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Case Report

Novel method of using angioembolization for treating testicular hemorrhage after blunt trauma ☆

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ABSTRACT

Testicular or scrotal trauma is a rare form of trauma in the United States. Blunt trauma to the testicle can lead to testicular tunica albuginea rupture, testicle contusion, testicle hematoma, testicle torsion and epididymal injury. We report a case of a 48-year-old male patient who presented with right sided scrotal swelling and pain from a motorcycle collision. This turned out to be from a testicular rupture and resulting in a hematoma. The patient's active bleeding from the right testicular artery was controlled by arterial embolization. Most reported cases of testicular artery bleeds are due to iatrogenic hemorrhage or non-traumatic injuries. Here, we report a rare case of testicular artery bleed due to a blunt trauma from a motorcycle collision. In conclusion, the testicular artery bleed was controlled successfully via testicular arterial embolization, making it a potential option for non-operative management for stable hemorrhage of the testicular artery.

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Introduction

Testicular or scrotal trauma is a relatively rare form of trauma in the United States [1]. The most common blunt testicular or scrotal trauma is from motorcycle collisions [1]. Blunt trauma to the testicle can lead to testicular tunica albuginea rupture, testicle contusion, testicle hematoma, testicle torsion and epididymal injury. The mainstay management strategy is surgery. However, a majority of the time blunt testicular or scrotal trauma does not require surgery [2,3].

To maximize the rate of testicular salvage, angioembolization can be done as initial non-operative management. Embolization is a minimally invasive approach that is able to control bleeding with less disruption of normal tissue than surgery [4]. It also plays a critical role in the nonoperative management of many traumatic injuries, resulting in a decreased need for blood transfusion and improved survival [4]. However, only three case reports have been reported in literature to manage testicular artery hemorrhage [5,6].

Here we present a rare case of testicular artery hemorrhage from a motorcycle collision that was managed via testicular artery embolism.

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Case presentation

A 48-year-old male with past medical history of asthma and gastric bypass presented to the emergency department for right sided scrotal swelling and pain. Earlier that day the patient lost control of his motorcycle and hit a wall. After the collision, he denied any fall or loss of consciousness, but most of the impact from the collision was to his scrotal region. The patient was wearing a helmet during the collision. After the accident, the patient drove himself home and did not seek medical attention. Over the course of the afternoon, he developed progressive right sided scrotal swelling and pain. He was able to void with hematuria. He could ambulate but endorsed pain when sitting down. On the emergency department visit, the patient's airway, breathing, and circulation was intact. His Glasgow coma scale was 15. In review of systems, the patient denied nausea, vomiting, dysuria, and urinary urgency or frequency. The neurological exam was unmarkable with no focal neurologic deficits. The testicular exam revealed significant right testicular swelling and hematoma with firmness to testicular palpation, severe tenderness, and loss of cremasteric reflex. In comparison, the left testicle was nontender and had an intact cremasteric reflex. There also was right sided inguinal swelling and tenderness extending down to the scrotum. The digital exam showed good rectal tone, smooth and slightly enlarged prostate, no tenderness to touch, and no frank blood. The patient's blood work showed an elevated white blood count of 13.6 $\times$ 10^3/mm^3, low red blood count of 4.26 $\times$ 10^6/mm^3, low hemoglobin of 12.7 g/dL, and low hematocrit of 39.2%. On the day of admission, the patient vitals were 36.3°C, heart rate of 104 beats per minute, respiratory rate of 14 breaths per minute, blood pressure of 173/95, and saturating 100% room air.

An ultrasound of the scrotum showed right sided teste measuring 4.2 $\times$ 3.6 $\times$ 3.0 cm and left teste measuring 4.7 $\times$ 2.2 $\times$ 3.0 cm (Fig. 1). The margins of the right teste were irregular signifying testicular rupture. In addition, there was a large pretesticular right scrotal hematoma. Computed tomography angiogram of the abdomen revealed a hemorrhage in the right greater than the left scrotum extending into the right groin and right hemipelvis. Computed tomography angiogram showed active arterial bleeding from the right testicular artery (Fig. 2A). Consequently, the patient underwent emergent interventional radiology (IR) embolization for the right testicular artery to manage the active bleeding.

The IR procedure entailed of super selective catherization of the right testicular artery and distal branched. The reason for a super selective catherization was that there were collaterals branching off the testicular artery before the distal portion of the testicular artery reached the testicle (Fig. 3). Angiogram demonstrated active arterial extravasation. After passing the collateral, the microcatheter was advanced to the distal branches of the right testicular artery. Here, the distal branch of the right testicular artery was embolized with multiple coils and Gel-Foam slurry. There was no postprocedural bleeding, which was confirmed by the angiogram (Fig. 2B). The patient tolerated the procedure without complications and left the angiography suite in stable condition.

The day after the IR procedure, the patient felt well with no progression of testicular swelling noted from the prior day. The patient's hemoglobin was stable and was discharged with recommendation to continue scrotal support and follow-up as an outpatient. The patient length of stay was 1 day.

