

The role of imaging in penile fracture

Our experience



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The role of imaging in penile fracture. Our experience

INTRODUCTION: *Fracture of the penis is a urological casualty resulting from a tear in the tunica albuginea of the penis. The diagnosis of suspicion is based fundamentally on the data obtained by means of clinical presentation and physical examination. Penile ultrasound is a useful, quick and innocuous test for suspected cavernous body ruptures.*

MATERIALS AND METHODS: *We observed 22 patients with suspected asymptomatic penile trauma. All of them underwent a Colour Doppler US examination, 5 of them an MRI scan. A functional US with stimulation was not carried out immediately, neither was a retrograde urethrography performed.*

RESULTS: *No lesions were found in six patients and only one patient underwent partial penectomy. The other patients received conservative treatments, such as cold compressive bandaging of the penis and the administration of fibrinolysis.*

CONCLUSION: *Penile fracture is underestimated because the traumas are often kept silent. Early diagnostic imaging management permits evaluation of the best procedure to adopt and whether surgery is necessary or not.*

KEY WORDS: Colour Doppler US, Penectomy, Penile fracture

Introduction

Fracture of the penis is a urological casualty resulting from a tear in the tunica albuginea of the penis often due to violent intercourse or other mechanical traumas that cause forcible bending of the erect penis. Less common aetiologies include turning over in bed, a direct blow, forced bending, or hasty dressing or undressing when the penis is erect, the latter an excuse often reported by patients too embarrassed to speak about their sexual activity ¹.

Penile fracture is rare in Europe and America although cultural reasons often cause it to be underestimated because similar traumas are kept silent due to modesty or cultural restraint. In the USA, the incidence reported is 1 out of a population of 175,000 males. The incidence of PF varies in different regions due to cultural diversity. In some Eastern countries the incidence is higher and up to one case per week may present to a busy emergency department ⁶. Some patients may not seek treatment because of embarrassment ²⁰.

Most commonly, penile fractures involve one of the corpora cavernosa. It may also affect both corpora cavernosa, the corpus spongiosum or urethra ². During erection, the thickness of the tunica albuginea decreases to 0.25-0.5 mm from the flaccid state's 2 mm, making the penis more vulnerable and prone to traumatic injury ³. The most common injury occurs when the penis slips out of the vagina and strikes against the symphysis pubis or perineum. In some reports, sixty per cent of cases

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occur during consensual intercourse ⁴, and are more likely when the recipient partner is on top ⁵.

Penile fracture is more likely to occur during sex involving a younger male. Penile fracture is a painful injury which usually affects the lower two-thirds of the organ. Symptoms of a penile fracture include: bleeding from the penis, dark-coloured bruising on the penis, trouble urinating, a cracking or popping sound often accompanied by sudden loss of erection, pain varying from minimal to severe. According to research, symptoms of penile fracture which do not include a popping sound or rapid loss of erection are usually due to other types of injury. A penile fracture will often cause the penis to take on what doctors call "eggplant deformity," where the penis appears purple and swollen. Rarer symptoms of penile fracture include swelling in the scrotum and blood in the urine. Other conditions that mimic the symptoms of penile fracture include rupture of the veins and arteries in the penis and a ruptured suspensory ligament. Within this set of pathological conditions, in addition to the rupture of the corpora cavernosa, lesions of the integuments (from simple contusions to tears, wounds or partial or total avulsions, with or without involvement of the scrotal sacs) and vascular lesions should be considered. These include thrombosis of the dorsal veins of the penis ¹, rupture of the dorsal artery, of the superficial dorsal vein and of the deep dorsal vein, a lesion scarcely referenced in the relative literature, due to its low frequency.

The diagnosis of suspicion is based fundamentally on the data obtained through clinical presentation and physical examination. In order to obtain more information about penile structures and verify the presence of accompanying lesions, as complementary tests, we can recur to ultrasound, cavernosography and retrograde urethrography in cases of suspicion of associated urethral injury.

Penile ultrasound is a useful, quick and innocuous test ^{7,8}, which can provide information about haematoma and albuginea of the corpora cavernosa, but as it does not always locate a rupture of the albuginea ⁹ if there is one, it must be very meticulously carried out by an expert sonographer.

A cavernosography can inform us about the state of the corpora cavernosa, but it also presents clear disadvantages: it is an invasive test, it can give rise to false negatives ¹⁰ due to early sealing of defect by a clot, it risks creating infection and involves exposing the patient to ionizing radiation.

Treatment of an acute penis due to rupture of the deep dorsal vein may be conservative or require emergency surgery, depending on the severity of each case and the presence or absence of accompanying injuries ⁴.

