

Delayed presentation and diagnosis of testicular torsion-insights from 10 years of cases

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Abstract

Introduction

Testicular torsion is a common and important cause of scrotal and abdominal pain in men, and delayed diagnosis can result in testicular necrosis necessitating orchidectomy. Delayed presentation of torsion remains a significant issue in the Irish health service. We aimed to report the clinical particulars of patients requiring orchidectomy for torsion for the last 10 years.

Methods

A retrospective review was performed of all orchidectomy cases from 2014-2024. Histology reports, clinical notes and operative notes were analysed to identify cases of testicular torsion. Patient data, radiologic and laboratory results and operative findings were recorded.

Results

180 patients underwent orchidectomy during this period. 15 (8.33%) cases of orchidectomy for testicular ischaemia due to torsion were identified. Mean ($\pm$ SD) patient age was 24 ($\pm$ 9) years. In 12 cases (80%), the delay in diagnosis was due to late patient presentation to the emergency department, with a median ($\pm$ IQR) time to presentation from onset of pain of 72 hours ($\pm$ 54). In 3 cases (20%) the patient had presented in a timely manner and was discharged with a presumed alternative diagnosis (epididymo-orchitis in two cases and non-specific abdominal pain in one case). These patients subsequently presented again with ongoing pain and ultrasound revealed an absence of Doppler flow to the affected testis.

Discussion

Delayed presentation of testicular torsion remains a significant problem. All cases of orchidectomy in this review were associated with a duration of pain >6 hours.

Introduction

Testicular torsion refers to twisting of the spermatic cord and its contents resulting in testicular ischaemia. It is an acute surgical emergency necessitating prompt diagnosis and surgical intervention in order to salvage the affected organ. Rates of testicular loss as a result of torsion vary hugely in reported studies, ranging from 20-60%¹⁻³. Animal studies have reported Sertoli cell death and cessation of spermatogenesis by 6 hours of testicular ischaemia, with Leydig cell death by 10 hours⁴. Prompt surgical intervention is required even when patients present outside of the traditional time frame, as there may be a chance to salvage the affected side, and orchidopexy is required on the contralateral side. The presence of anti-sperm antibodies is thought to affect contralateral testicular function if an ischaemic testis is left in situ⁵. There is some data supporting this from animal studies⁶, however clear evidence for contralateral testicular damage by anti-sperm antibodies in man is lacking.

The age distribution of testicular torsion is bimodal with peaks in neonates and in puberty⁷. Incidence has been reported to be 3.8 cases per 100,000 males <18 years of age⁸ and 1.3 per 100,000 males ≥18 years⁹. Estimated rates of testicular torsion have been reported to be higher in Ireland than elsewhere¹⁰.

Surgical intervention within 6 hours of diagnosis is associated with high rates of testicular salvage¹¹. Rates of testicular salvage have been reported to be lower for men >21 years of age compared to younger patients¹². The degree to which unilateral testicular torsion affects subsequent testicular function is unclear. One study found that half of patients with a salvageable testis at scrotal exploration for torsion went on to develop ipsilateral testicular atrophy (>50% reduction in volume on ultrasound compared to contralateral side) 14 months after the event¹³. It is unclear if loss of testicular volume has any meaningful clinical consequences. Several older studies with small patient populations reported significant impairment of spermatogenesis and endocrine function following testicular torsion. Anderson et al reported significant effects on semen parameters following repair of unilateral testicular torsion, with up to half of patients experiencing significant oligospermia¹⁴. The degree of testicular atrophy appears to be related to the duration of testicular ischaemia¹⁵. Follow-up hormonal profiles reveal elevated levels of FSH and LH in patients with duration of testicular pain >8 hours¹⁶. However more recently, a large Danish population study of men with prior torsion compared with age-matched controls observed no differences in semen parameters and only subtle differences in reproductive hormone levels¹⁷. Rates of paternity after testicular torsion do not appear to be affected compared to age matched controls¹⁸.

Rates of orchidectomy have been found to be higher in older men presenting with testicular torsion⁹. Poorer socioeconomic status⁹ and non-Caucasian race^{8,19} have also been reported to

be associated with lower rates of testicular salvage. However a large population based study did not find any association between race and rates of testicular loss²⁰. This study did however reveal that boys with comorbid medical conditions were more likely to undergo orchidectomy at surgical exploration for testicular torsion.

