HIGH-FLOW PRIAPISM CAUSED BY A PSEUDOANEURYSM AND AN ARTERIOCAVERNOSAL FISTULA: CLINICAL AND RADIOLOGICAL APPROACH OF 3 CASES

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Summary.- OBJECTIVE: We report three cases of high-flow priapism in three young patients who presented erectile dysfunction after perineal trauma.

METHODS: Complete clinical evaluation, blood tests, color Doppler ultrasonography (US), arteriography and selective embolization were performed.

RESULTS: The clinical history and physical assessment were compatible with high-flow priapism. Color Doppler US showed a pseudoaneurysm and an arteriocavernosal fistula, which was confirmed and embolized using arteriography.

CONCLUSIONS: High-flow priapism has a characteristic clinical presentation and physical examination. The radiologist has an important role in the diagnosis and treatment of this pathology. Color Doppler US and arteriography are essential in the diagnosis and allow embolization of the vascular injury. Prognosis is usually good.

Keywords: Priapism. Color Doppler ultrasonography. Embolization. Arteriography.

INTRODUCTION

Priapism is characterized by a persistent erection of the penis (more than 4 hours), without sexual stimulation. Clinically we can distinguish three types of priapism (including stuttering priapism, ischemic variant which occurs during sleep), with a different etiopathogenic mechanism, treatment and prognosis (1). High-flow priapism (5%) is caused by an arterial injury (cavernosal artery or helicins ones) that produces an arterio-cavernosal fistula (with or without a pseudoaneurysm associated) and an increase in the arterial blood supply to the corpus cavernosum. Diagnosis is clinical and radiological and the arteriography allows the confirmation and the treatment of the underlying vascular injury (superselective embolization) with, generally, successful results and good prognosis (resolution rate 74-78%, complications 5-39%, according to the technique employed) (1, 2).
CASE REPORTS

Described as the consensus guide ED National Institute of Health, USA, 1993 and instructions of the working group of V. Chantada and collaborators in 1999 (3,4).

CASE REPORT 1

Patient 31, without medical or surgical history of interest. After a labor perineal trauma (straddle), 2 months ago, begins with spontaneous penile tumescence one month earlier and later difficulty in achieving and maintaining an erection with dysuria. Physical examination: glans tumescence moderate limp. Anamnesis: erectile dysfunction (by scale 1-Erection Hardness EHS-Score) (5). Color Doppler ultrasound with 15 MHz linear probe pseudoaneurysm of 13 mm unilateral cavernous fistula associated with an artery-dependent arteriocavernous helicina with intense breath. Selective arteriography confirmed internal iliac pseudoaneurysm dependence unilateral pudendal branches. Embolization was performed with non-resorbaible material (“microcoils” of 4 mm diameter), resulting thrombose injury (Figures 1 and 2). Review at three months: erectile capacity (EHS 4), asymptomatic, with no significant changes from the state prelesional.

CASE REPORT 2

22 years old patient with no history of medical and surgical interest. Penile trauma while practicing sport begins with episodes of spontaneous penile swelling and erectile dysfunction than 3 months. Physical exam: moderate tumescence. Erectile dysfunction (EHS 1). Doppler ultrasound: pseudoaneurysm of 11 mm unilateral cavernous fistula associated with helicina arteriocavernous confirming by arteriography and embolization (“microcoils” 4 mm in diameter). Review at three months: asymptomatic with normal erectile function (EHS 4).

CASE REPORT 3

23 year old patient with no history of interest. Perineal trauma work 3 months ago, showing swelling and erectile dysfunction since. Exploration: moderate tumescence and flaccid glans. Erectile dysfunction (EHS 1). Color

Figure 1. Color Doppler US showing a hypoechoic lesion that presents turbulent-high flow and an arterio-venous fistula.
Doppler ultrasound and arteriography: fistula and pseudoaneurysm arteriocavernous unilateral 10 mm, in the corpus cavernosum. Embolization was performed (“micro-coils” 4 mm in diameter), getting thrombose injury. Review at three months: asymptomatic, good erectile capacity (EHS 4), no significant changes regarding the status pretensive.

DISCUSSION

Priapism is caused by a deregulation of the mechanisms of the penile detumescence, due to an inadequate venous outflow (type I, venous, low-flow, veno-occlusive, or ischemic type), to an excessive arterial blood supply (type II, traumatic, high-flow, non-ischemic or arterial type) or to an alteration in the enzymatic and molecular regulatory mechanisms of erection (stuttering priapism) (4).

