



A Retrospective Review of Acute Scrotum in Pediatric Patients with Epididymo-Orchitis, Testicular Torsion, and Torsion of Testicular Appendages

Patankar Jahoorahmad Z^{1*}, Manjusha Sailukar², Susan Fernandes³, Allan Pereira⁴, Ankit Desai⁵, Shiva Prasad Hirugade⁶, Dattatray B. Bhusare⁷, and Hemant Lahoti⁸

¹Consultant Paediatrician & Newborn Surgeon, Pediatric Urology and Laparoscopy, The Children's Hospital Mumbai, India

²Consultant Paediatric Surgeon & Associate Professor, Department of Surgery, KJ Somaiya Medical College Hospital & Research Centre, India

³Consultant Paediatrician & Neonatologist (Fellowship in Neonatal Intensive care), The Children's Hospital Mumbai, India

⁴Consultant Paediatrician, The Children's Hospital Mumbai, India

⁵Senior Paediatric Anaesthetist, Children's Anaesthesia Services, India

⁶Consultant Paediatric Surgeon & Associate Professor, R.C.S.M. Government Medical College, India

⁷Consultant Paediatric Surgeon & Professor, Department of Surgery, Head of Paediatric Surgery & Head of Department of Emergency Medicine, MGM Institute of Health Sciences, India

⁸Consultant Paediatric Surgeon & Associate Professor, Department of Paediatric Surgery, D. Y. Patil Hospital, India

*Corresponding author: Patankar Jahoorahmad Z, Consultant Paediatrician & Newborn Surgeon, Pediatric Urology and Laparoscopy, The Children's Hospital Mumbai, India

Received: 📅 December 21, 2022

Published: 📅 January 06, 2023

Abstract

Overview

- a) Acute Epididymo-Orchitis (EO), Testicular Torsion (TT), and Torsion of Testicular Appendages (TTA) can have a common presentation of pain.
- b) Distinguishing between acute EO and TT is important because their treatments differ significantly [1,2].

Study Objective

To compare historical features, physical examination findings, and testicular color Doppler ultrasound in pediatric patients with EO, TT, and TTA.

Methods

A retrospective review of patients with the diagnosis of EO, TT, or TTA at Children's Hospital in a Low-Middle Income country (LMIC).

Results

Ninety patients were included in the study (55 with EO, 22 with TT, and 13 with TTA). Historical features did not differ among groups except for duration of symptoms. Of 22 patients with TT all had an absent cremasteric reflex and tenderness unrelieved by scrotal elevation. When compared with the TT group, patients with EO had a tender testicle in 69% and an absent cremasteric reflex in 14%. 52 (96%) patients with EO had tender epididymis and 38 (69%) had scrotal erythema/edema. By comparison, 7 (31%) and 9 (40%) patients with TT had tender epididymis or scrotal erythema/edema, respectively. Color DU showed decreased or absent blood flow in 18 patients, 16 of whom were diagnosed with TT. 18 out of 22 patients with TT had a salvageable testicle at the time of surgery.

Conclusion

The physical examination is helpful in distinguishing between EO, TT, and TTA. Patients presenting with a tender testicle and an absent cremasteric reflex were more likely to have a TT rather than EO or TTA. An absent cremasteric reflex was the most sensitive physical finding for diagnosing TT. Color DUS is a useful adjunct in the evaluation of the acute scrotum when physical findings are equivocal. Childhood TT is a pediatric surgical emergency and requires an urgent and accurate diagnosis.

Keywords: Acute scrotum; epididymo-orchitis; testicular torsion; torsion of testicular appendages.

Introduction

Acute scrotum is defined as a painful acute swelling of the scrotum or its contents, which is followed by local symptoms of the scrotum or its contents [3]. Due to its various etiologies and overlapping clinical presentations, it poses a diagnostic dilemma [4]. TT, EO, and TTA are the three most common causes of acute scrotum in children below 25 years age [5]. Among the causes of acute scrotum TT is the one that must be ruled out first, as delay in the treatment leads to irreversible testicular necrosis thus the need for early identification and surgical intervention is important [6]. It is suggested that onset of irreversible ischemia sets in at around 6 h therefore early surgical intervention is of paramount importance in TT. Signs of testicular loss will appear over 24 h [7]. However, it can be extremely difficult to differentiate between causes of acute scrotum on clinical examination alone, especially between TT and EO, thus the need of a Doppler ultrasound study as a supplement to a scrotal examination when diagnosis of EO is equivocal as to rule out torsion [8].

