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Role of Ultrasound in Diagnostic Aid of a Case of Penile Fracture.

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Abstract:

Penile fracture is a rare urological emergency resulting from tear in the tunica albuginea of the penis due to forceful manipulation of an erect penis. We would like to report a case suspected of penile fracture presenting with large hematoma over the glans penis in which, ultrasound was used to confirm the diagnosis and correlate the ultrasound and intra operative findings.

Keywords: penile fracture, corpus cavernosum, corpus spongiosum, tunica albuginea, Bucks' fascia.

Introduction

Fracture of penis is a urological emergency resulting from a tear in the tunica albuginea of the penis often due to forceful manipulation of an erect penis. Normally it involves one of the corpora cavernosa. It may also affect both corpora cavernosa, the corpus spongiosum or the urethra. The frequency of penile fracture is likely underreported in the published literature. The mechanism of action may lead to embarrassment, causing patients to avoid seeking treatment. Penile fracture usually occurs due to vigorous vaginal or anal intercourse. Other potential causes include masturbation, gunshot wounds, or any other mechanical trauma that causes forcible bending of an erect penis. Other rare reported etiologies include turning over in bed, a direct blow, forced bending, or hastily removing or applying clothing when the penis is erect.

Case Report:

A 24 years old male with no previous illness presented to our centre with huge swelling in the ventral part of glans penis. Patient claimed he fell from bed and woke up with sharp pain in his penis. He denies vigorous sexual activity. On physical examination, there is a large hematoma overlying the ventral aspect glans penis extending to the right side of the penile shaft. There is only minimal deformity of the penile shaft. There is no urinary retention, dysuria or macroscopic hematuria. There is mild tenderness on palpation. Due to atypical presentation and strange history given by patient, ultrasound examination is requested. Ultrasound study was performed using 15 MHz linear array probe. It reveals there is irregularity and loss of continuity in the lateral aspect of right corpus cavernosum with overlying hematoma associated with deformity of right corpus cavernosum (Figure 1). There is also a large hematoma at the region of glans penis (Figure 2). The penile urethra and corpus spongiosum appear normal. Diagnosis of penile fracture involving the right corpus cavernosum was made based on ultrasound findings. Patient was rushed to the operating theater and intra operative findings revealed a 1.5cm defect at the lateral aspect of right corpus cavernosum with overlying hematoma. The defect was repaired and patient recovered after the surgery without any complications. On 6-month follow up, the patient reported normal sexual and voiding function.

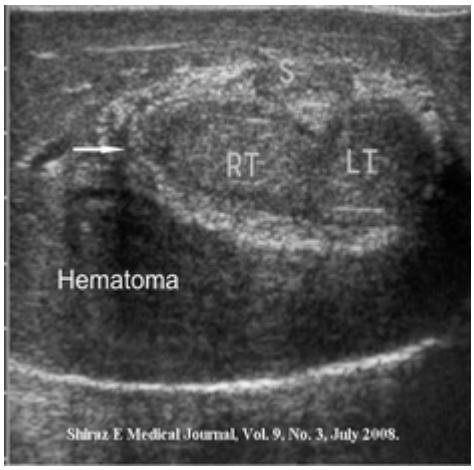

Figure 1. Ultrasound examination of the penis. Axial images with probe ventrally located. There is loss of continuity and irregularity in the lateral aspect of right corpus cavernosum (white arrow) associated with overlying hematoma. S=Corpus spongiosum, RT=Right corpus cavernosum, LT=Left corpus cavernosum.

Figure 2. Ultrasound examination of the glans penis. Axial image with probe ventrally located. Large hematoma at the glans penis is demonstrated. S=Corpus spongiosum, H=Hematoma.

Discussion:

The erectile bodies of penis include: the corpora cavernosa (left and right) and the corpus spongiosum. Corpora cavernosa are contained by the tunica albuginea. All three corpora are surrounded individually by Bucks' fascia. During erection thick tunica albuginea stretches, becomes thin and prone to tears. The tunica albuginea thickness reduces from 2.4mm during flaccid state to 0.25-0.5mm during erection. Sudden direct trauma to the penis or an abnormal bending of the penis in an erect state can cause tearing of the tunica albuginea, with injury to the underlying corpus cavernosum. The injury usually involves only one corpus cavernosum, but both can be involved. This is more commonly associated with penile laceration and urethral injury.[1] The diagnosis of penile fracture can usually be made clinically on the basis of the physical examination, and the patient's history. The classic, "text-book" history of penile fracture is a sudden cracking sound followed by pain, rapid detumescence, swelling and discoloration of the penis with or without voiding problems.[2] Radiological investigations can be helpful when clinical diagnosis proves to be difficult and also to rule out urethral injury when it is clinically suspected.

The penis is an ideal structure for imaging by sonography. It does not contain bone or air, which impede sound, and it is readily accessible. The sharp tissue interfaces between the corpora and tunica albuginea can be shown clearly with sonography. On ultrasound, the paired corpora cavernosa, the cavernosal arteries, the tunica albuginea and the corpus spongiosum are easily identified. The corpora cavernosa are of uniform hypo-echoic reflectivity and the tunica can be seen as an echogenic envelope surrounding the corpora. Corpus spongiosum is of higher echogenicity. Ultrasound is able to detect the site of the tear as an interruption of the echogenic line of the tunica albuginea. Ultrasound can be used for detection and determining the location of the tear. High frequency linear array probes are used and provide a high definition image quality. In 1983, Dierks and Hawkins [3] first described the use of sanography for the evaluation of corpus cavernosum rupture. They recommended that four areas should be examined: 1) the tunica albuginea, to look for tears; 2) the

corpora cavernosa, for evidence of deformity of irregularity; 3) the urethra and corpus spongiosum, to detect any damage; 4) the hematoma, to determine its size.

On MRI, corpus cavernosum fracture is depicted by the discontinuity of the low signal tunica albuginea. These findings are most evident on T1WI and PD images.[4] Cavernosography can also be used to locate the tear.[5] However, there is a significant incidence of false-negative results as well as a risk of tissue reactions to contrast material and increased liability to corporal fibrosis.[6]

In the study by Mydlo et al., the cavernosographic findings were falsely negative in 28.5% with penile fracture [7] however, in a study done in Qatar, ultrasound gave a false negative result in only two out of 12 patients with penile fracture (17%).[8]

Retrograde urethrography should be performed if urethral injury is suspected based on the presence of blood at the meatus, hematuria of any form, dysuria, or urinary retention. Ultrasound scan should be able to detect possible urethral injury, however in presence of clinical suspicion for urethral injury and a normal ultrasound scan, retrograde urethrography should still be performed.

Potential complications of penile fracture include erectile dysfunction, abnormal penile curvature, painful erections, formation of fibrotic plaques, penile abscess, urethrocutaneous fistula & corporourethral fistula. Patients treated with conservative management with cold applications, pressure dressings, catheterization, anti-inflammatory drugs, antibiotics and erection suppressing drugs have a significantly higher incidence of complications compared with those treated with prompt surgical therapy. Surgical repair is now the gold standard for treatment of penile fractures.[9]

Conclusion:

Penile fracture is a rare urological emergency and typically requires immediate surgical intervention. Ultrasound is a good modality to detect the presence and site of tear in the tunica albuginea. Ultrasound can also help with the correct diagnosis in difficult cases with atypical history or presentation. A case of penile fracture is reported with correlation of ultrasound and intra operative findings.

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