

Bedside Ultrasound in a Case of Blunt Scrotal Trauma

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This case study describes a patient who suffered blunt force trauma to the scrotum. Use of bedside emergency ultrasound facilitated early diagnosis of a ruptured testicle and allowed for prompt urological consultation and timely surgical repair. The utility of bedside emergency ultrasound in the evaluation of testicular trauma, as well as the outcome of our case, is discussed here. [West J Emerg Med 2013;14(2):127-129.]

INTRODUCTION

Currently, bedside emergency ultrasound (EUS) has become an important diagnostic tool employed by many emergency physicians (EP).^{1,2} For almost a decade EPs have been trained in EUS as a standard part of their residency curriculum, based on guidelines from numerous professional organizations, including the American College of Emergency Physicians, the Society for Academic Emergency Medicine and the American Board of Emergency Medicine.³ Ease of use, lack of ionizing radiation and increased interaction with patients are only a few of the many desirable qualities of EUS. However, its greatest asset lies in the ability to rapidly make the diagnosis of a time-sensitive medical condition, enabling the EP to mobilize resources and expedite treatment, which might otherwise be delayed. The use of EUS for the evaluation of scrotal injury from blunt trauma exemplifies this point.

Scrotal trauma due to blunt force frequently results in significant injury requiring urological evaluation and surgery.⁴ Evaluation by physical exam is often limited, or impossible, due to patient discomfort. A missed diagnosis of testicular rupture has serious consequences. In patients who present with gross testicular swelling following trauma, the incidence of testicular rupture has been reported to be greater than 50%.⁴⁻⁷ Without surgical repair, the testis is prone to both ischemia and infection and frequently requires orchiectomy. Conversely, if surgical intervention occurs within the first 72 hours after injury, testicular salvage rates approach 90%.⁸⁻¹⁰ After 72 hours, this salvage rate decreases to as low as 30%.¹¹⁻¹²

Within the scrotum, the testes are encased within the tough layer of the tunica albuginea. Surrounding this covering is the thin tunica vaginalis, a serous layer embryologically derived from the processus vaginalis of the peritoneum. A contusion to the scrotum can result in a hematocele, which is bleeding outside the tunica albuginea but within the layers of the tunica vaginalis. Bleeding deep to the tunica albuginea is termed a scrotal, or subcapsular, hematoma. When the inelastic tunica albuginea ruptures due to trauma, the testicular parenchyma may extrude into the scrotal sac. This defines testicular rupture, which should be differentiated from testicular fracture. The latter is a term, which describes a distinct, often linear, divide between two portions of the testicular parenchyma. In the best-case scenario, testicular fracture can exist in the absence of rupture. However, fracture may also lead to testicular rupture, with protrusion of testicular parenchyma, and a correspondingly worse outcome for the patient.

CASE REPORT

A 22-year-old male with no significant past medical history presented to the Emergency department approximately 3 hours after he was in an altercation, during which he sustained multiple blows to the head, stomach, and genital area with a large flashlight. His primary complaint was of severe testicular pain.

Physical examination revealed a calm, well-developed male in mild distress due to pain. Vital signs included a blood

pressure 132/85 mmHg, heart rate of 90 beats per minute, respiratory rate 16 breaths per minute, and temperature 98.9°F. On examination of the genitals, the penis was normal. His scrotum was enlarged to approximately the size of a grapefruit, and the overlying skin was erythematous. The scrotal area was exquisitely tender to palpation, making it impossible to reliably identify or examine either testis, despite the use of parenteral opioid analgesia. A urinalysis was obtained, which was normal and notably negative for blood.

A bedside scrotal ultrasound was then performed utilizing a 10 MHz linear array probe. The right testicle and epididymis appeared normal. Normal perfusion was present within the right testis on Color Flow Doppler ultrasound. The left testis had ill-defined margins and diffuse irregularity of the outer contour. The tunica albuginea was disrupted, with protrusion of testicular parenchyma. A hematocele was present surrounding the defect (Video 1). The testicular parenchyma had a distinct area where poor vascular perfusion was noted on Color Flow Doppler imaging, consistent with ischemia (Video 2).

Urology consultation was emergently requested and a formal ultrasound ordered, which confirmed the diagnosis of testicular rupture, with both sub-tunical and extra-tunical hematoma. Color Doppler Flow on the formal ultrasound also confirmed decreased flow in a portion of the left testis adjacent to the rupture, thought to be an area of infarction.

The patient was admitted by the urology service and promptly taken to the operating room. After dissection through the skin and layers superficial to the tunica, a 4 cm laceration was noted in the tunica albuginea. Necrotic testicular parenchyma was identified and excised. The remaining viable tissue was left and the tunica albuginea was closed. Following surgery, the patient did well post-operatively and was discharged from the hospital. Unfortunately, long-term follow up on the patient's progress was limited by his failure to return for clinic appointments or respond to telephone calls.

DISCUSSION

Blunt scrotal trauma can result in severe testicular injury requiring a time sensitive diagnosis in the setting of testicular rupture. Early surgical exploration has become the standard of care on the basis of data presented in the 1980s by Cass and Luxenberg.¹³ This showed a high rate of delayed orchiectomy, due to missed testicular rupture, when conservative management was employed.⁵⁻⁶ Gross reviewed the literature in 1969 and found an 80% salvage rate when surgical exploration was performed within 72 hours of trauma.¹¹ Numerous studies have shown that there is often a significant delay in presentation, with one study having a mean delay of 3.5 days.¹³⁻¹⁴ This delay in presentation and the resultant decrease in optimal outcomes for the patient with elapsed time make a cogent argument for the use of bedside EUS in facilitating improved care.

Bedside EUS of the scrotum is an advanced use of

ultrasonography. However, clinicians already adept at the use of EUS will find this additional modality to be a relatively easy application. Using a high frequency linear array probe, the testes should be individually visualized. Identification of the presence of a heterogeneous echo pattern of the testicular parenchyma, with a loss of definition of the outer contour, is highly correlative with testicular injury. Whereas older studies have indicated a poor sensitivity of ultrasonography in scrotal trauma, more recent literature has shown that using this criterion results in a sensitivity of 100% in identifying significant injury and can avoid delayed orchiectomy for missed testicular rupture.^{13,15} Ultrasound in this setting also has great utility in identifying a normal intact testis and avoiding unnecessary surgery.¹²

In conclusion, delayed orchiectomy for missed testicular rupture is a devastating result for a patient. Considering that salvage rates from early surgical intervention can be as great as 90%, accurate diagnosis and timely management by the EP are critical. Furthermore, orchiectomy can have long-term cosmetic, psychological, and reproductive consequences. These factors serve to increase the potential for litigation when the diagnosis is missed, facts that only reinforce the high-risk nature of caring for the patient with blunt testicular trauma. Bedside EUS of the scrotum by the EP can thus serve as an important tool in expediting the evaluation and necessary urological treatment for patients who present with this complaint.

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