Study Objective

Acute EO, TT, and TTA can have a common presentation of pain. Distinguishing between acute EO and TT is important because their treatments differ significantly. The objective of our study is to compare historical features, physical examination findings, and testicular color Doppler ultrasound in pediatric patients with EO, TT, and TTA. Further to determine if physical examination is helpful in distinguishing between EO, TT, and TTA.

Methods

A retrospective review of patients with the diagnosis of EO, TT, and TTA at Children's Hospital in a Low-Middle Income country (LMIC).

Results

Ninety patients were included in the study (55 with EO, 22 with TT, and 13 with TTA). Historical features did not differ among groups except for duration of symptoms. Of 22 patients with TT all had an absent cremasteric reflex and tenderness unrelieved by scrotal elevation. When compared with the TT group, patients with EO had a tender testicle in 69% and an absent cremasteric reflex in 14%. 52 (96%) patients with EO had tender epididymis and 38 (69%) had scrotal erythema/edema. By comparison, 7 (31%) and 9 (40%) patients with TT had tender epididymis or scrotal erythema/edema, respectively. Color DU showed decreased or absent blood flow in 18 patients, 16 of whom were diagnosed with TT. 18 out of 22 patients with TT had a salvageable testicle at the time of surgery.

Conclusion

The physical examination is helpful in distinguishing between EO, TT, and TTA. Patients presenting with a tender testicle and an absent cremasteric reflex were more likely to have a TT rather than EO or TTA. An absent cremasteric reflex was the most sensitive physical finding for diagnosing TT. Color Doppler ultrasound is a useful adjunct in the evaluation of the acute scrotum when physical findings are equivocal.

Discussion

The management of acute scrotum might be more challenging today than a decade ago, when urgent surgical exploration was the "method of choice" to investigate and treat almost any acutely swollen or painful scrotum. 22/90 (24.44%) of children in our study had TT, which constitutes an absolute indication for surgery. EO was found in 55/90 children (61%) and TTA in 14.44% of the cases. Anderson and Giacomantonio [9] found TT in 23% of their 48 patients below the age of 15 years. Caldamone and associates

[10] reported a similar 25% incidence of TT in their 150 patients, also including young men (age range 0-21 years). These figures are consistent with our own. Other studies have shown varying distributions of diagnoses associated with acute scrotum: Lewis and Bukowski [11] found TT in 16%, TTA in 46% and EO in 35% of 238 patients below the age of 19 years. Kadish and associates [12] reported a high incidence of EO (71%), but low incidences of TT (14%) and TTA (14%) in their study of 90 patients (0-18 years). The diagnoses in that study, however, were based mainly on clinical or ultrasound findings and only some of the patients had been operated on.

The higher incidences of EO may be explained by diagnostic difficulties in distinguishing EO from TTA by ultrasonography. A necrotic appendix gradually causes inflammation in the surrounding tissues, mimicking EO. The yearly incidence of testicular torsion is estimated at 1:4000 males younger than 25 years [13]. There are two distinct peaks of incidence in newborns and in teenagers (between 12-16 years) [14]. In comparison, inflammatory scrotal disorders are more common than torsion [15]. Neonatal testicular torsion is thought to occur because of general laxity of the gubernacular attachment of the testis to the scrotal floor [16]. Changes in tissue and testicular function are closely related to the duration of torsion. Several studies suggest that testicular salvage rate is approximately 80% if operated within six hours of the onset of pain and about 20% if operated around ten hours. Salvage is negligible in those operated on after 24 hours [17]. EO is seen in young adults most commonly between 19 to 35 years of age, although it is not unusual to encounter infants, adolescents, and older men presenting with this malady [18]. Except for scrotal pain as such, clinical status and a history were of questionable value in decision-making.

Although pain was a leading symptom in TT, it was complained of by 88% of boys more than one year of age. When examining children, it is important to recognize that absence of pain does not exclude possibility of TT in a swollen scrotum. Sudden scrotal pain caused by TTA was probably of lesser degree than pain caused by TT. Although operative treatment of AT is not imperative, it is acceptable since morbidity is diminished compared to conservative treatment with anti-inflammatory analgesics and rest. Our study also showed that all testicles with torsion were salvaged when the blood supply was restored within six hours. Similar frequencies of salvage have been reported in other studies. Based on these findings we strongly recommend urgent surgical exploration in all patients whose severe scrotal symptoms have lasted less than six hours. It is as important to the primary medical care system as to the surgery unit to realize that acute scrotum is still an emergency.