The low-flow priapism is the most common. This disease is characterized by a painful erection with complete rigidity of the penis, due to an inadequate venous outflow, leading to hypoxia, acidosis and tissue ischemia. A prolonged tissue ischemia can lead to fibrosis and permanent erectile dysfunction; therefore, this entity must be considered an authentic urologic emergency. It is more frequent in patients with a hematologic disorder (as sickle cell anemia, leukemia...), drugs abuse, being idiopathic in one third of the cases. This type of priapism has a worse prognosis (3, 4, 5).

The high-flow, arterial or non-ischemic type is very uncommon (5%) and usually appears after a recent perineal trauma. It is caused by an arterial injury (cavernosal artery or helicins ones) that produces an arterio-cavernosal fistula (with or without a pseudoaneurysm associated) and an increase in the arterial blood supply to the corpus cavernosum, leading to an arterial congestion of the penis, developing an incomplete and painless erection. There is not tissue ischemia, so the risk of permanent complications is very low and the management is not an emergency like the low-flow type. No tissue ischemia so the treatment, according to the literature, may be deferred (2, 3, 4, 5, 6). Sometimes, it can resolve

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<tr>
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<th>High-flow priapism</th>
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<tbody>
<tr>
<td>Pain</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Rigidity</td>
<td>Incomplete</td>
<td>Complete</td>
</tr>
<tr>
<td>Ischemia</td>
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<td>Yes</td>
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<tr>
<td>Underlying disease</td>
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<td>Yes</td>
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<tr>
<td>Trauma</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Prognosis</td>
<td>Good</td>
<td>Worse</td>
</tr>
<tr>
<td>Frequency</td>
<td>Less</td>
<td>Higher</td>
</tr>
<tr>
<td>Emergency</td>
<td>Less</td>
<td>Higher</td>
</tr>
<tr>
<td>Underlying lesion</td>
<td>Fistula, Pseudoaneurysm</td>
<td>No</td>
</tr>
<tr>
<td>Color doppler US</td>
<td>Fistula, Pseudoaneurysm</td>
<td>Arterial compression</td>
</tr>
<tr>
<td>Embolization</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Gasometry</td>
<td>Oxygenated</td>
<td>Deoxygenated</td>
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Figures 2A and 2B. Selective arteriography confirming the lesion. C). Superselective embolization.
spontaneously (62%) (5), so a close follow-up may be enough. If local treatment fails (external compression, local cold application, intracavernosal injection of vasoactive drugs –adrenergics agonists) can be performed the supraselective embolization of the underlying vascular injury with absorbable material (autologous clot or gelatin sponge) with resolution rate of 74% and erectile dysfunction by 5%, or nonabsorbable (“coils” of platinum), with resolution rate of 78% and 39% of erectile dysfunction (7,8,9). Authors such as Bassett J et al to propose the use of first choice resorbable materials in embolization (9). Contrary to the literature in our three cases the conservative approach did not provide results thus performed superselective arteriography and embolization of the pudendal nonabsorbable material (“platinum coils”), with good results in the first operation (since no is always 100% effective on the first try and you have to make a second embolization) (7) and without complications. The main complication (less frequent than in the venous type) is erectile dysfunction, but have also been described necrosis, ischemia, gluteal, perineal abscess and purulent cavernitis (2, 3, 4, 5, 6). In case of failure of radiological interventional techniques surgical ligation of the cavernous or pudendal arterial branches is indicated (9,10,11).

The differential diagnosis between the two main groups of priapism is based in the physical exploration, clinical presentation, aspiration-blood from the corpus cavernosum (oxygenated in the high-flow priapism and non-oxygenated in the low-flow type) and the diagnostic imaging techniques. The blood tests (searching hematologic disorders) can help to distinguish between them. Color Doppler US can identify a vascular injury (arteriocavernosal fistula with or without a pseudoaneurysm associated in a high-flow priapism), an absence-extremely reduced blood flow from the cavernosal arteries in a low-flow priapism (owing to vessel compression) or even a venous thrombosis of the corpus cavernosum. Selective arteriography is useful for the diagnosis and for the treatment with superselective embolization (1, 2, 5, 6, 7, 8). In both types of priapism the main complication (more frequent in low-flow priapism) is the erectile dysfunction (1, 2, 3, 4).

In our cases we noted a typical clinical history, supported diagnosed with color Doppler ultrasound and arteriography allowing the diagnosis and endovascular treatment supraselective, with total resolution in all three patients, results similar to those valued in the literature but a lower incidence of erectile dysfunction using nonabsorbable material (up to 39% while in our case we did not record such a complication).

**CONCLUSIONS**

The color Doppler sonography and angiography are important imaging methods in the study of the high-flow priapism. In our cases arteriography allows the supraselective embolization of the vascular lesion with functional clinical resolution in the three patients.

**REFERENCES AND RECOMMENDED READINGS**

(*of special interest, **of outstanding interest)


