



ORIGINAL ARTICLE

Corpus cavernosum fracture: The ultrasound in the emergency diagnosis[☆]

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KEYWORDS

Corpus cavernosum;
Emergency;
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Ultrasound

Abstract

Objective: The main objective of this work is to study usefulness of ultrasound (US) for the emergency diagnosis of the penile fracture.

Material and methods: We reviewed all the penile US studies registered in our Emergency Department between July 2007 and August 2009 with suspicion of a corpus cavernosum fracture. We compared US findings (subcutaneous hematoma, peri-albuginea hematoma, albuginea rupture and Buck's fascia rupture), and the clinical progress, with those of the surgery. We studied sensitivity, specificity, positive predictive value and negative predictive value of US in the diagnosis of rupture of the tunica albuginea. The epidemiological data of all the cases reviewed were collected.

Results: Twelve patients with a mean age of 37.8 years were reviewed. The most common cause of injury was sexual intercourse. A subcutaneous hematoma was found in nine patients, a peri-albuginea hematoma in eleven of the cases, and an albuginea rupture was seen in six of them. We found no Buck's fascia rupture. Seven patients underwent surgical treatment and in the remaining five patients, treatment was conservative. Clinical progress was good in all cases. US, as an emergency test to diagnose albuginea fracture gave 0.83 sensitivity, 1 specificity, 1 positive predictive value and 0.83 negative predictive value.

Conclusion: We believe that US is a useful procedure in the diagnosis of acute penile fracture and that it could be proposed as the diagnostic method of choice to confirm the clinical suspicion of penile fracture. Identifying the exact site of a tear in the tunica albuginea facilitates the surgical procedure.

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PALABRAS CLAVE

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Fractura de cuerpo cavernoso: la ecografía en el diagnóstico de urgencia**Resumen**

Objetivo: Valorar la utilidad de los hallazgos ecográficos en la sospecha de fractura de pene.

Material y métodos: Se revisan las ecografías de pene realizadas en urgencias entre julio de 2007 y agosto de 2009 por sospecha clínica de fractura del cuerpo cavernoso, comparando los hallazgos ecográficos (hematoma subcutáneo, hematoma perialbugínea, rotura de la albugínea y rotura de la fascia de Buck) con los quirúrgicos, y la evolución a medio plazo. Se calculan sensibilidad (S), especificidad (E), valor predictivo positivo (VPP) y valor predictivo negativo (VPN) de los hallazgos ecográficos para el diagnóstico de fractura del cuerpo cavernoso. Recogemos datos epidemiológicos de los casos revisados.

Resultados: Se estudiaron a 12 pacientes, con edad media de 35,75 años. El origen más frecuente de la lesión es el traumatismo durante el acto sexual. Ecográficamente, presentaron un hematoma subcutáneo 9 pacientes, perialbugínea 11 sujetos y discontinuidad de la albugínea 6 pacientes. No se visualizaron roturas de la fascia de Buck. Siete fueron operados. En los 5 sujetos restantes se realizó manejo conservador. La evolución fue siempre satisfactoria. La identificación mediante ecografía de la discontinuidad de la albugínea mostró una S de 0,83, E de 1, VPP de 1 y VPN de 0,83.

Conclusión: Consideramos la ecografía como un procedimiento útil para diagnosticar la fractura de cuerpo cavernoso y que se puede proponer como de elección para confirmar la sospecha clínica. La identificación del punto exacto de rotura dirige y facilita la cirugía.

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Introduction

Fracture of the corpus cavernosum refers to the solution of continuity in its surrounding tunica albuginea. The fracture is secondary to trauma to the penis during erection, when the tunica thins from 2 mm to 0.5–0.25 mm. Generally, the fracture occurs in the tunica albuginea of only one corpus cavernosum and in one single site; however, rupture of Buck's fascia, urethra or both corpora cavernosa may also occur.¹

Patients commonly report hearing a "crack" followed by severe pain, detumescence, penile deformity and hematoma. Hematoma extravasation into the perineum may occur in case of rupture of Buck's fascia. The penis remains flaccid and deviated toward the opposite side of the fracture.

Treatment is usually surgical,² and this entity truly represents a urological emergency. Closure of the tunica albuginea is used to prevent sequelae³ such as fibrous scarring, which causes the penis to bend, experience painful erections and even urethral stenosis.⁴ Early surgery reduces the duration of hospitalization and is associated with faster functional recovery⁵ and lower risk of complications.¹

Regarding the surgical technique, direct incision over the fracture site is recommended when the location of the fracture is well defined, which reduces the duration of surgery and complications. In cases of unclear location of the fracture, presence of a large hematoma or urethral injury, a circumferential subcoronal incision is recommended since this allows thorough examination, evacuation of the hematoma and closure with absorbable sutures.³

Ultrasound (US), cavernosography and magnetic resonance imaging (MRI) are used as diagnostic modalities,^{6,7} but there is no standard protocol regarding the first-choice technique. As MRI is not readily available in emergency departments and cavernosography is an invasive procedure,

we believe that ultrasound is a valid alternative because it is easily available, fast and safe.

The main objective of this study is to evaluate the usefulness of US findings in patients with suspected corpus cavernosum fracture. Epidemiological data were also recorded and described.

Material and methods

This retrospective study included those patients who underwent an US examination for clinically suspected fracture of the corpus cavernosum at the Emergency Department of our hospital between July 2007 and August 2009. Patients were selected from our database of radiological examinations carried out at the Emergency Department. All the penile US examinations performed during the study period were filtered and those whose reason for consultation was not suspected corpus cavernosum fracture were excluded. In all the cases the clinical evaluation was performed by an on-duty urologist. Since this is a prospective study, informed consent of patients and ethics committee approval were waived. The study was in compliance with the good clinical practice and the Spanish Data Protection Act and confidentiality of the information.

Ultrasound examination technique

A Toshiba Power Vision (Tokio, Japan) US system with a high frequency transducer (7.5–10 MHz) was used for all the examinations.

Patients were imaged in the supine position with the penis on the abdominal wall. The examination started in B mode on the dorsal region of the penis, and continued on the ventral surface. Measurements of flow in the cavernous

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