

Research Article

Testicular Trauma In A Tertiary Hospital In The Metropolitan Region Of Paraíba Valley, Brazil

Jose Vitor Santos Gomes¹; José Vitor Barros Calil¹, João Marco Braz Scarpa Mariano Pereira¹; Leonardo de Oliveira Antunes²; Isabella Siqueira Vilela de Oliveira²; Fredrico Vilela de Oliveira¹; Luiz Carlos Maciel¹; Guilherme Diego de Oliveira³

1 University of Taubaté – UNITAU, Brazil

2 Resident of general Surgery in University of Taubate in Hospital regional do vale do Paraíba e Hospital Municipal Universitário de Taubaté

3 Resident of internal medicine in Hospital das Clínicas Samuel Libano, ex-student of University of Taubaté

* Correspondence: josevitorsantosgomes@gmail.com

<https://doi.org/ciki/10.59652/aim.v2i4.346>

Abstract: Testicular trauma is a cause of morbidity in patients of all age groups, especially among young people. The Paraíba Valley Regional Hospital (PVRH) is a reference in the care of polytraumatized patients and because it is located in a strategic region being cut by major highways. A retrospective analysis of the medical records of patients submitted to unilateral orchiectomy, bilateral orchiectomy and scrotum exploration was performed at the PVRH in a period of 4 years. Within this database, 11 patients submitted to these procedures due to traumatic etiology were found. Orchiectomy was the predominant treatment in the case series reported here (72.7%). The therapeutic approach adopted in this study differs from that reported in the literature, due to the time taken from the trauma until the therapeutic conduct was long, only 36.4% with treatment within 24 hours, thus making more conservative or even more reparative conducts unfeasible, as well as the severity of the injuries involved with the trauma with motorcycles. Thus, studies that lead to the detailing of patients victims of testicular trauma in other institutions may contribute to a positive evolution in the quality of pre- and in-hospital care.

Keywords: trauma, Injury, Lesion, testicle, scrotal

Received: 05 November 2024

Accepted: 04 December 2024

Published: 12 December 2024



Copyright: © 2022 by the authors.

Submitted for open access publication

under the terms and conditions of the

Creative Commons Attribution (CC BY)

license

(<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Testicular trauma is a cause of morbidity in patients of all age groups, especially among young people (1, 2). High-energy automobile accidents, stab wounds or firearm projectiles (FAP) are possible etiologies of injuries in the urogenital tract, accounting for 10% of traumas in general (3, 4, 5). The mechanical trauma with avulsions, contusions and lacerations, although less frequent, can cause injuries sometimes disabling (6). Testicular trauma is the third most frequent cause of testicular pain, due to the mobility of the scrotum and its anatomical position that contribute to the development of injuries associated with trauma and facilitate the development of lesions in view of the area being more exposed (7).

According to the analysis made by other centers, the most prevalent age group are young people with an average age of 29 years (1,2,8). The most prevalent etiology in scrotum trauma is the firearm (9, 10). According to previous studies most testicular traumas are isolated, that is, they are not associated with traumas in other systems (9,10).

The Paraíba Valley Regional Hospital (PVRH) is a reference in the care of polytraumatized patients and because it is located in a strategic region being cut by three highways with a high flow of vehicles and, located in a region with an estimated population of 2.5 million,

according to the estimate of the Brazilian Institute of Geography and Statistics (IBGE) for 2023, conditions that enable it to centralize care for these patients.

2. Objectives

General objectives: To identify and organize patients victims of testicular trauma treated and/or referred to the emergency unit at HRVP

Specific objectives: To relate the type and severity of the injury of these patients with: Length of hospital stay; Dagnostic methods adopted; Therapeutic approach chosen; Time taken from trauma to conduct; Trauma-associated injuries.

3. Materials and Methods

A retrospective analysis of the medical records of patients undergoing unilateral orchiectomy, bilateral orchiectomy and scrotum exploration at the Paraíba Valley Regional Hospital in a period of 4 years (January 1, 2017 to December 31, 2020) was carried out, and patients who were not victims of scrotal trauma and under 18 years of age were excluded from the study.