Conservative treatment consists in the application of a local cold compressive bandage and the administration of fibrinolytics. This conservative approach is accompanied by a high risk of sequelae (up to 10% of cases), like the formation of abscesses and fibrous plaques, which can

lead, in turn, to penile curvatures and future deformities, as well as erectile problems.

Emergency surgical treatment consists of drainage of the haematoma and the ligation of both ends of the sectioned vein ⁵. This therapeutic measure has a lower sequelae risk-factor than that of the conservative approach while it also helps to confirm diagnosis and ensure the integrity of the urethra and the corpora cavernosa, avoiding future complications, reasons why most authors recommend early surgical exploration.

Materials and Methods

A 23-year-old patient consulted our facility for penile trauma during sexual intercourse accompanied by perception of a "cracking" sound accompanied by painless loss of erection. He came for treatment because he noticed a swelling at the level of the dorsal aspect of the penis, with a large haematoma that had progressively extended to the distal area, a detumescent penis, slightly swollen with an ecchymosis of the III proximal region of the scrotum root. No haematuria was observed, and urination was preserved. We performed an ultrasound, a dynamic penile ultrasound and an MRI scan for suspected cavernous body ruptures.

This event has made us re-analyse all the cases that have come to our observation for asymptomatic penis trauma. From November 2016 to August 2018, we observed 22

TABLE I - Injury Scoring Scale: Our penile injury scale

Grade	Description of injury	N° of patient
I	Cutaneous laceration/contusion	12
II	Laceration of Buck's fascia (cavernosum) without loss of tissue	4
III	Cutaneous avulsion	2
	Laceration through gland/meatus	2
	Cavernosal or urethral defect <2cm	2
IV	Partial penectomy	1
	Cavernosal or urethral defect ≥ 2 cm	1
V	Total penectomy	0
Total		22

TABLE II - Penile Trauma

Penile Trauma	N° Patients
Unilateral Penile	8
Bilateral Penile	3
Bilateral corpora Tear	3
Urethral Injury	2
No Total fracture identified	0
Absence of lesions	6

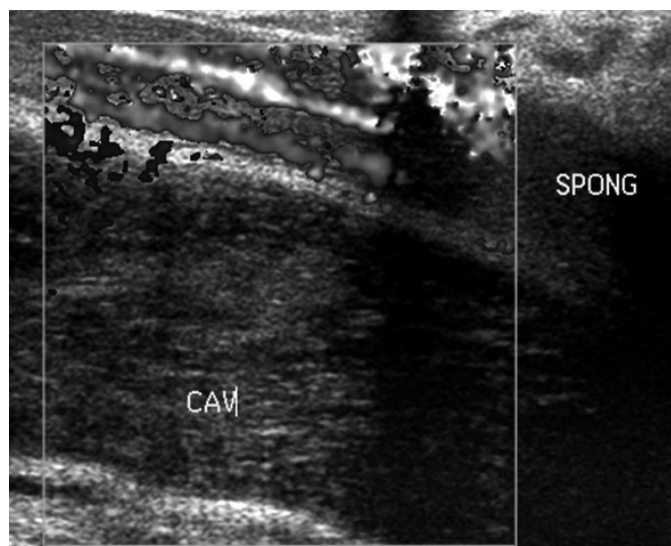


Fig.1: Male, 32 years of age. Injury during violent sexual intercourse. US of the pre-pubic region using a linear transducer (5–12 MHz), transverse scan: the corpus spongiosum is interrupted and a hypoechoic area is highlighted (III grade).



Fig. 2: Male 45 years old. This US using a linear transducer to detect a penis injury where the corpus spongiosum and urethra were broken by road-accident trauma (IV grade).

patients of different ages; two under 18 years; 14 between the ages of 18 and 65, and six more over 65; we selected only those who had presented with suspected penile trauma. We divided these men into three age groups: under 18, between 18 and 65 and over 65.

Of the patients with spectra injuries attended by us 85% were potent according to their anamnestic reports. Two patients presenting with minimal corporeal injury, who did not undergo exploration, did well. The patients all underwent Colour Doppler US and 5 of these an MRI

scan, as well. A functional US with stimulation was not carried out immediately, to avoid an increase in blood flow and increase of haematoma under vascular stimulation. We carried out a functional eco-colour-Doppler only in one case, after administering 3 mcg of PGE1. No Retrograde urethrography was performed.

Results

The results are shown in Table I-II. Of group A, 2 had had accidents, one with a bicycle, the other while closing a zip. Of group B, 5 had had motorbike accidents, 7 had experienced accidental bumps during sexual intercourse, 2 had had accidents at work. In the sole patient examined functionally using eco-colour-Doppler with 3 mcg of PGE1, a rapid fall of peripheral resistance was observed along with a normal increase in the systolic flow rate after 5 minutes. The cavernous arteries explored along their course did not seem to show morphological alterations. At 5 minutes, the bilateral diastolic flow zeroed.

