

CASE REPORT

PENILE FRACTURE WITH UNILATERAL CORPOREAL RUPTURE – CASE REPORT AND REVIEW OF THE LITERATURE

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ABSTRACT

Introduction. Penile fracture is an urological emergency that implies the rupture of the tunica albuginea and of the corpus cavernosum, with or without urethral injury, secondary to a traumatic event, more often secondary to vigorous sexual intercourse. Despite the fact that clinical examination and patient history are sufficient in most cases for establishing the diagnosis, imaging investigation has an important role in confirming the presence of the tunica albuginea rupture.

Case presentation. We report the case of a 44 years old male patient, who presented to the emergency department for penile swelling and hematoma, 16 hours following a traumatic sexual intercourse. The ultrasound examination revealed a discontinuity at the level of the right tunica albuginea. Surgical exploration with hematoma evacuation, hemostasis, ligation of the right injured central cavernosal artery and suture of the ruptured right corpus cavernosum and of the albuginea tunica were immediately performed. The postoperative evolution was favorable without any

RÉSUMÉ

Fracture du pénis avec rupture corporelle unilatérale – rapport de cas et revue de la littérature

Introduction. La fracture du pénis est une urgence urologique qui implique la rupture de la tunica albuginea et du corpus cavernosum avec ou sans blessure urétrale, secondaire à un événement traumatique, plus souvent secondaire à des rapports sexuels vigoureux. Malgré le fait que le diagnostic clinique et les antécédents de patients sont suffisants dans la plupart des cas pour établir un diagnostic, l'étude de l'image joue un rôle important dans la confirmation de la présence de la rupture de la tunica albuginea.

Présentation de cas. Nous rapportons le cas d'un homme de 44 ans qui s'est présenté au service des urgences avec un gonflement du pénis et un hématome, 16 heures après un rapport sexuel traumatique. L'examen ultrasonore a révélé une discontinuité au niveau de la tunica albuginea droite. L'exploration chirurgicale avec évacuation de l'hématome, l'hémostase, la ligature de l'artère caverneuse centrale blessée droite

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immediate complications, the patient being discharged 6 days after the surgery. During the periodic postoperative follow-up the patient related that the erections were similar to those he had before the incident. No signs of penile curvature were found.

Conclusions. Penile trauma with corpus cavernosum rupture is a rare pathology, in which surgical exploration is mandatory in order to prevent debilitating complications that can result secondary to the ischemic and fibrotic local changes.

Keywords: penile trauma, tunica albuginea rupture.

INTRODUCTION

Penile trauma with rupture of the corpus cavernosum is an urological emergency. This pathology requires a prompt diagnosis and an adequate treatment to avoid complications following local hypoxia with ischemic changes that can lead to necrosis, penile deformity due to fibrous scarring tissue and erectile dysfunction, complications that may significantly alter the patients' quality of life¹.

The most common cause for penile rupture is sexual intercourse, followed in small percentages by self-manipulation of the erect penis in order to obtain pleasure (masturbation) or to stop erection (especially in Middle East countries - the taghaadan practice), blunt trauma of the genital region, falling from bed or rolling on the erect penis or when forcefully attempting to remove a constriction ring placed in order to maintain an erection²⁻⁶.

The penile fracture implies the rupture of the corpus cavernosum tunica albuginea. During erection, due to the tumescence process, the penis increases its volume becoming a rigid organ and the albuginea tunica thickness decreases from 2 mm (in the flaccid state) to approximately 0,25mm, becoming more susceptible to traumatic injuries. Therefore, any penile trauma that may lead to sudden and abnormal bending of the erect penis and to intracavernosal increased pressure may result in the rupture of the tunica albuginea^{7,8}.

As we have previously mentioned, vigorous sexual intercourse is the most common cause for the rupture of the tunica albuginea, the injury occurring when the erect penis slips out of the vagina and hits the perineum or the pubic bone^{9,10}. Often the injury occurs unilateral, but bilateral rupture of the tunica albuginea is not an uncommon situation, this being

et la suture du corpus cavernosum droit rompu et de la tunique albuginea ont été effectuées immédiatement. L'évolution postopératoire était favorable sans complications immédiates, le patient étant déchargé 6 jours après la chirurgie. Au cours du suivi postopératoire périodique, le patient a signalé que les érections étaient semblables à celles qu'il avait avant l'incident. Aucun signe de courbure du pénis n'a été trouvé.