The collected data were analyzed by means of descriptive statistics and compared to the data of the pertinent literature.

Ethical aspects: The identities of the patients were preserved, being used only the medical information contained in the medical record that allows the establishment of statistical data, without the identification of the patients; Project approved by Plataforma Brasil, using the competencies defined in Resolution CNS/MS 466/12 (Opinion Number: 3,915,652). Informed consent was waived by the committee.

4. Results

In the proposed period, 11 patients who met the proposed criteria were identified. The most affected age group was 25 to 30 years with 36.4% of the cases, the second most frequent was 18 to 25 years with 27.3%. No associated comorbidity was observed. Regarding the specification of trauma, five patients suffered scrotal trauma through automobile accidents, being the most common etiology (45.5%). Other relevant etiologies were gunshot wound (9.1) and aggression (9.1%), two patients in each situation. (Table 1).

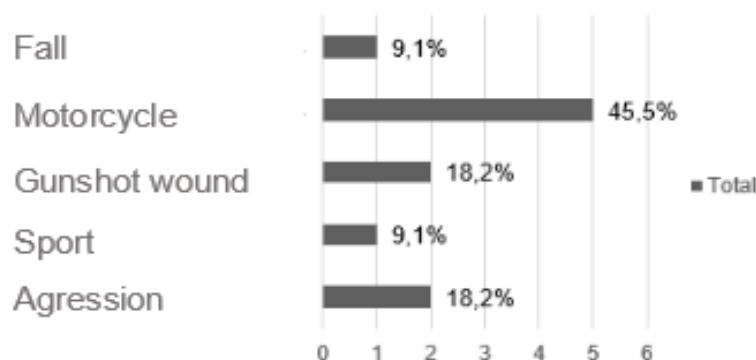


Table 1: Trauma specification of patients included in the study (n=11)

It was observed in eight patients (81.8%) exclusively scrotal trauma, while victims of multiple traumas were in the minority, observing only 2 cases (18.2%). Among the patients included in the study, only 18.2% were polytraumatized.

Regarding the time of the trauma, it was possible to observe that 36.4% in the afternoon (12:00-17:59), 18.2% at night (18:00-23:59), 9.1% at dawn (00:00-5:59) and 36.4% could not verify the time of the accident (figure 1a).

Autumn was the time of year with the highest predominance of testicular trauma and incidence of 36.4%, followed by winter and spring both with 27.3% and summer corresponding to only 9.1% of cases (figure 1b).

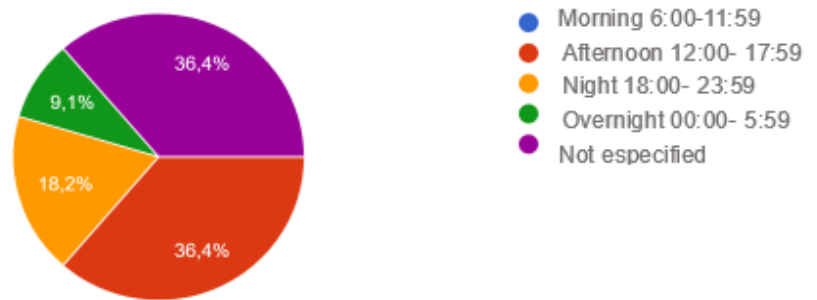


Figure 1a : Specification of the trauma time of patients included in the study (n=11)

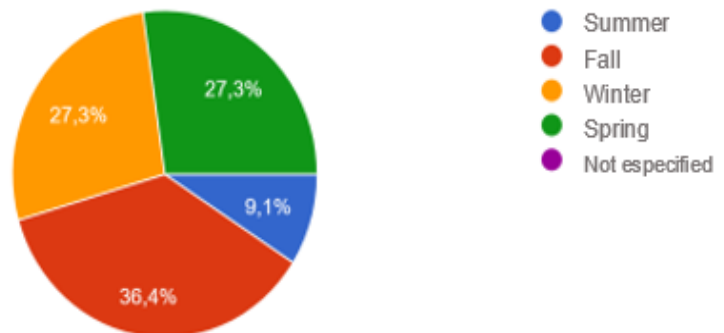


Figure 1b: Specification of the season of the year when the trauma occurred for patients included in the study (n=11)

Regarding the signs and symptoms associated with testicular trauma: 81.8% had testicular pain and edema, hematoma was observed in 45.5% of the cases, signs of infection in only one case (9.1%) and one of the patients 9.1% had decreased level of consciousness and did not report pain or symptoms (Table 2).

