Trauma and Reconstruction

Dartos Fascia Interposition Flap for Penetrating Cavernosal and Urethral Trauma

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Article history:
Received 30 October 2016
Accepted 10 November 2016

Keywords:
Dartos interposition flap
Penetrating penile injury
Gunshot wound
Penetrating urethral injury

A R T I C L E   I N F O

Article info

Abstract

We present an unusual case of a single gunshot to the genitalia in which the bullet trajectory injured the urethra, corpus cavernosum, and both testicles. All injuries were successfully repaired during initial exploration. Our report serves as a reminder to clinicians to have a high index of suspicion in this circumstance and consider immediate exploration of all the injured areas. We also demonstrate the use of a dartos fascia interposition flap to cover and separate the concomitant urethral and corporal sutures lines. Our dartos flap bolstered the urethral and cavernosal repairs and helped prevent postoperative corporourethral fistula formation.

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Introduction

Penetrating trauma to the external genitalia is uncommon. Data from a large US trauma center showed that only 0.57% of all trauma patients suffered penetrating external genital trauma.1 Of these trauma cases, 28% had a penile injury, 13% had a urethral injury, and 8% had bilateral testicular injuries. Another US trauma center reported only 63 gunshot wounds to the penis in 20 years.2 As a result, the current literature on penetrating GU trauma is limited.

We present an unusual case of penetrating trauma wherein a single bullet trajectory injured the penile urethra, corpus cavernosum, and both testicles. We also present a novel technique to augment the surgical repair using the dartos fascia to minimize the risk of postoperative urethrocavernosal fistula formation.

Case report

A 31-year-old male was transported to our trauma center via EMS after multiple gunshot wounds including a single shot to the pento-scrotal region. On the initial trauma assessment, he was found to have a left hemotorax, left humerus fracture, and multiple injuries to the penis and scrotum. His left hemotorax and humerus fractures were addressed by the trauma service.

On careful inspection of the genitalia, it appeared that the patient had a bullet entry and exit point on the right mid-shaft of the penis as well as two bullet entry points in the scrotum (Fig. 1). We decided to bring the patient to the operating room for surgical exploration. A scrotal US was not performed prior to exploration. We explored the scrotum using a single midline incision. The right testicle had a small fracture of the tunica albuginea. We excised the nonviable seminiferous tubules and closed the tunica albuginea with a running 3–0 chromic suture. The left testicle had a severe fracture of the tunica albuginea and a large adjacent hematoma. We debrided about 50% of the left testicle and closed the tunica albuginea with a running 3–0 chromic suture. Doppler signals in both testicular arteries were strong throughout the case. We partially closed the scrotal incision with a running 3–0 chromic suture and packed the remaining part of the incision with gauze.

We then performed a flexible cystoscopy which showed a urethral injury at right mid-shaft. We inserted a Foley catheter without any difficulty. We then explored the penis via a circumferential incision. There was a tear in the tunica albuginea at the mid-shaft (Fig. 2) next to the urethral tear (approximately 1.5 × 0.5 cm in size). We placed a tourniquet at the base of the penis and started our repair. With the Foley catheter in place, we mobilized the urethra off of the tunica and repaired it primarily using interrupted 3–0 chromic sutures. We repaired the corporal tear with a 3–0 running polyglactin suture. We then interposed the two repair sites using 2 dartos advancement flaps (Fig. 2). We closed the penile incision primarily. Total penile tourniquet time was less than 30 min.

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http://dx.doi.org/10.1016/j.eucr.2016.11.015
We took the patient back to the operating room for scrotal debridement and washout on hospital day 3 and 6. Scrotal tissue was mostly clean, and only a small amount of further debridement was performed. Patient was discharged on hospital day 14 with a Foley catheter. Patient was seen in clinic 1 month after his initial surgery. His incisions were well-healed and his Foley catheter was removed. The patient had no difficulty in urinating after catheter removal.

Discussion

In contemporary literature, gunshot wounds to the scrotum have the best outcomes with immediate exploration and surgical repair. Nonoperative management frequently results in delayed surgical exploration and orchiectomy. Treatment of gunshot wounds to the anterior urethra is somewhat controversial. While most case series favor immediate repair, good outcomes have also been achieved with urinary diversion alone. Immediate surgical exploration and repair of penile corporal injury due to penetrating trauma is recommended. Case series report good outcomes in terms of curvature and erectile function after surgical correction. However, these results should be taken with caution given the lack of standardization in reporting, short-term patient follow-up, and the unknown erectile function of most patients prior to the trauma.

In concurrence with the most popular recommendations, we surgically explored our patient after his other injuries were stabilized by our trauma surgeons. We felt that our patient’s injuries were more extensive than appreciated from the bullet entry/exit sites. Our surgical findings included bilateral testicular injuries, a urethral injury, and penile corporal injury (Fig. 1). We repaired our testicular injuries in a standard fashion. Upon repair of both the urethral injury and the corporal injury, we were concerned that the proximity of our urethral and corporal suture lines placed the patient at risk for a urethrocorporal fistula. We thus chose to place two dartos interposition flaps between the repairs. While this technique has been used to repair urethrocutaneous fistulas and to prevent urethral fistulas during hypospadias repair, it has not been reported in the trauma literature. We were able to achieve satisfactory outcomes with our repair.

Conclusion

We present the surgical management of a complex peno-scrotal penetrating trauma from a single bullet. There were numerous genital injuries in spite of a minimal finding on physical exam. We were able to salvage the testis and repair the penile and urethral injuries. Two dartos interposition flaps was used to separate suture lines and prevent urethrocorporal fistula formation.

Conflict of interest
None to declare.

Consent
All surgical consents at our institution include the following: “photographs and information from my medical record may be used for educational materials and scientific publications but only if my name and identity cannot be recognized.”

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