التدفق العالي والذي حدث نتيجة لإذى انسداد العجان وتلف الشريان الكهفي الأيمن والذي عولج بالكامل بعد التصوير المنتقى بدقة للأوعية والعلاج بالانصمام

INTRODUCTION:

Arteriovenous fistulas (AVFs) are abnormal communications with shunting of blood from an artery to a vein. AVFs mainly involve the peripheral vascular system but can affect virtually any organ or system in the body. They may be congenital, created surgically for hemodialysis or caused by pathologic processes including trauma. The criteria for the diagnosis of AVF by color Doppler ultrasound and duplex ultrasound include low- and high-resistance flow in the supplying artery, high-velocity arterialized waveform in the draining vein, and turbulent high-velocity flow spectrum at the junction of the artery and vein. CT and MR angiography typically show early contrast filling in the vein during the arterial phase. Digital angiography is helpful in identifying the arteries feeding the fistula and in elaborating a vascular map for endovascular treatment. Most patients can be successfully treated with catheter embolization. Arterial priapism arising after trauma to the perineum or penis is distinct from and less common than venous priapism¹. Post-traumatic arterial priapism is characterized by increased flow in the corpora cavernosa. The origin of this increased inflow is usually an AVF or pseudoaneurysm, although iatrogenic injection therapy with papaverine may produce a similar result in adults. This type of priapism is painless because there is no tissue ischemia². Traumatic priapism develops immediately after trauma in two thirds of patients; in the remaining third, priapism appears 1–15 hours after trauma. This suggests that hemodynamically relevant fistulas may develop from vascular defects that initially are very small³. The management of traumatic priapism remains a challenging clinical problem. Both conservative methods and surgery are associated with a high risk of erectile dysfunction. Angiography with selective embolization is a safe and effective method to correct post-traumatic priapism⁴⁻⁵.

CASE REPORT:

A 23-year-old man complaining of non-painful priapism of 5 month duration, which developed shortly after a blunt perineal trauma. An arteriocavernous fistula caused the high-flow priapism, and it was detected on both color Doppler sonography. Selective arteriography with selective embolization was planned after patient interview at our Interventional clinic. Procedure was done under general anesthesia due patient preference, a 5F vascular introducer sheath was placed in Rt femoral artery with a modified Seldinger method using a single wall needle. A non selective pelvic angiogram was obtained, by using

a 5- F pigtail catheter (Johnson & Johnson, Cordis Europe, Oosteinde, the Netherlands), to identify the internal pudendal arteries, images were obtained at the rate of 2-3 frames/s. Nonionic contrast agents (UltravistR [iopromid] 370 IU per 100 ml, Schering-Germany, and Omnipaque R [iohexol] 350 IU 100 per ml, Nycomed, Ireland) were administered using an Angiomat 6000 (Liebel-Flarsheim Company, USA) automatic injector with 12ml/second for 2 second, pelvic angiogram revealed Rt sided cavernosal AVF, the catheter was exchanged for F5 RUC catheter (Cook Europe, Denmark). Selective Rt internal iliac artery angiogram was performed which clearly delineated the fistula

Fig1.

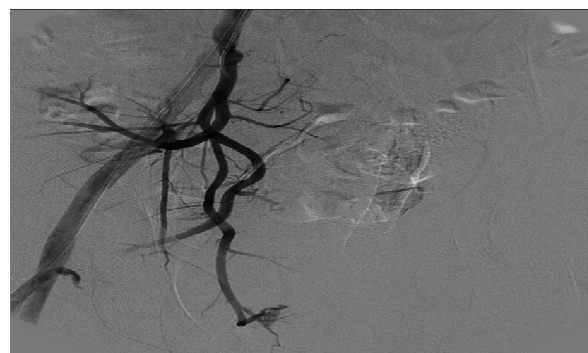


Figure 1. Selective Rt internal iliac artery showing cavernosal AVF



Figure 2. Super-selective angiogram Rt cavernosal AVF.