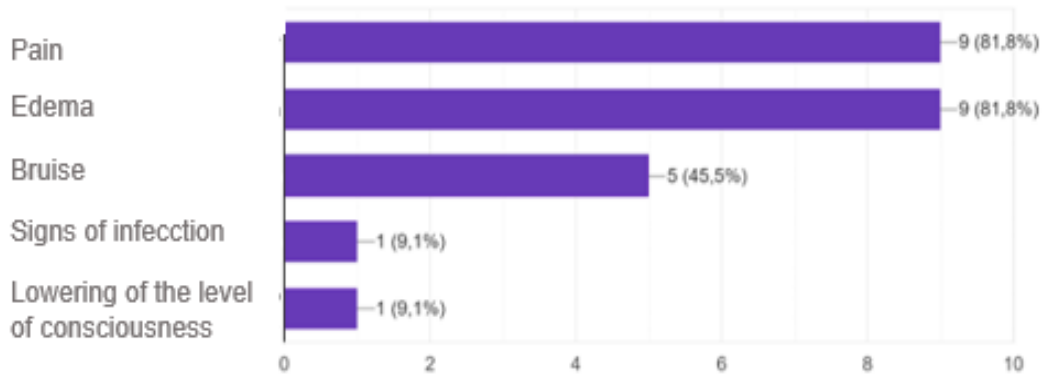


Table 2: Signs and symptoms related to trauma of patients included in the study (n=11)

Extragenital signs and symptoms ecchymosis (1 case) and hematoma (4 cases) were the only ones reported in the study. Regarding the treatment, 72.7% were submitted to unilateral orchietomy, 18.2% underwent raphe of tunica albuginea and in one case (9.1%) the exploration of the scrotum without the need for repair.

Among the patients included in the study, 54.5% had the right testicle affected (6 patients), 45.5% the involvement of the left testicle (5 patients) and in one case (9.1%) the involvement only scrotal (1 patient), no bilateral lesion was observed. Among the patients with the affected testicle: 27.3% suffered open trauma (3 patients), 27.3% had exposure of the tunica albuginea (3 patients), but 72.7% were victims of closed testicular trauma (8 patients).

Regarding the association of injuries to testicular trauma: 1 patient had Traumatic Brain Injury (TBI), 2 associated penile fractures, 1 limb bone fracture, and 5 had no concomitant injuries to scrotal trauma. The most frequent reported excoriation was genital (27.3%), while perineum, lower limbs and upper limbs were only observed in 9.1% of the cases

A good prognosis was observed in 54.5% of the patients treated. However, 27.3% had a moderate evolution, mainly due to granulomas, hematomas and bleeding in the surgical wound. Only one patient (9.1%) had a poor prognosis due to the delay in the surgical approach and severity of the associated lesions. In one case (9.1%) it was not possible to assess the prognosis due to the transfer of the patient to another service

The methods of choice for the imaging diagnosis of patients victims of this type of trauma were: Ultrasonography in 6 cases (54.5%), and only in 1 case (9.1) computed tomography was used. On the other hand, in 5 cases (45.5%) x-ray analyses of the pelvis were performed to evaluate bone lesions associated with the genital lesion.