Conclusions. Le traumatisme du pénis avec la rupture du corps caverneux est une pathologie rare, mais en présence d'une exploration chirurgicale, il est obligatoire de prévenir les complications débilitantes qui peuvent résulter d'un changement ischémique et fibrotique local.

Mots-clés: traumatisme du pénis, rupture de la tunique albuginée.

reported in 2-10% of the cases¹¹⁻¹³. Concomitant spongy and urethral rupture is rare, but according to literature the percentage varies between 5% and 30%¹⁴⁻¹⁶.

In most cases, the diagnosis is relatively easy to establish, based on the patient's history, local examination and imaging investigations. Usually the patient reports a "popping" or a "cracking" sound during sexual intercourse in the genital area, followed by local pain, penile detumescence, progressive penile swelling due to edema and hematoma formation, ecchymosis that may extend to the scrotum and to the pubic region¹⁷. Another clinical important local change, which is pathognomonic for penile rupture, is penile deviation towards the opposite side of the injury, due to the mass effect of the local hematoma. The distribution of the hematoma depends on the integrity of the penile fascial layers. Therefore, if Buck's fascia is intact, the blood extravasation will be localized along the penile shaft and it will completely deform it, resulting in an "eggplant deformity"^{4,18}. If Buck's fascia is ruptured, the hematoma will extend towards the scrotum, perineum and pubic area, leading to the "butterfly like" hematoma¹⁹⁻²¹.

Imaging investigations such as ultrasonography, Doppler ultrasonography, cavernography, urethrography, angiography and magnetic resonance imaging have an important role in confirming the diagnosis and in evaluating the site and the extend of the injury, in order to establish a proper therapeutic conduct. Ultrasonography is a cheap, accessible and non-invasive investigation that can be easily used in emergency rooms and in experienced hands it may provide useful information. Magnetic resonance imaging is a very efficient investigation, used especially for unclear cases and to exclude other causes that may lead to a similar clinical presentation, like dorsal vein

rupture or rupture of the circumflex veins²². For cases where urethral lesions are suspected, voiding difficulty or the presence of blood at the urethral meatus, urethrography is a quick and very useful investigation^{19,23}. Over the years, numerous studies have concluded that immediate surgical exploration is better than conservative treatment when managing patients with penile trauma, due to a lower rate of complications and to better long term results, especially when we consider the erectile function and the possibility of penile curvature, which is estimated to be encountered in more than 10% of the cases^{24,25}.

CASE PRESENTATION

We present the management and the outcomes of a patient with penile fracture following vigorous sexual intercourse. A 44 years old male patient presented at the emergency department for penile swelling and deformity, local hematoma and mild pain. The patient related that 16 hours ago he had sexual intercourse and that during the contact the penis slipped out of the vagina and hit the partner's perineum. He noticed a slight detumescence right after the incident, but he continued the sexual intercourse.

Local examination revealed an uncircumcised, swollen and deformed penis, curved towards the left side of the penis, having a slightly S shape, with enlarged scrotum and a penile hematoma that extended to the scrotal and to the pubic area, as well as local tenderness. There were no urethral bleeding or signs of blood at the urethral meatus and the patient didn't accuse hematuria or urinary tract symptoms. The ultrasound examination revealed a discontinuity at the level of the right tunica albuginea, in the middle third

of the right cavernous body. Considering history, local examination and the ultrasonography findings, the diagnosis of penile rupture was clear (Fig 1,2).

Immediate surgical exploration was decided, in order to prevent the possible complications that could appear in such cases if neglected. A urinary catheter was inserted before surgery, without encountering any difficulties. We have started with a dorsal split incision and we have prolonged it on the dorsal penile surface and managed to deglove the penis. During the dissection maneuvers, we have identified blood clots at the level of the right cavernosal body, that extended to the right hemiscrotum and inferior hypogastric region. After the evacuation of the hematoma, the rupture of the right tunica albuginea was noticed, as well as of the right cavernosal body in its middle third part, with active bleeding. The bleeding was generated by the central cavernosal right artery, which was injured during the traumatic event. We have ligated the injured right cavernosal artery and sutured the right cavernosal body and the tunica albuginea using a 3.0 vicryl surjet suture (Fig. 3,4,5,6,7).