A coaxial micro-catheter (Renegade HI-FLO-Fathom Kit with Fathom-16 Guide wire packaged Microcatheter Kit by Boston scientific, USA) was used for super selective cannulation of Rt cavernosal artery followed by superselective angiogram, Fig 2. microcatheter was advanced and successfully canulate the cavernosal AVF, embolization with single (3mmx6mm helical 0.018" Fibered Platinum Coil by Boston scientific, USA) was performed to seal the fistula, post embolization angiogram revealed complete occlusion of AVF, Fig3. Clinically immediate detumescence was detected. Patient was followed at IR clinic every 3 months for 1 year, no fistula was detected by subsequent color Doppler sonography examination, as well as patient admired normal erection.

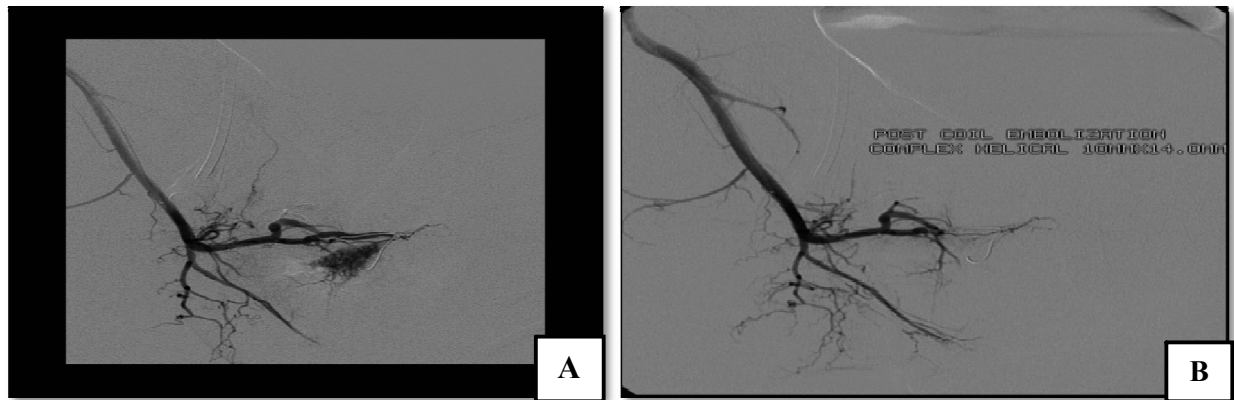


Figure3. a) Deployment of microcoil through cavernosal AVF, b) Total occlusion of cavernosal AVF

DISCUSSION:

The arterial supply to the penis usually comes from the common penile artery that arises from the internal pudendal artery. This, in turn, is a branch of the inferior epigastric artery originating from the internal iliac artery. The internal pudendal artery runs downwards and laterally to the lower part of the rim of the greater sciatic foramen, curves around the back of the ischial spine, and enters the perineum through the lesser sciatic foramen, approximately 4 cm above the lower limit of the tuberosity. As it approaches the ischial ramus, the artery proceeds deep to the urogenital diaphragm and ends behind the inferior pubic ligament by dividing into the (a.) bulbourethral artery, which is a short large-calibre artery that enters the bulbospongiosus (b.) The dorsal artery, that travels along the dorsum of the penis in a coiled configuration in the flaccid state⁶. straightens in the erectile state. Along its course it gives off 3 to 10 circumflex branches around the lateral surface of the corpora. The terminal branches supply the glans penis. Sometimes a branch penetrates the tunica and, in some individuals, helps supply the erectile tissue. The cavernosal artery, usually a single artery, arises on each side as the terminal branch of the penile artery. This artery enters the corpus cavernosum at the hilum, runs the length of the penile shaft, and gives off many helicine arteries that constitute the arterial portion of the erectile apparatus. Occasionally, a branch enters the opposite corpus and sometimes a single artery branches in the opposite corpus^{7,8,9}. Priapism is persistent erection caused by imbalance between arterial inflow and venous outflow^{10, 11}, the commoner veno-occlusive type results from prolonged stagnation of blood in the corpora due to inadequate venous outflow, leading to painful erection - secondary to an acidotic hypoxic environment. It is usually caused by hematologic syndromes (sickle cell, leukemia), hypercoagulable states, fat emboli, metastatic disease and metabolic

