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RESEARCH ARTICLE

SURGICAL REPAIR FOLLOWING TRAUMATIC TESTICULAR RUPTURE : OUTCOME OF 3 CASES

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Abstract

Scrotal traumas are relatively uncommon. Most are blunt trauma caused by a direct blow to the scrotum. Early surgical exploration has considerably improved the prognosis of testicular trauma and reduced the rate of orchiectomy. Ultrasound has also improved the management of scrotal trauma. But there is controversy over the accuracy of ultrasound in predicting the presence or absence of testicular rupture. It's important to acknowledge the potential long-term repercussions such as testicular atrophy and infertility. We report three clinical cases, all young and victims of scrotal trauma with unilateral testicular rupture, all three of whom benefited from scrotal exploration with testicular preservation.

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Introduction:-

Testicular trauma occurs most frequently in young men between the ages of 15 and 40. There are serious consequences if a testicular rupture goes undetected.[1] Although not life-threatening, the loss of a testicle could compromise future fertility, contribute to a hypogonadal state and affect social confidence. Clinical examination in scrotal trauma can be challenging due to swelling, pain, and bruising of the scrotum. Given the high incidence of testicular rupture associated with scrotal trauma, early diagnosis and surgical intervention are crucial to achieve high rates of preservation. [2]

Medical Observations:

First case:

A 25-year-old patient, with no significant medical history, was admitted to the emergency room with an acute painful large bruise as a result of scrotal trauma. The patient had been kicked in the scrotum during a soccer game. He consulted late because of persistent pain and swelling, several hours after the initial trauma.

On clinical examination, the patient was hemodynamically stable and afebrile, but presented with pain rated at 7 on the visual analog scale (VAS). Physical examination revealed significant edema accompanied by localized ecchymosis over parts of the right scrotum. (Figure 1)

Emergency scrotal exploration was performed after obtaining the patient's informed consent, in preparation for a possible orchiectomy. The incision was made along the median raphe, and the exploration was complex. Several haematomas of varying degrees of severity were evacuated before accessing the right testicle, which presented an obvious rupture of the tunica albuginea on its anterolateral surface, measuring 2 cm in length. (Figure 2) After careful lavage and hemostasis, the testicle appeared viable, justifying primary repair. (Figure 3) The tunica

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albuginea was sutured with a 4-0 PDS suture. The testis was replaced correctly, a Delbet blade was left in place, and the incision was closed with 3.0 skin suture in Blair-Donati stitches. The post-operative course was satisfactory. The Delbet blade was removed the following day. The patient was discharged on the second post-operative day with daily care and a follow-up consultation scheduled 10 days after surgery, ensuring the healing process and during which the stitches were removed. A follow-up Doppler ultrasound at 3 months showed good testicular vascularization, with a slight decrease in the volume of the right testicle compared with the left.

Figure 1:- Image of the scrotum revealing significant edema with localized ecchymosis over parts of the right scrotum.



Figure 2:- Intraoperative image of the right scrotum showing several haematomas and an obvious rupture of the tunica albuginea on the anterolateral surface, measuring 2 cm in length.

