[Orthopaedic Surgery]

Presumed Testicular Rupture During a College Baseball Game: A Case Report and Review of the Literature for On-Field Recognition and Management

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Scrotal rupture during athletic competition is considered a rare occurrence; however, blunt trauma to the scrotum is relatively common. Protective athletic cups are strongly recommended for both children and adults engaging in contact sports as they likely limit the amount of serious injury to the scrotal contents. Nonetheless, should the on-field assessment by the athletic trainer, coach, or team physician indicate that the athlete has increased pain, ecchymosis, swelling, and tenderness to palpation after blunt trauma, testicular rupture should be suspected and prompt ultrasound and urologic assessment should be undertaken, as early operative intervention is necessary for testicular preservation. This report reviews testicular trauma during athletic competition.

Keywords: baseball; testicular trauma; testicular rupture; blunt sports injury; testicle hematoma

A healthy 21-year-old male catcher without a past medical history was competing in the National Collegiate Athletic Association (NCAA) Division II baseball playoffs. The player was struck with a fouled baseball to the undersurface of his protective athletic cup. The player performed a self-evaluation of his genitalia on the field. Secondary to continued discomfort, a locker room assessment was performed. This demonstrated an asymmetry and tense testicle in comparison with the contralateral side. The asymmetry caused enough alarm to contact the urology team at the tertiary care center.

On arrival, pain was localized to his left testicle. Urologic assessment found a firm left testis with diffuse discomfort on palpation. There was no evidence of epididymal pain or varicocele, and a cremaster reflex was present bilaterally.

To rule out torsion or rupture, an ultrasound of the testes was completed (Figures 1-3) and showed a small to moderate left subcapsular hematoma and irregularity of the contour of the testicle anteriorly and inferiorly, suspicious for disruption of the

Figure 1. Sagittal ultrasound image of a normal-appearing testicle.

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Figure 2. Sagittal ultrasound demonstrating a boundary between the subcapsular hematoma and testicle (white arrows). There is a loss of the clear tunica vaginalis along the right portion of the image, which is concerning for testicular rupture (orange arrow), compared with the intact tunica vaginalis (blue arrow).

Figure 3. Ultrasound demonstrating adequate blood flow via Doppler.

tunica albuginea and testicular rupture (Figure 2). Ultrasound assessment of his right testicle was equivocal (Figure 3). Arterial and venous flow documented by spectral Doppler analysis in both testes was normal.

Urologic consultation recommended urgent operative exploration of his left testicle with possible orchiectomy versus primary repair. A left-sided transverse hemiscrotal incision was made, and dissection was carried down to the testis. The testis had some intratesticular hematoma, but no frank disruption of the tunica was noted. An intraoperative Doppler ultrasound

Figure 4. Normal testicular anatomy. The differential diagnosis for testicular trauma includes testicular rupture, hematoma, and torsion.

probe demonstrated adequate blood flow. The testicle was viable without exposure of seminiferous tubules, and further manipulation was not indicated. The testis was then placed back in the normal anatomic position in the left hemiscrotum, and the incision closed in standard fashion. Postoperatively, the patient demonstrated adequate pain control, was discharged home, and allowed activity as tolerated. He limited strenuous activity in the immediate postoperative period. He was allowed to resume full baseball activity without restriction 10 days after surgical repair following drain removal.

REVIEW OF THE LITERATURE

Reported testicular ruptures are exceedingly rare in athletic competition (Figure 4). In a 2003 review of the National Pediatric Trauma Registry database from 50 states of patients aged 5 to 18 years, of the 81,923 total traumas, 5439 were sports-related, and 1 testicular injury was sustained from 1990 to 1999.¹² This occurred when a male patient was struck by a batted softball during recreational sport competition; the testicle,

which was injured, was not lost.¹² In a 2002 trauma registry review of 14,763 patients studied between 1984 and 2000, 113 total renal (98/113) and testis (15/113) injuries were sustained during sporting activities.⁷ Of the 15 testicular injuries, 1 occurred during bicycling, 1 in equestrian sports, 4 during falls, 1 in rollerblading, 2 on playground equipment, 2 playing ball, and 4 during team sports (soccer, baseball, and basketball).⁷ The use of a protective cup was not specifically noted. All 4 testes were surgically explored, and none were lost.⁷