It was observed that 63.3% of the patients were operated more than 24 hours after the trauma, 18.2% within 48 hours, 18.2% within 72 hours, 27.3% after 72 hours and only 36.4% with treatment within 24 hours after the trauma (Figure 2)

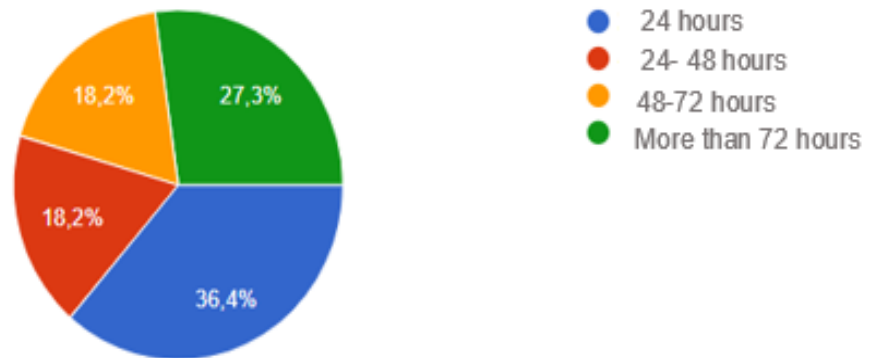


Figure 2: Time taken from trauma to surgery for patients included in the study (n=11)

5. Discussion

Testicular trauma is the third most frequent cause of testicular pain, due to the mobility of the scrotum and its anatomical position that contribute to the development of injuries associated with trauma (7). Eleven cases of testicular trauma were treated in the years 2017 to 2020 at the Paraíba Valley Regional Hospital, a tertiary hospital of reference in the metropolitan region Paraíba Valley, in the interior of the state of São Paulo, cut by major highways and with an estimated population of 2.5 million inhabitants, according to the IBGE. The most prevalent age group was between 18 and 30 years (63.75%), similar data were observed in the studies of Papoutsoglou N et. al and Sallami S et al (1,2, 8). The most frequent cause of testicular trauma (45.5%) were accidents with motorcyclists and 18.2% were patients victims of polytrauma, which differs from a North American analysis, Grigorian et al, in which fire-arm injury was the most common etiology of scrotal trauma, which was also observed by Lee, S. et al in a Hospital in South Korea (9, 10). However, according to these same studies, most testicular traumas are isolated, that is, they are not associated with trauma in other systems, similar to what was observed in this study, where 18.2% were victims of polytrauma (9,10).

In the first visit, 100% of the individuals denied previous comorbidities, possibly related to the fact that the most affected age group was composed mostly of young people, while Grigorian A et. al conducted a study with about 1500 victims of testicular trauma, with a mean age higher than that found in this study, and observed some associated comorbidities, except for hypertension, all of them had a low prevalence (9). Through the retrospective analysis, no relationship was observed between the use of alcohol or drugs, possibly due to omission of the patients in the first visit.

The most affected testicle was on the right (54.5%), which was also observed in the literature review by Whang, Z et al, although the author reports that the study proposed by Zee et al is more reliable, which proposes that both testicles can be equally affected (11, 12)

Orchiectomy was the predominant treatment in the case series reported here (72.7%) after the evaluation of the repair procedure was discarded, in the other cases the raphe of the tunica albuginea was adopted (18.2%) and in 9.1% no reparative techniques were required after scrotal exploration. The reconstructive surgical treatment of the testicle is widely used,

as reported by the review of Whang, Z et al. and orchietomy being reserved for severe cases, when reconstruction is not possible, or in late surgical approaches (11,13). However, Redmond et. al propose conservative treatment in a series of 23 patients obtaining good results regardless of the sonographic findings and reached safe results with lower risks of testicular atrophy (14). Lucky, M., Brown et al propose a consensus published by the British Association of Urology (NICE) where orchietomy is not widely indicated, and attempts to recover the testicle are adopted, especially in the first hours, which differs from the cases reported in question, possibly due to the severity of injuries associated with motorcycle accidents and the observed time from trauma to surgical approach 63.3% of the patients operated after 24 hours in the institution of this study, being one of the causes the prolonged time for transfer of the patients in services that made the first attendance and the reference service (PVRH) (15). According to Stillwell et al, twenty-three patients with a diagnosis greater than 72 hours were eventually submitted to orchietomy and the rates of testicular preservation decreased from 90% to 45% when there was late testicular repair (16,17,18). For Lee, S. H. et. al the exploration should occur as soon as possible after the injury, regardless of the contusion or testicular rupture, and should be done to eliminate the painful edema that hinders daily activities and reduce the devastating effects of the long term, such as chronic pain and testicular atrophy, with the consequent orchietomy causing psychological damage (10).