Discussion

Although the scrotum is vulnerable to traumatic insult given its exposed nature, the scrotum is relatively protected from injury due its inherent mobility which tends to protect it from potentially serious damage [1,2]. The testicles are also protected by the presence of the cremasteric reflex and tunica albuginea. The incidence of scrotal or testicular injury in trauma is relatively rare [1]. A national analysis of testicular and scrotal trauma in the United States found of all male trauma patients, scrotal or testicular injury accounted for 0.23%, with less than half (44.6%) involved in blunt trauma and with 50.5% involved in penetrating trauma (eg assault by firearm) [1]. In the study, blunt trauma refers to motorcycle collision (38.5%), motor vehicle accident (21.3%), pedestrian collision (15.8%), and bicycle collision (2.8%) [1]. Furthermore, most of these patients had isolated scrotal or testicular trauma (74.5) with 48.3% requiring scrotal or testicular operation, which was most commonly a repair of the laceration (37.3%) [1]. The average length of stay was 3 days [1]. This signifies that traumatic injury to the scrotum and testicle is rare. Motorcycle accidents are the most common mechanism of blunt trauma that cause isolated scrotal or testicular injury.

The consequence of testicular or scrotal blunt trauma can be significant because it can cause testicular tunica albuginea rupture, testicle contusion, testicle hematoma, testicle torsion and epididymal injury. Our patient sustained a testicular rupture due to the blunt trauma from his motorcycle collision. Clinical presentation of testicular rupture is associated with immediate, pain, nausea, and vomiting, which can be accompanied by a tender, swollen and ecchymotic hemiscrotum [2,3].

According to the American Urologic Association guidelines, ultrasound is the indicated modality to confirm or imply testicular rupture in patients with blunt scrotal trauma because 50% of cases presenting for evaluation of a blunt scrotal trauma may lead to rupture of the tunica albuginea [3]. Like with our patient, his ultrasound showed irregular margins of the right teste which is consistent with testicular rupture and a presence of a large pretesticular right scrotal hematoma. Literature shows such findings to be consistent with testicular rupture [7]. The specific findings on ultrasound are loss of testicular contour and heterogenous echotexture of parenchyma and regions of avascularity [3,7]. After such findings, prompt diagnosis and treatment is required to salvage the testicle [3,7].

Management of the testicular trauma requires prompt surgical intervention to maximize the rate of the testicular salvage. Another method used to maximize the rate of testicular salvage is via angioembolization. Embolization is a minimally invasive approach to control active bleeding which plays a critical role in the nonoperative management of many trau-

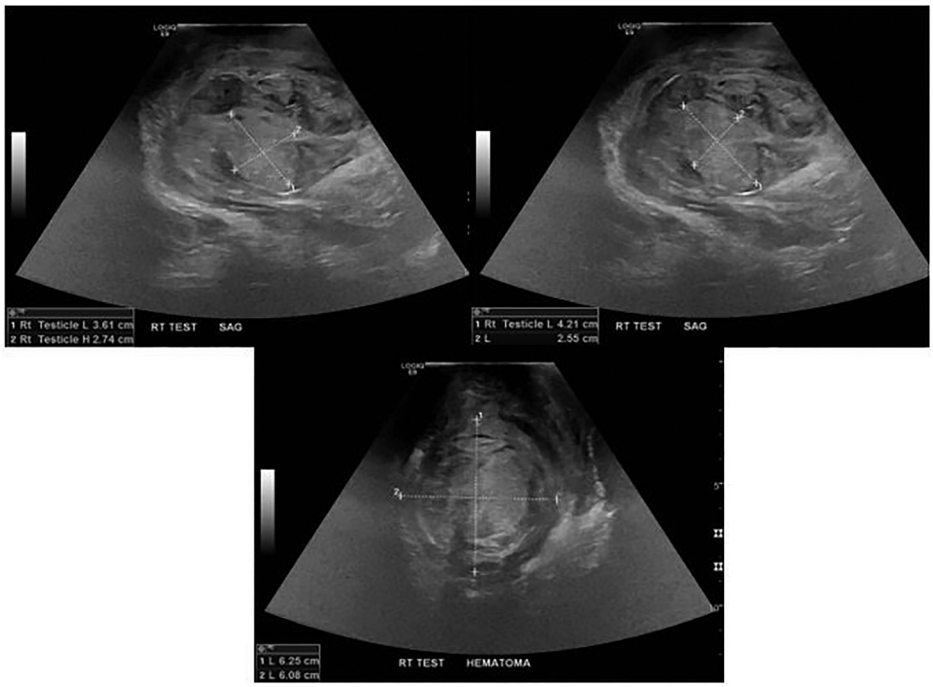


Fig. 1 – Ultrasound shows the right sided teste measuring 4.2 x 3.6 x 3.0 cm. The margin of the right teste is irregular which is consistent with testicular rupture. In addition, there is a large pretesticular right scrotal hematoma.