disorders like Fabry's disease. The condition is an emergency and delay in treatment causes corporeal fibrosis and permanent impotence^{10,11}. In contrast, high flow priapism is due to increased arterial inflow caused by trauma to the cavernosal artery or to its helicine branches. Rare instances of idiopathic etiology are reported. This results in an arteriocavernosal fistula with or without a pseudoaneurysm. The erection can occur upto 8 hours after the traumatic event. Since arterial inflow is good, there is no ischaemia - and treatment is not emergent^{10,11}. The clinical presentation in case of high flow priapism is quite typical: history of recent penile or perineal trauma followed, by the onset of a painless, incomplete and constant erection of the penis. In addition to the clinical picture, diagnosis is confirmed by results of gasometry from cavernosal blood aspirate, cavernosography. Colour Duplex Doppler and pudendal angiography¹¹. Cavernosal blood gas analysis will reveal values similar to arterial blood. Colour Doppler confirms patency of cavernosal arteries, prominent venous drainage and unilateral / bilateral arteriocavernous fistulae with or without a pseudoaneurysm. The spectral pattern in our patient was highly pulsatile with diastolic reversal, similar to the pattern found in Papaverine induced erection - secondary to the high pressure in the cavernous sinusoids. Bilateral internal pudendal angiography is the gold standard in diagnosis of this condition - but Colour Doppler is reported to have a sensitivity of 100% and specificity of 73% compared to the angiogram¹². Treatment of the condition is initially conservative. Mechanical external compression of the perineum, ice packs, corporeal aspiration and irrigation with saline have been tried, beside intracorporeal administration of alpha - agonists and methylene blue - which antagonizes endothelial derived relaxation factor¹¹. Recently, Color Doppler guided transperineal mechanical compression of the fistula with the ultrasound

probe has been reported to have more success, in contrast to the imprecise pressure applied by blind mechanical compression¹³. However these measures are often unsuccessful and invasive methods are required. Internal pudendal angiography delineates the fistula with accuracy. Embolisation of the Deep artery of penis (cavernosal artery) is the treatment of choice, but controversy exists as to the choice of embolic material. Autologous blood clot has been recommended as the embolic agent of choice since it occludes the fistula, while preserving potency as the vessel recanalizes^{10,11,14}. This is especially relevant in bilateral pudendal artery embolisation. Other researchers have used Gelfoam pledgets - however studies have shown Gelfoam can also cause panarteritis and disruption of the intima^{10,11}. Iso-butyl-cyanoacrylate has been used rarely¹², but is not favored since it occludes the deep artery of penis permanently. Recently, several reports of the use of micro coils indicate that superselective placement of coils does not affect the return of potency¹⁶. In our patient, we used super-selective embolization with microcoils. Residual cavernous turgidity can be treated with intracavernous streptokinase irrigation. In a series report of long term follow up of high flow priapism treated by embolisation¹⁷, in one out of nine patients, repeated embolisation procedures failed and surgery was resorted to. Fistula recurrence requiring re-embolisation was reported in 4 out of 9 patients. Sexual function was preserved in 80%. Patients in whom embolisation fails have to undergo surgery¹⁸. There are two surgical approaches - extracorporeal and transcorporeal. Extra corporeal ligation of the cavernosal artery poses fewer risks - but can have arteriogenic impotence as a sequela. Transcorporeal resection may be required in arterial priapism of long duration, especially if a vascular pseudocapsule forms around the fistula - however damage to the corporal venoocclusive mechanism can result in venogenic impotence. Bilateral pudendal artery embolisation can result in temporary loss of potency, which may take upto 5 months to resolve¹⁰. In summary, high flow post traumatic priapism is a condition elegantly managed by superselective transarterial embolisation.

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