In order to verify the possible leakage, normal saline solution was injected in the right cavernosal body. We have continued the dissection of the left cavernosal body and of the spongiosum body in order to identify any other injuries, but none were found. Two drainage catheters have been placed, one in the pubic area and one in the right hemiscrotum. Due to the swelling of the penile foreskin, which made difficult the approximation of the incision edges, we have opted to perform circumcision and continued with the suture of the dorsal penile body incision. At the end of the intervention, a compressive bandage was applied to the penis (Fig. 8,9,10).

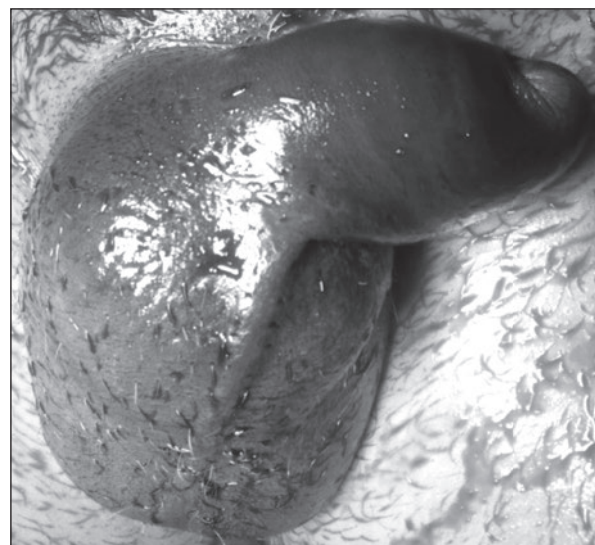


Figure 1 and 2 – preoperative images.

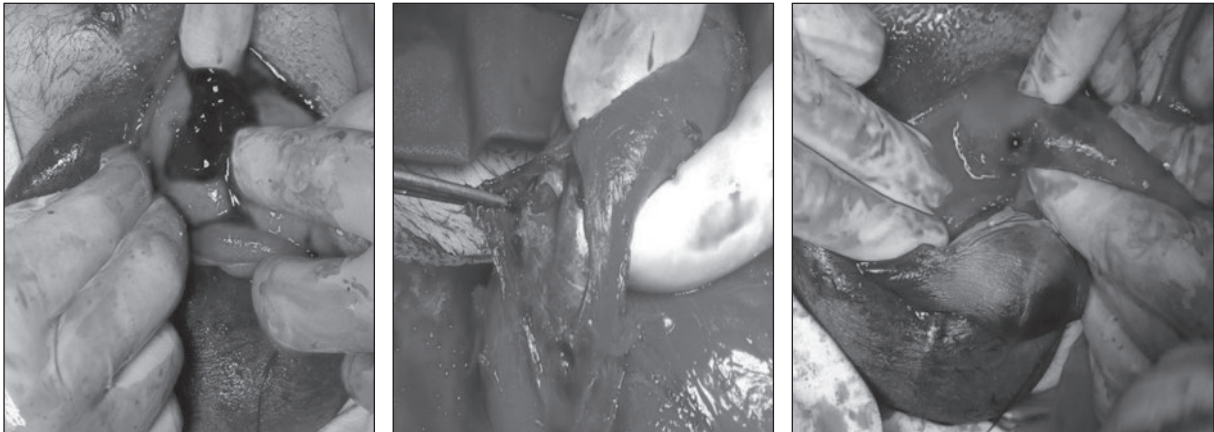


Figure 3, 4 and 5 – intraoperative images (hypogastric hematoma; rupture of the right cavernosal body; active bleeding from the central right cavernosal artery)