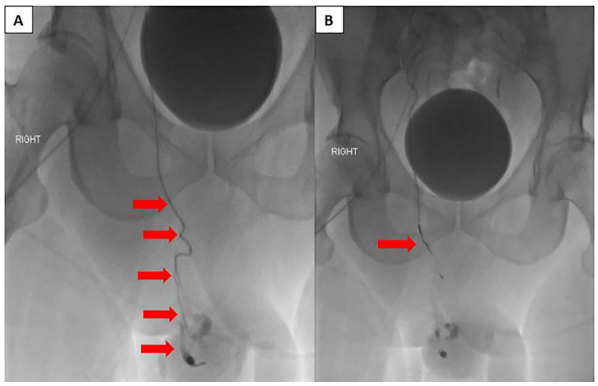


Fig. 2 – A. Angiogram of initial pre-embolization. Red arrows indicating testicular artery and the hemorrhaged area. B. Angiogram after embolization as seen by the contrast to the level of the coils. Red arrows indicate the embolization coils and notice no blood flow after the embolization.

matic injuries, resulting in a decreased need for blood transfusion and improved survival. Only three cases of testicular hemorrhage via angioembolization have been reported in literature [5,6]. Although the three cases reported for testicular bleeds were not due to blunt testicular trauma, the cases did manage to control active bleed with testicular artery embolization, like the way our patient was managed [5,6]. In our patient, once the access to the testicular artery was achieved, a microcatheter was advanced to the distal branches of the right testicular artery which was then embolized with multi-

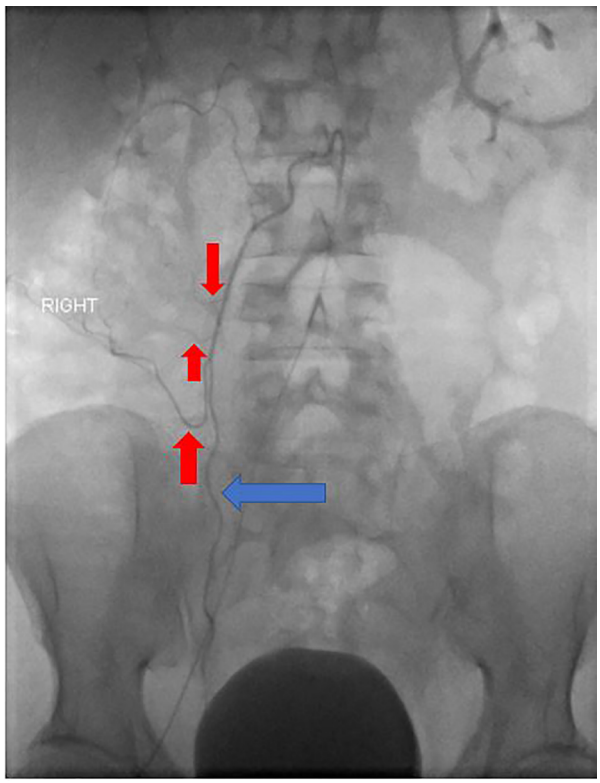


Fig. 3 – Red arrows indicate three side collaterals branching off the testicular artery, which is indicated in blue. The collateral side branches were bypassed with a microcatheter to avoid nontarget embolization.

ple coils and Gel-Foam. This procedure was done similarly to the reported cases and used best practice of embolization as reported in literature [4–6].

Furthermore, embolization of the testicular artery works because the testicular blood supply comes from testicular artery which stems from the abdominal aorta. The testicular artery forms two anastomosis. The first anastomosis is with the cremasteric artery which arises from the inferior epigastric artery. The second anastomosis is the testicular artery with the artery of the ductus deferens, which arises from the inferior vesical artery given off by the anterior divisions of the internal iliac artery. With this anatomy, the question regarding the effects of fertility comes to play. A study investigated the rate of infertility in patients who underwent varicocelectomy and had accidental ligated testicular artery from the surgery [8]. The study found that accidental ligation of testicular artery had no deleterious effect on the semen parameters during primary varicocele repair if the testicular arterial supply was compromised [8].

The next question begets the efficacy in controlling bleeding in patient with blunt trauma with angiographic embolization. A retrospective study looked at 137 patients who underwent angiography with intent to embolize active bleeding sites within the abdomen [9]. The study showed a success rate of 91% for angioembolization in both blunt and penetrating trauma [9]. This implies that testicular artery angioembolization can be a non-operative method to control bleeding in hemodynamically stable patients who sustained a testicular artery blunt trauma.

Conclusion

Although testicular or scrotal trauma is rare, blunt testicular or scrotal trauma is most commonly due to motorcycle collision. The initial diagnosis is testicular hemorrhage and rupture, which is confirmed with ultrasound findings indicating loss of testicular contour and heterogenous echotexture of parenchyma. Our case shows that testicular hemorrhage from a motor vehicle collision can be managed with testicular arterial embolization.

Patient consent

The patient consented to the submission of the case report to the journal. Verbal and written consent was obtained from the patient.

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