The complementation of the clinical examination was made mainly by Ultrasonography in 6 cases (54.5%), as observed in other studies, and only in 1 case (9.1%) computed tomography was used (13,19,20). On the other hand, the x-ray was used in a complementary way to the testicular evaluation, for lesions associated with genital trauma in 5 cases (45.5%), however no benefit was observed in the evaluation of the testicle. On the other hand, Powers et. al concludes that the specificity of ultrasonography is low to exclude the surgical approach (21).

In 50.4% of the cases the prognosis was moderate due to hematomas and bleeding of the surgical wound and in 9.1% (2 cases) a new surgical approach was necessary, complications were also not frequent for Pogorelić Z et. al, being observed only infection in the operative wound, but with absence of major complications (22). In 45.5% of the cases it was necessary hospitalization longer than 72 hours, time similar to that reported by Altarac S et al (23). Antibiotic therapy and tetanus prophylaxis was mandatory for Santucci RA, Bartley JM et al. especially for patients with FAP injury (23, 24). It is valid to carry out new studies for the analysis of fertility and testosterone production in these patients in the period of outpatient follow-up after trauma, as other authors have already done (6, 8). In view of this, many authors defend the view that patients benefit greatly from early surgical intervention, due to the increase in the rate of testicular salvage, promotion of testicular function, faster control of symptoms, shorter hospitalization time and earlier return to their usual activities (10,11,12, 17).

This study is a retrospective analysis and has some limitations, where the number of patients included is relatively small. Although it is not possible to generalize the results observed by this analysis, similarities to other studies were noted. Another limitation is the use of ultrasonography that presents subjective results and depends on the analysis of the radiologist, although the method used is agreed by other authors (1,3,4,12,13,19). Thus, studies that lead to the detailing of the victims of testicular trauma in other institutions can contribute to a positive evolution in the quality of pre- and intra-hospital care, a situation that can help reduce costs by reducing the morbidity of this disease to patients who are victims of this type of genital trauma.

5. Conclusions

In view of the above, it is worth noting that the length of hospital stay was satisfactory and the evolution of the patients had a good prognosis and no major complications. The therapeutic approach adopted in this study differs from that reported in the literature, due to the time taken from the trauma until the therapeutic conduct was long and made more conservative or even more restorative conducts unfeasible, as well as the severity of the injuries involved with motorcycle trauma. No major injuries associated with this type of trauma were observed, although the etiology of the trauma observed in this center (motorcycle trauma) is different from that observed by other analyses, few individuals were polytraumatized