Missed torsion represents a significant source of medicolegal litigation worldwide, with major liabilities for claims being reported as errors in diagnosis and delays in referral. A misdiagnosis of epididymo-orchitis was cited in 64% malpractice claims related to missed torsion in one study²¹.

Methods

We performed a retrospective review of all orchidectomies performed during the years 2014-2024. We used the electronic theatre record system to record the number of operations performed for emergency scrotal exploration during this period. Data collected included patient demographics, time from onset of pain to presentation to hospital, details of initial presentation to hospital, time from presentation to hospital to surgical exploration, operative findings, and ultrasound findings when imaging was performed.

Results

180 patients underwent orchidectomy from 2014-2024, with the majority of cases performed for excision of testicular cancer. There were 203 scrotal explorations performed during the same period. 15 orchidectomies (8.33%) were performed for ischaemia due to testicular torsion. Mean ($\pm$ SD) patient age was 24 ($\pm$ 9) years. In all cases, the final diagnosis was made at a time interval >6 hours from the onset of pain.

In 80% orchidectomy cases ($n=12$), the delay in diagnosis was due to late patient presentation to health services. Median ($\pm$ IQR) time to presentation from onset of pain was 72 hours (± 43.5). Time to presentation was highly variable, ranging from 12 hours to 96 hours. Of these 12 cases, 8 presented to the emergency department and were admitted to hospital at time of presentation. 2 of these patients proceeded directly to scrotal exploration, and were found to have a non-salvageable testis. 6 of these patients underwent urgent ultrasound evaluation of the scrotum, which revealed an absence of Doppler flow to the affected side, and were then scheduled for orchidectomy in the following 24 hours. In 4 of the 12 cases, patients presented to the emergency department with scrotal pain ≥ 24 hours duration, and were sent home from the emergency department with a prescription for antibiotics and pain relief. These patients were either booked for an ultrasound in the following days, or presented back to the emergency department with ongoing pain.

In 20% cases (n=3), patients presented to the emergency department in a timely manner (<6 hours from onset of pain) and were discharged with a presumed alternative diagnosis. Time from onset of pain to presentation to the emergency department in these cases was 1 hour, 3 hours and 5 hours in each case. 2 of these patients were discharged by a doctor working in the emergency department, one with a presumed diagnosis of epididymo-orchitis and one with non-specific abdominal pain. One patient was reviewed by the urology registrar on call and discharged with a presumed diagnosis of orchitis.

Discussion

In the years 2009-2018 in Ireland, 1746 men under the age of 25 underwent scrotal exploration for suspected testicular torsion¹⁰. The authors report that factors associated with risk of orchidectomy included age, lack of private insurance, province of residence and transfer from another hospital. This aligns with the higher rates of orchidectomy in patients with poorer socioeconomic status and lack of private health insurance reported in other international studies⁹.

Misdiagnosis and delayed diagnosis of testicular torsion represents a major source of medicolegal activity for hospitals and urologists. In an analysis of 333 legal claims for cases of missed testicular torsion in Catalonia, epididymo-orchitis was the most common alternate diagnosis (60.4%) recorded for initial presentations which subsequently resulted in delayed diagnosis of testicular torsion²². While scrotal pain was the most common presenting complaint in this series (75.25%), a significant minority of patients presented with abdominal pain (19.8%). This affirms the need to consider a diagnosis of testicular torsion in young men presenting with abdominal pain. In our series, the patient who presented with abdominal pain underwent imaging with abdomino-pelvic computed tomography (CT), but did not have the findings of a testicular exam documented in their notes. Failure to perform a genital exam for a young male with abdominal pain has been cited as grounds for litigation in medical malpractice cases with large financial settlements awarded to the injured parties²³. Although the diagnostic sensitivity and specificity of ultrasound is high²⁴, immediate surgical exploration is warranted in cases of suspected torsion, in order to limit ischaemia time.