Clinical Presentation in Our Study

In our study, the most common signs and symptoms are tenderness, erythema, and edema. When compared with the TT group, patients with EO had a tender testicle in 69% and fewer patients with EO had an absent cremasteric reflex. 52 (96%) patients with EO had tender epididymis and 38 (69%) had scrotal

erythema/edema. By comparison, 3 (23%) and 9 (40%) patients with TT had tender epididymis or scrotal erythema/edema, respectively. Different studies reported common symptoms in different occurrence percentages. In 2015, Wael Mohammed et al., found that pain and swelling were the most common signs and symptoms in the percentage of 90.8%, whereas Ibrahim et al. [19]. Most patients experienced a sudden onset of pain (overall, 76.3%; TT, 84.6%; TTA, 87.5%; and EO, 63.3%). Other research indicated that nausea, vomiting, and low-grade fever are the most common signs and symptoms of TT. The hemiscrotum of the affected side is usually swollen and inflamed during physical examination, accompanied by an absent cremasteric reflex and tenderness unrelieved by scrotal elevation [20].

The length and torsion degree influence testicular salvage. If the testicle is explored within 6 h from the onset of symptoms, the salvage rate can be as high as 100%. The rates of testicular salvage decrease to 70% if intervention is performed within 6-12 h, whereas it will decrease to 20% if intervention is performed within 12-24 h. In this study, 18 out of 22 patients with TT had a salvageable testicle at the time of surgery mostly performed within 8-12 h from symptom onset. This finding is in agreement with the previously reported study by I. Alsoub in 2012, who claimed that the primary explanation for such an outcome may be a delayed presentation to the hospital requesting proper management. However, most reports suggest early exploration in all cases to ensure optimum testicular salvage [21]. The optimal treatment for TT patients entails early diagnosis and surgical intervention.

The surgical techniques used are scrotal exploration, orchidectomy for nonviable testicles, detorsion and orchidopexy for a viable one, and contralateral orchidopexy. The patient's medical history, physical examination, and imaging procedures, such as color Doppler ultrasonography, are used to diagnose TT (DUS). To distinguish torsion from other causes of acute scrotal pain, DUS can be used [22]. However, the actual incidence of torsion in patients with severe scrotal pain (acute scrotum) is still uncertain, and the incidence rates reported in the literature have substantially been in the range of 9%-72% [23,24]. TT should be detected and treated early to avoid necrosis and testicle degradation. It has been suggested that if the torsion is successfully repaired within 6 h from onset of symptoms, the salvage rate will be 80%-100%, whereas after 12 h, the salvage rate will decrease to 20% [25,26].

Conclusion

TT is considered to be the most extreme condition that affects the scrotum which requires immediate diagnosis and care to save the affected testis and to prevent testicular loss, fertility issues, and legal medical problems. Signs of testicular loss will occur over 24 h following symptom initiation. The physical examination is helpful in distinguishing between EO, TT, and TTA. Patients presenting with a tender testicle and an absent cremasteric reflex were more likely to have a TT rather than EO or TTA. An absent cremasteric reflex was the most sensitive physical finding for diagnosing TT. Color

Doppler ultrasound is a useful adjunct in the evaluation of the acute scrotum when physical findings are equivocal. Childhood TT is a pediatric surgical emergency and requires an urgent and accurate diagnosis.