References

1. Munter DW, Faleski EJ. Blunt scrotal trauma: emergency department evaluation and management. *Am J Emerg Med.* 1989;7:227-34.
2. Papoutsoglou N, Thiruchelvam N. Diagnosis and Management of Testicular Injuries. *Med Surg Urol.* 2013;2:108
3. Jeffrey RB, Laing FC, Hricak H, McAninch JW. Sonography of testicular trauma. *AJR Am J Roentgenol* 1983; 141:993-5
4. Nicola R, Carson N, Dogra VS. Imaging of traumatic injuries to the scrotum and penis. *AJR Am J Roentgenol* 2014; 202:W512-20.
5. Santucci, R. A., & Bartley, J. M. (2010). *Urologic trauma guidelines: a 21st century update.* *Nature Reviews Urology*, 7(9), 510–519. doi:10.1038/nrurol.2010.119
6. Starmer, B. Z., Baird, A., & Lucky, M. A. (2017). *Considerations in fertility preservation in cases of testicular trauma.* *BJU International*, 121(3), 466–471.
7. Ragheb D, Higgins JL Jr. Ultrasonography of the scrotum: technique, anatomy, and pathologic entities. *J Ultrasound Med.* 2002;21:171-85.
8. Sallami S, Khouni H, Ichaoui H, Ben Atta M, Abou El Makarim S, Ben Rhouma S. Blunt scrotal trauma in adults: A multi-institution study evaluating the American Association for the Surgery of Trauma organ injury grading scale About 107 cases. *Tunis Med.* 2017 May;95(5):331-335.
9. Grigorian A, Livingston JK, Schubl SD, Hasjim BJ, Mayers D, Kuncir E, Barrios C, Joe V, Nahmias J. National analysis of testicular and scrotal trauma in the USA. *Res Rep Urol.* 2018 Aug 10;10:51-56.
10. Lee, S. H., Lee, D.-G., Choi, S.-K., Choi, T., & Yoo, K. H. (2017). *Trends in Testicular Injury in Korea, 1986–2015.* *Journal of Korean Medical Science*, 32(10), 1669.
11. Wang, Z., Yang, J., Huang, Y., Wang, L., Liu, L., Wei, Y., ... Tang, Z. (2016). Diagnosis and management of testicular rupture after blunt scrotal trauma: a literature review. *International Urology and Nephrology*, 48(12), 1967–1976.
12. Lee SH, Bak CW, Choi MH, Lee HS, Lee MS, Yoon SJ. Trauma to male genital organs: a 10-year review of 156 patients, including 118 treated by surgery. *BJU Int.* 2008 Jan;101(2):211-5.
13. Buckley JC, McAninch JW. Use of ultrasonography for the diagnosis of testicular injuries in blunt scrotal trauma. *J Urol* 2006; 175:175-8.
14. Redmond, E.J., Mac Namara, F.T., Giri, S.K. et al. Blunt testicular trauma – is surgical exploration necessary?. *Ir J Med Sci* 187, 1109–1113 (2018).
15. Lucky, M., Brown, G., Dorkin, T., Pearcy, R., Shabbir, M., ... Shukla, C. J. (2018). *British Association of Urological Surgeons (BAUS) consensus document for the management of male genital emergencies - testicular trauma.* *BJU International*, 121(6), 840–844.
16. Stillwell T, Reading C, Leary F. Untreated rupture of the tunica albuginea. *Mayo Clin Proc* 1986; 61: 975
17. Gross M. Rupture of the testicle, the importance of early surgical treatment. *J Urol* 1969; 101: 196–7
18. Cass, A. S. & Luxenberg, M. Testicular injuries. *Urology* 37, 528–530 (1991).
19. Trinci M, Cirimele V, Ferrari R, Ianniello S, Galluzzo M, Miele V. Diagnostic value of contrast-enhanced ultrasound (CEUS) and comparison with color Doppler ultrasound and magnetic resonance in a case of scrotal trauma. *J Ultrasound.* 2020 Jun;23(2):189-194.
20. Misgav Rottenstreich, MC IDF, Ofer N. Gofrit, MC IDF (Ret.), Blunt Scrotal Trauma in Soldiers—Epidemiology and Outcome, *Military Medicine*, Volume 182, Issue 9-10, September 2017, Pages e1929–e1931,
21. Powers, R., Hurley, S., Park, E., McArdle, B., Vidal, P., Psutka, S. P., & Hollowell, C. M. P. (2018). *Usefulness of Preoperative Ultrasound for the Evaluation of Testicular Rupture in the Setting of Scrotal Gunshot Wounds.* *The Journal of Urology*, 199(6), 1546–1551.
22. Pogorelić Z, Jurić I, Biočić M, Furlan D, Budimir D, Todorčić J, Milunović KP. Management of testicular rupture after blunt trauma in children. *Pediatr Surg Int.* 2011 Aug;27(8):885-9.
23. Altarac S. Management of 53 cases of testicular trauma. *Eur Urol.* 1994;25(2):119-23.
24. Santucci RA, Bartley JM. Urologic trauma guidelines: a 21st century update. *Nat Rev Urol.* 2010 Sep;7(9):510-9.