Sonographic study of penis injury

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Learning objectives

To describe the sonographic findings occurring in penis injury so that a precise diagnosis can be established for facilitating the most appropriate treatment choice which may be either medical or surgical depending on the case.
Background

Penis injuries are uncommon lesions associated with urethral lesions in 20 to 30% of cases, with fracture of the corpus cavernosum accounting for 33 to 58% of injuries.

There are several ways to classify these injuries; in daily practice the most useful method takes into account where the affected tissue is located by dividing the lesions into three groups: (a) those of the tegument; (b) the corpus cavernosum; and (c) corpus spongiosum of the urethra. Taking into account skin integrity, we can divide the lesions into open and closed classes, the latter being the most common.

Closed wounds could be classified in the following way:

1.- Corpus cavernosum fracture: This usually occurs when an abnormal or angled force is applied to the erect penis during sexual intercourse, although almost 3% of cases could be caused by direct trauma to the penis when it is flaccid. The fracture involves tearing of the tunica albuginea, a fibrous layer surrounding the corpus cavernosum and corpus spongiosum. In a state of flaccidity this membranous layer measures 2.4 mm, but during erection it narrows down to 0.25 mm, making it more fragile. The fracture only usually affects just one corpus cavernosum (75% of cases), with the right side being the most affected, located in the ventral face and in a crosswise direction. The lesion can spread to the urethra in 8 to 30% of cases, and infiltration should be suspected when the corpus cavernosum fracture is bilateral. With regard to clinical characteristics, the patient usually reports having heard a "cracking" sound, followed by the loss of the erection, pain, a hematoma and if the urethra is affected, bleeding through the urethral meatus can be experienced. On physical examination, it is sometimes possible to palpate the breakage or defect, deviation or curving of the penis towards the opposite side of the lesion and, if Buck's fascia is intact, a small hematoma in the penis. Although bleeding in the patients is usually limited it is important to measure the haemoglobin, to achieve a baseline reference.

In these cases ultrasound is a useful and cost-effective tool, allowing us to visualize the continuity of the tunica albuginea, and also the frequently associated hematoma. This is seen as a hypoechogenic collection adjacent to the affected area and as an increase in the thickness and echogenicity of the area covering of the penis.

2.- Vascular lesions can affect the artery or superficial or deep dorsal vein and the cavernous artery. These lesions usually occur during sexual intercourse because of vessel compression against the surrounding bone structures of the vagina. Its clinical characteristics are similar to corpus cavernosum fracture, and as such, a differential diagnosis should be carried out.
In these cases the Doppler echocardiogram test combined with the B-mode ultrasound are useful for assessing the integrity of the cavernous arteries, the penile veins and the penile structures.

3.-Contusions: These are caused by an external force applied to the penis when it is in a state of flaccidity and there is a breakage of the cutaneous vessels, appearing clinically as a hematoma and oedema of the skin or a tegument of the penis, which can spread to the scrotum or the skin of the abdomen. In these cases the ultrasound enables us to view the increase in the thickness of the soft tissue of the penis and/or the superficial hematoma and thus to rule out other pathologies.

4.-Breakage of the suspensory ligament: This occurs in downward flexions of the penis when it is erect. The patient’s reports having heard a "cracking" sound with a sudden pain at the base of the penis. Sonographically a hypoechogenic collection can be observed in this area, which represents the hematoma.

Open wounds have clear clinical signs, whose intensity and extent will depend on the energy, the aggressor agent and the quantity of tissue and structures affected. It is of utmost importance to rule out urethral infiltration. In these cases, ultrasound has a complementary role.

Consequently, ultrasound is going to play a useful role in the following cases: penis breakage or fracture (corpus cavernosum) which account for 33 to 58 % of trauma; contusions; breakage of the suspensory ligament; hematomas; vein thrombosis; infiltration of the urethra; and some open wounds of the penis.

Hence, ultrasound is an effective method of exploration for the initial assessment of penile trauma and its follow-up. What is more, this procedure could help us to decide between medical or surgical treatment. It will also provide guidance on the need to complete the study using other techniques, mainly magnetic resonance.

We analyze the cases of penile trauma registered in the Reina Sofia University General Hospital between 2005 and 2010 together with a description of their sonographic findings.

Within the period stated 5 cases of penile trauma were recorded. The 5 cases of fracture of the right corpus cavernosum were associated with adjacent hematoma. The mean age of our patients was 33.5 years. None of them had important antecedents and their haemoglobin values were normal. The 5 patients reported that during intercourse they felt or heard a "cracking" noise, followed by the loss of the erection; some experienced pain and others did not. They consulted their physician due to inflammatory signs and hematoma of the penis-scrotal junction. The clinical diagnosis of all the patients was corpus cavernosum fracture and an ultrasound test was performed in 3 of these.

The following sonographic findings were apparent in the patient with an increased penis size and dorsal hematoma: Considerable thickening of the tunica albuginea from the base
of the penis and on the right side, with a hypoechoic collection with mixed echoes in its interior, on the dorsal side of the right corpus cavernosum. **FIG Nº 1.**

Another patient with an enlarged penis size presented with a hematoma mainly in the right portion of the penis. In the sonographic images this was represented by a hypoechoic collection of heterogeneous echoes adjacent to the right corpus cavernosum where there was a rupture on the ventral surface, connected to the hematoma, which was all highly suggestive of breakage in this area. Also, diffuse inflammatory changes were seen in the superficial soft tissue. **FIG Nº 2.**

Our third patient with penis fracture presented with a hematoma reaching the scrotum and in the sonographic images there was intermediate echogenic material in the subcutaneous tissue in the right margin of the base of the penis, suggestive of hematoma, in close contact with the slightly irregular tunica albuginea. **FIG Nº 3**

The 5 patients were given emergency operations, revealing breakage of the right corpus cavernosum. In all cases excavation of the hematoma and suture of the affected cavernous body were performed.
Imaging findings OR Procedure details

All images are cases of Reina Sofia Hospital within the period stated in the job.
**Fig. 2:** RIGHT CORPUS CAVERNOSUM RUPTURE: Ventral surface rupture, with heterogeneous echoes collection, corresponds to hematoma.

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Fig. 1: FRACTURE OF THE RIGHT CORPUS CAVERNOSUM: Thickening of the tegument and the tunica albuginea. Hematoma dorsal to the right corpus cavernosum.

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**Fig. 3:** FRACTURE OF THE RIGHT CORPUS CAVERNOSUM: Collection of intermediate echoes in the subcutaneous tissue of the penis based, corresponds to hematoma, in close contact with the slightly irregular tunica albuginea.

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Conclusion

In penis injury, ultrasound is the first imaging technique of choice, given that it is easily accessible, has a low-cost and is reliable in the diagnosis of lesions, being aimed at specialists who need to choose between conservative or surgical treatment, encouraging rapid patient recovery and thus avoiding any complications.
References