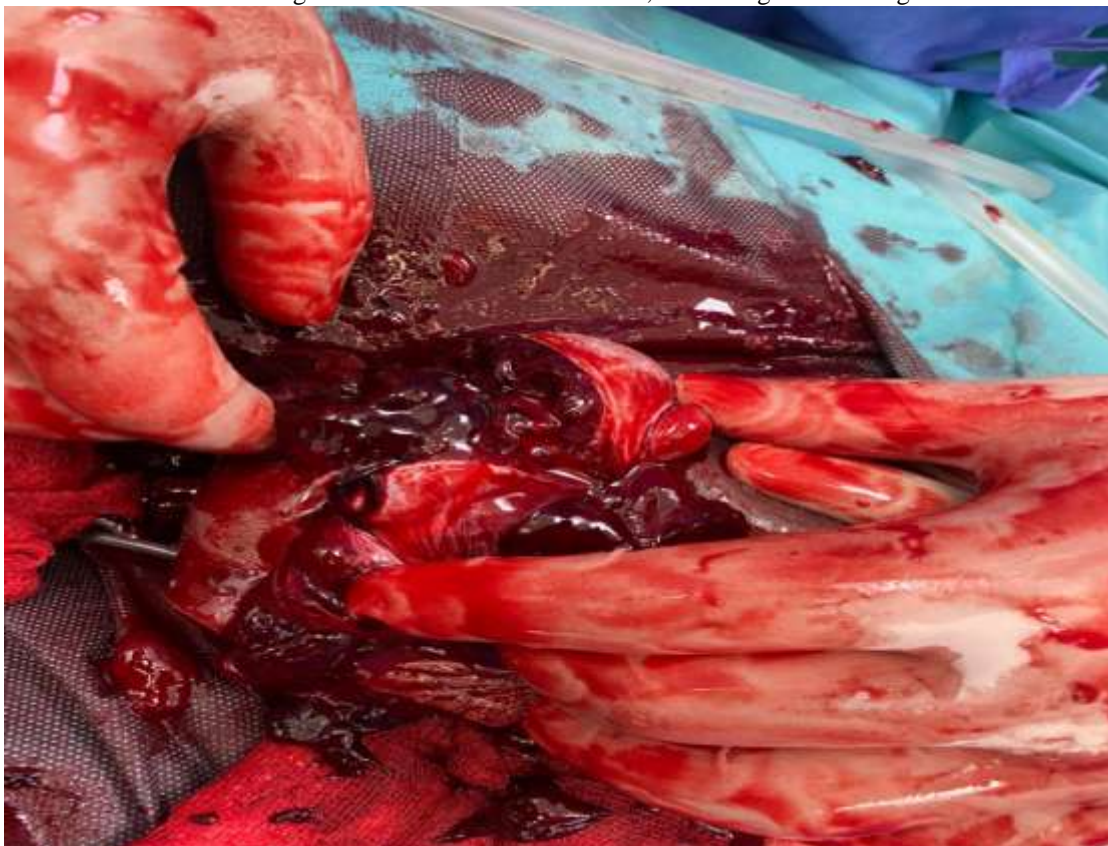


Figure 3:- Preoperative image of the surgical testicular repair.



Second Case:

A 21-year-old patient admitted to the emergency room with an acute painful bursa following scrotal trauma. He had been physically assaulted by a wooden baton with a scrotal point of impact.

On admission, the patient was stable and in pain, with a VAS of 6 and a GCS of 15. Physical examination revealed a few ecchymotic lesions on the right arm, with no associated wounds or fractures. Scrotal examination revealed edema accompanied by localized ecchymoses on the left hemi-scrotum, which were very painful to the touch.

An emergency scrotal ultrasound with Doppler was performed after conditioning, showing an abnormal morphology of the left testicle, with an interruption of the tunica albuginea. In addition, the testicular pulp and several extra-testicular haematomas were clearly visible (Figure 4).

After obtaining the patient's informed consent, an emergency scrotal exploration was performed.

The incision was made along the median raphe and exploration was carried out with care. Several haematomas were evacuated before locating the left testicle, where an obvious rupture of the tunica albuginea measuring 3 cm in length was noted on its anterior surface. After meticulous lavage, necrosectomy and meticulous haemostasis, testicular viability did not seem evident, but a decision to repair was taken, justified by its feasibility and the patient's young age. (Figure 5) The tunica albuginea was sutured with a 5-0 PDS suture.(Figure 6) The testicle was reinserted correctly, and the incision was closed with 3.0 skin suture in single stitches. A compression dressing was maintained for the first 24 hours.

The post-operative period was uneventful. The pressure dressing was removed the following day. The patient was discharged on the second postoperative day, with instructions for home care. A follow-up consultation was scheduled 10 days after the operation, at which time the stitches were removed and the evaluation of the healing process was satisfactory. Follow-up Doppler ultrasonography at 3 months indicated good testicular vascularization, although the left testicle was slightly hypotrophic.

Figure 4:- Ultrasound image shows an interruption of the echogenic tunica albuginea (arrow),The adjacent heterogeneous echogenic material (star) represents extruded testicular material and the associated extra-testicular haematoma.



Figure 5:- Intraoperative image showing the rupture of the tunica albuginea measuring 3 cm in length and what's left of the right testis, after meticulous lavage, necrosectomy and meticulous haemostasis.



Figure 6:- Pereoperative image of the testicle after surgical repair.



Third Case:

A 26-year-old patient was admitted to the emergency department with an acute painful bursa due to scrotal trauma following an ATV accident. The patient was stable and in pain with a VAS of 7 and a GCS of 15. Physical examination revealed scrotal edema accompanied by localized ecchymosis on the left scrotum, which was very painful to the touch. Scrotal ultrasound revealed an interruption of the tunica albuginea. After obtaining the patient's informed consent, scrotal exploration was performed on an emergency basis. The incision was made along the median raphe. Several haematomas were evacuated before locating the left testicle, where a clear rupture of the tunica albuginea was noted on its anterior surface. (Figure 7) After meticulous lavage and hemostasis, testicular viability appeared feasible. The tunica albuginea was sutured with a 5-0 PDS suture. (Figure 8) The testicle was reinserted correctly, and the incision was closed with 3.0 skin suture in single stitches. A pressure dressing was maintained for the first 24 hours. The post-operative recovery went off with no significant incident. The compression bandage was removed the following day. The patient returned home on the second day after surgery. Follow-up Doppler ultrasonography at 3 months confirmed good testicular vascularization, although the left testicle was slightly reduced in volume.