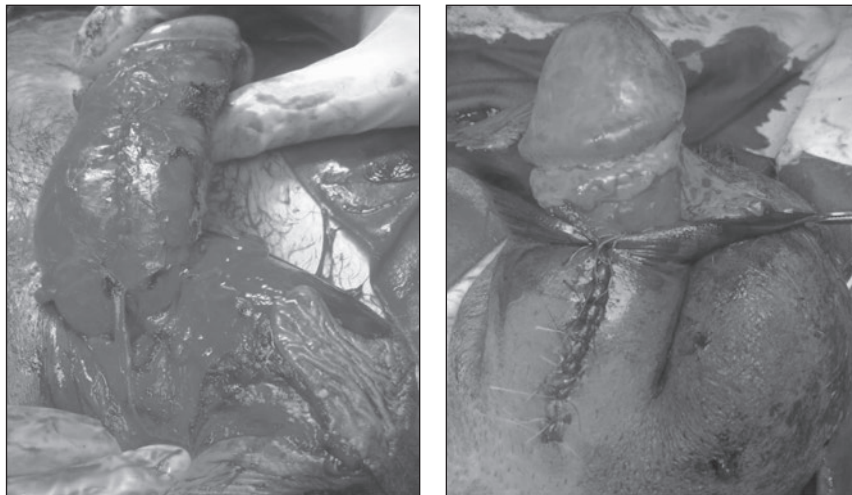


Figure 6 and 7 – intraoperative images (suture of the right albuginea tunica and of the dorsal penile skin)

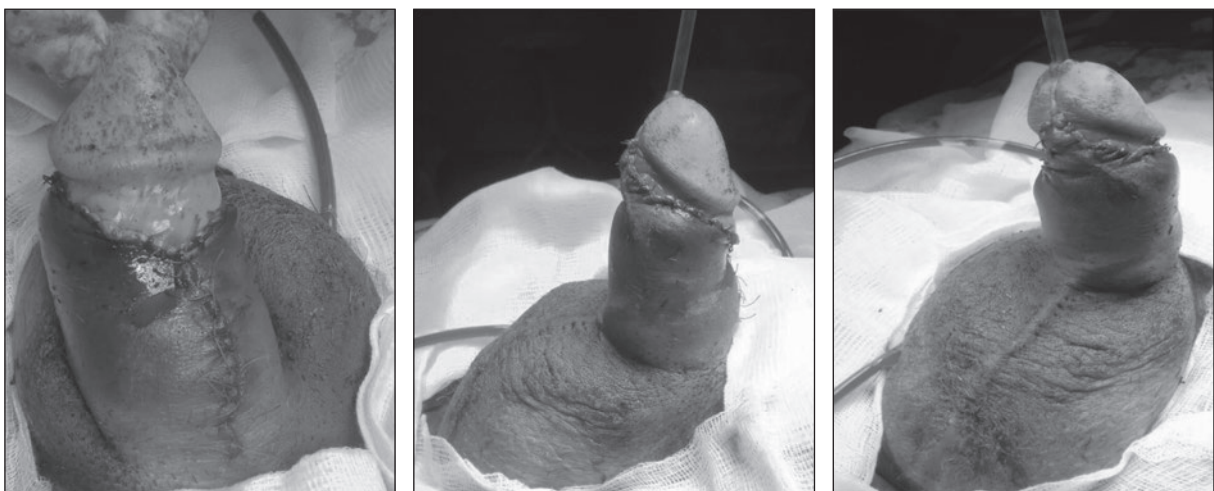


Figure 8, 9 and 10 – intraoperative images (at the end of the surgery)



Figure 11 – postoperative image (two months after the surgery)

The postoperative evolution was favorable, the urinary catheter being removed on the first day after surgery and the drainage catheters on the third and fourth days after surgery. The patient was discharged on day 6 following surgery with the recommendation to avoid sexual contact for two months.

During the periodic postoperative follow-up the patient related that the erections were similar to those he had before the incident. No signs of penile curvature were found (Fig. 11).

DISCUSSION

According to literature, most cases of penile trauma with rupture of the corpus cavernosum are related to sexual intercourse, especially in Western countries¹⁰. Vigorous sexual intercourse may lead to bilateral rupture of the corpus cavernosum and it may also affect corpus spongiosum and the urethra²⁶.

Several studies have revealed that the rate of urethral injuries is much higher in Western Europe and in North America when compared to the Middle East countries or Nord African countries, this being related to the fact that the most frequent cause for penile rupture in Western countries is a vigorous sexual intercourse, whereas in the Middle East countries and in North Africa self-manipulation is the principal cause of penile rupture^{7, 27}.

Despite the fact that clinical examination and patient history are sufficient in most cases for establishing the diagnosis, imaging investigations such as ultrasonography have an important role in confirming the presence of the tunica albuginea rupture. Using the linear transducer, we can evaluate the penile corporal bodies and the integrity of the tunica albuginea that appears as a hyperechoic line. The presence of a discontinuity at this level suggests an injury of the tunica albuginea, in most cases exploratory surgery being necessary²⁸. Ultrasonography also permits the visualization of local hematoma, its extent and

relationship with the tunica albuginea, whether it is localized above the tunica albuginea or strictly in the corpus cavernosum. Using Doppler ultrasonography we can evaluate the vascular damage. Penile swelling due to local edema and hematoma may deteriorate the quality of the images, making it difficult in some cases to identify the tear of the tunica albuginea²⁹.

