

Case – Repair of extensive testicular rupture: A unique use for biosynthetic grafts

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Introduction

Testicular rupture is defined as the disruption of the tunica albuginea of the testes. It may occur as a result of blunt or penetrating trauma.¹ In cases of testicular rupture, urgent surgical management is required for effective care of the patient and involves primary closure of the defect.² However, if the testicular rupture is extensive and primary closure is not possible, the patient must either undergo orchiectomy or an alternative method must be used to close the defect. In this case series, we present three cases of extensive testicular rupture, one penetrating and two blunt, where a biosynthetic graft was used to successfully close the defect and preserve the testes.

Case reports

Case 1

A 21-year-old male presented to the emergency department by ambulance with multiple gunshot wounds to his scrotum and both thighs. Primary survey showed stable vital signs. A secondary survey revealed two penetrating entry and exit wounds in his scrotum (one on the left side and one on the right). It also revealed three entry wounds on his thighs (two on the right medial thigh and one on the left medial thigh) with two corresponding exit wounds on the posterior side in his right buttock and right thigh. The penis was uninjured. Computed tomography (CT) scan of the pelvis revealed a swollen scrotum and active contrast blushing in right side of the scrotum. Hemoglobin was stable at 113.

Scrotal exploration was performed and revealed severe right testicular injury and rupture. A significantly contami-

nated area was debrided to healthy tissues and repair of a large defect in the tunica albuginea was achieved with a biosynthetic graft (Biodesign Surgisis) to the remaining tunica edges. The graft was secured with 4-0 PDS sutures. A Penrose drain was left in the scrotum.

Postoperative management included admission into a high dependency unit with intravenous cephazolin for 24 hours, intravenous fluids, and scrotal support dressings. The patient was discharged with seven days of oral cephalexin. Ultrasound was performed seven days after discharge and showed perfusion in both testes. Followup ultrasound of the scrotum one month later also showed testicular blood flow bilaterally.

Case 2

A 25-year-old male presented with severe right testicular pain after he sustained blunt trauma to the right scrotum by a cricket ball. The right scrotum was extremely tender and swollen and the preoperative ultrasound showed significant hematocele with a disruption of tunica albuginea in keeping with a ruptured testis.

The scrotum was explored and revealed extensive rupture of the right testis. Careful debridement was performed until healthy seminiferous tubules were demonstrated. The defect coverage was achieved with a biosynthetic graft (Biodesign Surgisis). He was discharged well the next day following 24 hours of intravenous cephazolin and one week of oral cephalexin. Ultrasounds at one week and four weeks postoperative followup visits showed a well perfused right testis.

Case 3

A 28-year-old male presented to the hospital for a one-day history of right testicular pain and swelling following a collision with a cricket ball.

On examination, the right testis was grossly swollen and tender. Ultrasound showed large areas of hematoma and an ill-defined tunica albuginea suspicious of testicular rupture.

The patient underwent scrotal exploration. The right testis had a global dusky appearance. Rupture was seen at the inferior pole with extruded seminiferous tubules and hematoma on view (Fig. 1). Judicious debridement was performed, with approximately 30% of right testis volume lost; the remaining defect was difficult to close primarily (Fig. 2). There was a noticeable return of colour of the testis with warm packs. The decision was made to close the defect with a biosynthetic graft (Biodesign Surgisis) (Fig. 3). The patient was discharged home following 24 hours of intravenous cephazolin on one week of cephalexin, analgesia, and scrotal support.

On followup, the patient reported good recovery with repeat ultrasound at one week showing hematoma but normal vascularity of the right testis. Six-week ultrasound showed resolving hematoma and a testis volume of 7.5 cc, as expected. On examination, the testes appeared normal with no swelling, tenderness, or signs of infection.

Discussion

Extensive injury of the testes is rare secondary to the anatomical location of the testes between the thighs and their mobile nature within the scrotal sac.³ Treatment of testicular rupture can involve a number of different strategies. Conservative management has been reported in previous studies, but its use is controversial due to the increased risk of infection, atrophy, and impaired fertility caused by hematocele and necrotic tissue.⁴ The current recommendation for management of testicular rupture is early surgical intervention with scrotal exploration within 72 hours of injury.⁵ This has been shown to decrease rates of orchiectomy, improve testicular hormone function, and improve symptom control.⁶

Repair of testicular rupture involves scrotal exploration with the debridement of necrotic tissue, saline irrigation, and primary closure of the tunica albuginea with absorb-

able sutures.² However, in extensive defects, closure with the tunica albuginea may not be possible. In these injuries, the options are orchiectomy or repair of the defect using alternative methods.

In this case series, we present three cases of extensive defects of the tunica albuginea that could not be repaired with primary closure. Instead of orchiectomy, we opted for the use of a biosynthetic graft to cover the defect. This technique was successfully used in each of the three cases and the patients recovered without complications. Avoiding orchiectomy allowed for the maximal preservation of testicular tissue and hormonal function.

Alternative methods for repair of extensive testicular rupture have been reported in literature; most commonly, an autologous graft from the tunica vaginalis has been harvested from the ipsilateral hemiscrotum and sewn to the edges of the tunica albuginea.^{7,8} However, current literature is somewhat limited and there is not enough data to support this method as the most effective for repair of extensive testicular rupture. As well, tunica vaginalis graft would not be a viable option in cases where the quality of tunica vaginalis was also compromised, such as in our first case. The use of polypropylene mesh as a graft material has also been described and has been shown to preserve more testicular volume than primary closure in blunt testicular rupture.⁹ The use of synthetic grafts to repair rupture from gunshot wounds has been previously associated with high infection rates.⁷ However, the infection rate may be lowered via the use of a biosynthetic graft and antibiotic prophylaxis, as seen in the cases we presented. The protection against infection with biosynthetic grafts for testicular rupture has been similarly described in the use of bovine pericardium, cadaveric pericardium, and cadaveric dermis.¹⁰

We acknowledge the weaknesses of our series given the short duration of followup. Further studies are needed to determine the repair's effect on long-term testicular preserva-



Fig. 1. Case 3 prior to debridement.



Fig. 2. Case 3 post-debridement.



Fig. 3. Case 3 post-repair with biosynthetic graft.

tion and its relation to hormonal and reproductive function to be able to completely determine benefit.

Conclusions

In cases of extensive testicular rupture where primary closure is not possible, we have demonstrated that biosynthetic grafts could be a safe and feasible alternative to orchiectomy. This would facilitate the maximal testicular preservation, which would potentially reduce any loss of important testicular function.

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This paper has been peer-reviewed.

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