References

- Tracy CR, Steers WD, Costabile R (2008) Diagnosis and management of epididymitis. *Urol Clin North Am* 35(1): 101-108.
- Tracy CR, Costabile RA (2009) The evaluation and treatment of acute EO in a large university-based population: are CDC guidelines being followed. *World J Urol* 27(2): 259-263.
- Lyronis ID, Ploumis N, Vlahakis I, Charissis G (2009) Acute scrotum-etiology, clinical presentation and seasonal variation. *Indian J Pediatr* 76(4): 407-410.
- Günther P, Rübgen I (2012) The acute scrotum in childhood and adolescence. *Dtsch Arztebl Int* 109(25): 449-458.
- Nason GJ, Tareen F, McLoughlin D, McDowell D, Cianci F, et al. (2013) Scrotal exploration for acute scrotal pain: a 10-year experience in two tertiary referral paediatric units. *Scand J Urol* 47(5): 418-422.
- M Bertolotto, I Campo, LE Derchi (2019) Imaging of Acute Scrotum. *Pain Imaging* pp. 487-498.
- Kims S (2014) A Case of Torsion Testis Salvage by Detorsion. *Journal of Chalmeda Anand Rao Institute of Medical Sciences* 7(1): 51-53.
- T Beni-Israel, M Goldman, SB Chaim, E Kozer (2010) Clinical predictors for TT as seen in the pediatric ED. *Am J Emerg Med* 28 (7): 786-789.
- Anderson PA, Giacomantonio JM (1985) The acutely painful scrotum in children: Review of 113 consecutive cases. *Can Med Assoc J* 132(10): 1153-1155.
- Caldamone AA, Valvo JR, Altebarmakian VK (1984) Acute scrotal swelling in children. *J Pediatr Surg* 19(5): 581-584.
- Lewis AG, Bukowski P, Jarvis D, Wacksman J, Sheldon CA (1995) Evaluation of the acute scrotum in the emergency department. *J Pediatr Surg* 30(2): 277-282.
- Kadish HA, Bolte RG (1998) A retrospective review of pediatric patients with epididymitis, testicular torsion, and torsion of testicular appendages. *Pediatrics* 102(1 Pt 1): 73-76.
- Williamson RCN (1976) Torsion of the testis and allied conditions. *Br J Surg* 63(6): 465-476.
- Skoglund RW, McRoberts JW, Radge H (1970) Torsion of the spermatic cord: A review of the literature and an analysis of 70 new cases. *J Urol* 104(4): 604-606.
- Brewer ME, Glasgow BJ (1986) Adult testicular torsion. *Urology* 27(4): 356-357.
- Ransler CW, Allen TD (1982) Torsion of the spermatic cord. *Urol Clin North Am* 9(2): 245-250.
- Cass AS, Cass BP, Veeraraghavan K (1980) Immediate exploration of the unilateral acute scrotum in young male subjects. *J Urol* 124(6): 829-832.
- Kaver I, Matzkin H, Braf ZF (1990) Epididymo-orchitis: A retrospective study of 121 patients. *J Fam Pract* 30(5): 548-552.
- Ibrahim AG, Aliyu S, Mohammed BS, Ibrahim H (2012) Testicular torsion as seen in University of Maiduguri teaching hospital, Northeastern Nigeria. *Borno Med J* 9(2): 31-33.
- Washowich TL (2001) Synchronous bilateral testicular torsion in an adult. *J ultrasound Med* 20(8): 933-935.
- Vasdev N, Chadwick D, Thomas D (2012) The acute pediatric scrotum: presentation, differential diagnosis, and management. *Curr urol* 6(2): 57-61.
- Murphy FL, Fletcher L, Pease P (2006) Early scrotal exploration in all cases is the investigation and intervention of choice in the acute paediatric scrotum. *Pediatr surg Int* 22(5): 413- 416.
- Lam WWC, Yap TL, Jacobsen AS, Teo HJEL (2005) Colour Doppler ultrasonography replacing surgical exploration for acute scrotum: myth or reality? *Pediatric radiology* 35(6): 597-600.
- Beni-Israel T, Goldman M, Chaim SB, Kozer E (2010) Clinical predictors for TT as seen in the pediatric ED. *Am J Emerg Med* 28(7): 786-789.
- Yang C, Song B, Liu X, Wei GH, Lin T, et al. (2011) Acute scrotum in children: an 18- year retrospective study. *Pediatr Emer Care* 27(4): 270-274.
- Cokkinos DD, Antypa E, Tserotas P, Kratimenou E, Kyrtzi E, et al. (2011) Emergency ultrasound of the scrotum: a review of the commonest pathologic conditions. *Curr Probl Diagn Radiol* 40(1): 1-14.



This work is licensed under Creative Commons Attribution 4.0 License

To Submit Your Article Click Here: [Submit Article](#)

DOI: [10.32474/PAPN.2023.04.000178](https://doi.org/10.32474/PAPN.2023.04.000178)



Progressing Aspects in Pediatrics and Neonatology

Assets of Publishing with us

- Global archiving of articles
- Immediate, unrestricted online access
- Rigorous Peer Review Process
- Authors Retain Copyrights
- Unique DOI for all articles