Magnetic resonance imaging is not routinely used for the evaluation of the patients with penile trauma, due to the fact that it is expensive and it is not available everywhere. However, MRI examination offers higher quality images than those obtained by ultrasound examination, due to its higher sensitivity in detecting the rupture of the tunica albuginea, therefore it could be used in selected, atypical cases or to exclude other injuries that could lead to penile hematoma and swelling³⁰.

Due to personal embarrassment the patients may delay seeking medical help during the first hours and even days, this resulting in severe complications due to local ischemic and fibrotic changes. Numerous studies showed that delayed presentation for medical help is directly associated with late postoperative complications²³.

In an article regarding the delayed repair of the penile fracture, Cummings reported that a delay of 24 to 48 hours has a minor impact regarding the postoperative penile recovery and functionality³¹.

Over the years, the management of penile trauma with rupture of the corpus cavernosum has changed from conservative treatment (painkillers, anti-inflammatory and anti-fibrinolytic medication, ice packs, Foley catheterization) to exploratory surgery, due to better outcomes of the latter³². The prompt surgical approach associates a shorter hospitalization, a better recovery of the penile functionality and fewer late debilitating complications that may severely affect the patient's quality of life^{2, 25, 32}. Conservative treatment and delay in presentation have been associated with complications such as infected hematoma, abscesses

and tissue necrosis (encountered in up to 25% of the patients), penile curvature (found in approximately 10 % of the cases), pain during intercourse, erectile dysfunction, urethral stricture^{1,28}. Therefore, immediate surgical exploration with hematoma evacuation, hemostasis, suture of the albuginea and urethral suture if it is found to be ruptured, represents the gold standard treatment for this pathology²⁸.

In a 2008 article concerning the surgical approach in eight patients with penile fractures, Evangelos et al reported that at 12 months after the surgery all the patients presented similar erections to those that they had before the incident. All the patients presented at the hospital within 48 hours from the trauma³³.

Muentener and his collaborators reported their long-term experience with surgical and conservative treatment in patients with penile fractures in an article published in 2004. The success rate obtained in the cases where immediate surgical exploration was preferred was 92%, whereas in the case of the conservative treatment the success rate was 59%³⁴.

Phillips et al reported their 9 year experience regarding the surgical management of acute penile trauma. 32 patients with confirmed penile fracture presented to the hospital, within 76 hours after the injury, four of them having bilateral cavernosal and urethral rupture. During the follow-up period, 15% of the patients developed complications such as wound infection 5%, erectile dysfunction 5%, urethral stricture and fistula 1%. It was underlined that the patients with complications following surgery presented later than those without complications³⁵.

In a 2016 meta-analysis regarding penile fracture, Tarik Amer reported a rate of complications of 20.6% following immediate surgery versus 46% when conservative treatment was preferred. Erectile dysfunction was encountered in 22% of the cases with conservative management and only in 1.94% in the patients who have undergone surgery. The rate of penile curvature following surgery was 2.7% compared to 13% in the conservative treatment cases. It has also been observed that the rate of complications following immediate surgery versus delayed surgery was lower, especially in the cases with penile curvature. No significant difference was found regarding the rate of erectile dysfunction when comparing immediate and delayed surgery³⁶.

CONCLUSIONS

Penile trauma with rupture of the tunica albuginea and corpus cavernosum is an urological emergency, not so often encountered in the daily practice

and it requires surgical exploration to prevent severe complications such as erectile dysfunction and penile curvature.

Imaging investigations have an important role in confirming the diagnosis and in the preoperative evaluation, in order to establish the site of the injury and its extent.

Personal embarrassment may lead to higher rates of complications because the patients may delay their presentation, therefore vital time can pass from the moment of the trauma until the surgery, period of time in which ischemic and fibrotic local changes occur.

Over the years, the immediate surgical approach has become the treatment of choice when facing with this type of pathology, due to a shorter hospitalization, better recovery and fewer late complications when compared to the conservative approach.

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