During erection, at the level of the proximal section of the c.c. a left hyperechogenic area of about 9.5 mm of likely fibrous nature is observed. Good erection is observed with a discrete deviation to the left of the shaft.

In younger children, penile trauma has different underlying aetiologies. These include iatrogenic injury during circumcision, attack by a domestic animal, child abuse, motor-vehicle accidents, entrapment in zippers, or penile strangulation by tourniquet.

Discussion

Fracture of the penis is a urological casualty resulting from a tear in the tunica albuginea of the penis. Genital trauma is commonly seen in boys but rarely results in serious injury necessitating surgical intervention. Most injuries to the penis and scrotum are due to traumas caused by blunt instruments and can be diagnosed and managed by A & E physicians. Early diagnostic imaging management permits evaluations of the best procedure to follow and helps decide whether surgical intervention is opportune or not. Imaging permits physicians to reach a correct diagnosis and treat the underlying cause while avoiding subsequent sequelae. Rupture of the deep dorsal vein of the penis is another condition that should be considered during differential diagnosis of acute penis. Its clinical features are similar to those of cavernosal rupture. The use of cavernosography is now very limited due to the false negatives it often produces due to the presence of blood clotting in the traumatised region. Some authors, however, still frequently consider this method useful in cases of discrepancy between clinical data. While Ultrasound is not diagnostic, it is a useful, quick and innocuous test ^{7,8}, and can provide informa-



Fig. 3: Male 24 years old. An MRI of the middle III of the left corpora cavernosa (about 8-9 cm from the apex of the gland), on the dorsal-lateral slope observed an interruption of the continuity of the tunica albuginea, compatible with an incomplete transverse fracture lesion. The breach has a width of 6-9 mm. The lesion affects, at the same level, also the median septum with communication between the two corpora cavernosa. The lower part of the cavernous body wall is intact. The albuginea of the right cavity body is intact (where the interruption of the median septum is excluded with communication between the two bodies, over-declared).

A, B axial scan (SE/Fs *T2 weighted TR2960 mc, TE 98 ms FA 150)

C, D coronal scan and sagittal- (SE*T2 weighted TR2960 mc, TE 98 ms)

tion about haematomata and albuginea of the corpora cavernosa, although it has the disadvantage of not always detecting ruptures of the albuginea ⁹. Even though US by contrast-enhanced ultrasound in young patients with penile trauma may be advisable, we do not always avail ourselves of ultrasound with contrast medium because it is still experimental in our facility.

The use of penile cavernosography remains controversial. Although some authors recommend routine cavernosography for all patients with suspected penile fracture, most suggest reserving it for unusual cases, such as those with delayed presentation or discrepancies among clinical findings ¹¹. There is a significant incidence of false-negative

results (due to early sealing of the defect by a clot) as well as the risk of tissue reacting to contrast media and increased liability of corporal fibrosis. Therefore, even in doubtful cases, the clinical utility of cavernosography remains limited. The European Association of Urology (EAU) guidelines suggest that imaging (USS or MRI) may be useful in diagnosing PF ³.

Conclusion

A penile fracture is not the same as a break in a bone. Instead, it is a rupture in the two areas of the penis

responsible for erection: the corpora cavernosa and the penile sheath. Because the injury can cause long-lasting damage to a man's sexual and urinary function, it is important to seek emergency medical attention while early diagnostic imaging management permits evaluation of the best procedure to follow and whether it is advisable to recur to surgery or not.

Riassunto

La frattura del pene si accompagna ad una soluzione di continuo da strappo a carico della tunica albuginea del pene.

La diagnosi di sospetto si basa fundamentalmente sui dati anamnestici e l'esame obiettivo. L'ecografia peniena è un test utile, rapido e innocuo per confermare il sospetto di rotture del corpo cavernoso.

Nella nostra esperienza abbiamo osservato 22 pazienti con sospetto trauma penieno asintomatico. Tutti hanno subito un esame Eco- color-doppler, 5 dei quali una risonanza magnetica. L'esame ecografico funzionale con stimolazione non è stato eseguito immediatamente, né è stata effettuata una uretrografia retrograda.

In sei pazienti non sono state rilevate lesioni, e solo uno è stato sottoposto a penectomia parziale. Gli altri pazienti hanno ricevuto trattamenti conservativi, come il bendaggio compressivo freddo del pene e la somministrazione di fibrinolisi.

Dobbiamo concludere che la frattura del pene è sotto-stimata perché i traumi sono spesso tenuti in silenzio.

Una precoce diagnostica per immagine consente di valutare la migliore terapia da adottare e, in particolare, se la chirurgia è necessaria o meno. L'ecografia peniena è un test utile, rapido e innocuo per sospette le rotture del corpo cavernoso.

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