Figure 7:- Preoperative image showing the rupture of the tunica albuginea.



Figure 8:- Preoperative image of the left testicle after surgical repair.



Discussion:-

Trauma to the scrotum in young men accounts for less than 1% of all trauma, of which 1.5% is complicated by testicular rupture. Rupture of the tunica albuginea exposes the seminiferous tubules, putting the patient's fertility at risk. The diagnosis can be made on the basis of basic circumstances and testicular Doppler ultrasonography. Depending on the testicular lesions and hematocele, conservative or surgical management may be performed. [1]

Direct impact on the genitalia is the main mechanism that causes hyperpressure inside the albuginea, leading to rupture. [3] It is estimated that a pressure of 50 kg is required to rupture the albuginea. [4] Three cardinal signs are found in testicular rupture: a traumatic context, paroxysmal unilateral scrotal pain and scrotal swelling.

Scrotal ultrasound is a reliable aid in the diagnosis of testicular rupture. Using the 7.5 MHz transverse probe, contusions, hematoceles, testicular dislocations, intra-testicular hematomas and testicular ruptures can be visualized. The size, consistency of the parenchyma, correlation with surrounding structures and comparison with the contralateral side can greatly aid in the initial assessment, diagnosis and management of testicular rupture. [5]

Although we opted for a surgical approach in our cases, Redmond et al. consistently advocate a nonsurgical approach for all testicular trauma [2]. In their view, necrosectomy results in the loss of viable testicular tissue, and early closure of the albuginea can cause compartment syndrome leading to testicular atrophy.

On the other hand, most experts agree that surgical exploration performed within 24 to 72 hours of trauma significantly improves the chances of testicular salvage, enabling preservation of testicular function, faster symptom relief, shorter hospital stay and earlier return to sporting activity. Mild testicular fractures can be treated conservatively, but if a fracture is suspected, surgical exploration is recommended. [1] [6] Surgical intervention within 72 hours is associated with a greater likelihood of testicular salvage in cases of testicular rupture. Delay in surgical repair of the tunica albuginea may result in loss of reproductive or endocrine function and a lower probability of salvage. Surgical delay can reduce the salvage rate from 80-90% to 45-55%. [1] [3] In our three cases, we opted for immediate surgical management, given their fairly obvious clinical and ultrasound presentation, which enabled testicular preservation in all 3 patients. Even in the second case, where the intraoperative decision to salvage was not so clear-cut due to the percentage of viable parenchyma remaining, the post-operative result was satisfactory and confirmed by follow-up ultrasound.

No studies are currently available on the minimum testicular volume required to maintain testicular hormonal function. Consequently, orchietomy could be considered as a last resort, only when even a quarter of the testicular tissue cannot be preserved, or if it is segmented and deprived of blood supply. In cases where suturing of the albuginea is not feasible due to edema, Block et al. suggest the use of a tunica vaginalis flap to close the sectioned area [1].

Secondary testicular atrophy is quite common, and may affect up to 50% of patients. [3] The risk factors predisposing to atrophy are not known. Secondary testicular atrophy is more frequent in severe trauma, but may also be observed after hematocele, testicular hematoma or simple contusion. [7] The mechanisms by which atrophy occurs are poorly understood: post-traumatic lesions of the testicular microvascularization; ischemia by compression due to edema and hematoma; autoimmune mechanisms. Cases of atrophy of the testicle contralateral to the trauma have been described. In addition, experimental studies on rats have demonstrated the presence of bilateral testicular lesions after unilateral trauma. Autoimmune or cell-mediated immunological mechanisms have been incriminated. [7] [8] None of our patients showed testicular atrophy, even though there was a reduction in testicular volume labelled on the control ultrasound at 3 months, but well defended by the notion of lost parenchyma.

A limited study compared spermogram parameters between patients who had undergone primary testicular reconstruction and orchietomy for testicular ruptures [9]. The authors concluded that the testicular preservation group showed no significant seminal or endocrine abnormalities, while the orchietomy group showed a significant decrease in sperm density and elevation of FSH, LH. This supports an aggressive attempt at testicular reconstruction rather than orchietomy, even in cases of severe testicular rupture with a normal contralateral testis. This may seem unlikely, but with complete exposure of the tunica albuginea and debridement of the extruded seminiferous tubules, a surprising amount of testis can be preserved.

Conclusion:-

Primary repair of testicular rupture remains a controversial procedure in the management of trauma to the scrotum, although if carried out, it can preserve the endocrine and exocrine functions of the testis. In this case, it is imperative to highlight the importance of rapid and accurate assessment, as well as meticulous surgery, in order to optimise long-term results. In addition, careful and regular post-operative monitoring is essential to detect any complications and ensure optimal patient recovery.

Declarations :**Competing interests:**

The authors declare no competing interests.

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