The testicles are suspended from the spermatic cord within the scrotum allowing them a large range of motility, and as such, some protection from trauma (Figure 4). A 50-lb force is needed to rupture the protective outer tunica albuginea after direct force.^{11,13} The testicle ruptures when force is applied through the organ that is “trapped” against the bony pelvis, protective cup, or inner thigh. After a tear develops in the tunica albuginea, the seminiferous tubules extravasate, with a resultant development of a scrotal hematoma (Figure 4).^{11,13} As highlighted in our case presentation, despite protective cup use, it is still possible to sustain a traumatic injury to the testicles during athletic competition.

The American Urological Association Foundation recommends that a young male athlete should start wearing an athletic supporter as soon as he is exposed to sport activities that may result in injury to the groin.² The American Association of Pediatrics notes that boys with a solitary testis may participate in sports activity with the use of an athletic cup in “certain sports.”⁹

Patients develop systemic signs of discomfort after testicular rupture that may include nausea and vomiting. On inspection, the testicles may appear to “lay” differently or there may not be a cremaster reflex^{4,8,11}; testicular torsion should also be considered on the differential diagnosis (Figure 4).

Urgent ultrasound evaluation of the scrotum and testicles has become a standard evaluation procedure of blunt traumatic injury to the male groin (Figures 1-3).^{3,6,10} With the use of

Doppler flow technology, blood flow to the testis can also be assessed (Figure 3). A ruptured testis may continue to have adequate blood flow on Doppler assessment; however, focal areas of altered echogenicity, discrete fracture plane, loss of testis contour, and heterogeneous parenchyma are consistent with the findings of rupture (Figure 2).^{3,6,10} Ultrasound evaluation provides 100% sensitivity and 65% specificity in diagnosing testicular rupture.⁶ Ultimately, testicular rupture is a clinical diagnosis, and persistent symptoms and/or a concerning examination along with a corresponding history, regardless of imaging findings, mandates operative exploration.

If imaging is equivocal or torsion or rupture is determined, operative management is generally indicated.^{4,8,11} Generally, surgical exploration within 24 to 72 hours of the initial trauma is necessary for testicle salvage.^{4,5,8,11} Typically, open scrotal and testicular exploration, debridement of nonviable tissue and evacuation of hematoma, and finally, primary repair of the disrupted tunica albuginea was performed.^{4,8,11} Orchiectomy should be reserved for cases in which the testicle is clearly nonviable, and is only considered if repair is not possible.^{4,11} Delayed surgical repair may reduce testicle salvage rates from approximately 85% to 50%.^{1,5,8}

CLINICAL RECOMMENDATIONS

Protective athletic cups are strongly recommended in both children and adults engaging in contact sports as they likely limit the amount of serious injury to the scrotal contents. Nonetheless, should the on-field assessment by the athletic trainer, coach, or team physician indicate that the athlete has increased pain, ecchymosis, swelling, and tenderness to palpation after blunt trauma, testicular rupture should be suspected and prompt ultrasound and urologic assessment should be undertaken, as early operative intervention is necessary for testicular preservation.

Clinical Recommendations

SORT: Strength of Recommendation Taxonomy

A: consistent, good-quality patient-oriented evidence

B: inconsistent or limited-quality patient-oriented evidence

C: consensus, disease-oriented evidence, usual practice, expert opinion, or case series

Clinical Recommendation	SORT Evidence Rating
A young male athlete should start wearing an athletic supporter as soon as he is exposed to sport activities that may result in injury to the groin. ²	C
Boys with a solitary testis may participate in sports activity with the use of an athletic cup in “certain sports.” ⁹	C

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