The limitations of this study include the retrospective nature of the data and the overall small number of cases identified over a 10 year period. Due to lack of an integrated electronic health record, it was not possible to collect data on the number of patients presenting to our emergency department with scrotal pain during the study period, which would provide useful information on the rate of missed torsion as a proportion of the overall number of patients presenting with suspected torsion. It is also possible that there were more missed cases of

testicular torsion who attended our hospital initially, were discharged and presented to another unit subsequently. A national patient database would be required to capture such cases. In our series, most delays occurred prior to presentation at the hospital, which is similar to other reported studies²⁵. Delay in presentation and diagnosis can result in testicular loss, therefore increased awareness of testicular torsion is needed among the general population to reduce the time to hospital attendance.

Declarations of Conflicts of Interest:

None declared.

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References:

1. Moran GW, Wang CN, Chung R, Movassaghi M, Carpenter CP, Finkelstein JB. Atypical Presentation Delays Treatment of Pediatric Testicular Torsion. *Pediatr Emerg Care*. 2024;40(4):255-60.
2. Sharp VJ, Kieran K, Arlen AM. Testicular torsion: diagnosis, evaluation, and management. *Am Fam Physician*. 2013;88(12):835-40.
3. MacDonald C, Kronfli R, Carachi R, O'Toole S. A systematic review and meta-analysis revealing realistic outcomes following paediatric torsion of testes. *Journal of Pediatric Urology*. 2018;14(6):503-9.
4. Smith GI. Cellular changes from graded testicular ischemia. *The Journal of urology*. 1955;73(2):355-62.
5. Visser A, Heyns C. Testicular function after torsion of the spermatic cord. *BJU international*. 2003;92(3).
6. Madarikan B. Testicular salvage following spermatic cord torsion. *Journal of Pediatric Surgery*. 1987;22(3):231-4.

7. Melekos MD, Asbach HW, Markou SA. Etiology of acute scrotum in 100 boys with regard to age distribution. *J Urol.* 1988;139(5):1023-5.
8. Zhao LC, Lautz TB, Meeks JJ, Maizels M. Pediatric testicular torsion epidemiology using a national database: incidence, risk of orchiectomy and possible measures toward improving the quality of care. *J Urol.* 2011;186(5):2009-13.
9. Greear GM, Romano MF, Katz MH, Munarriz R, Rague JT. Testicular torsion: epidemiological risk factors for orchiectomy in pediatric and adult patients. *Int J Impot Res.* 2021;33(2):184-90.
10. Sugrue DD, O'Connor E, Davis N. Testicular torsion in Ireland: a 10-year analysis of incidence and risk of orchidectomy. *Irish Journal of Medical Science (1971-).* 2022:1-8.
11. Murali TV, Jaya KV, Kumar R. Testicular torsion - symptomatology and outcomes of 101 scrotal explorations. *Urol Ann.* 2022;14(2):167-71.
12. Cummings JM, Boullier JA, Sekhon D, Bose K. Adult testicular torsion. *The Journal of urology.* 2002;167(5):2109-10.
13. Lian BS, Ong CC, Chiang LW, Rai R, Nah SA. Factors predicting testicular atrophy after testicular salvage following torsion. *European Journal of Pediatric Surgery.* 2016;26(01):017-21.
14. Anderson J, Williamson R. The fate of the human testes following unilateral torsion of the spermatic cord. *British journal of urology.* 1986;58(6):698-704.
15. Thomas W, Crane G, Cooper M, Lee G, Williamson R. Testicular exocrine malfunction after torsion. *The Lancet.* 1984;324(8416):1357-60.
16. Brasso K, Andersen L, Kay L, Wille-Jørgensen P, Linnet L, Egense J. Testicular torsion: a follow-up study. *Scandinavian journal of urology and nephrology.* 1993;27(1):1-6.
17. Hansen AH, Priskorn L, Hansen LS, Carlsen E, Joensen UN, Jacobsen FM, et al. Testicular torsion and subsequent testicular function in young men from the general population. *Hum Reprod.* 2023;38(2):216-24.
18. Mäkelä EP, Roine RP, Taskinen S. Paternity, erectile function, and health-related quality of life in patients operated for pediatric testicular torsion. *Journal of Pediatric Urology.* 2020;16(1):44. e1-. e4.
19. Castañeda-Sánchez I, Tully B, Shipman M, Hoeft A, Hamby T, Palmer BW. Testicular torsion: a retrospective investigation of predictors of surgical outcomes and of remaining controversies. *Journal of Pediatric Urology.* 2017;13(5):516. e1-. e4.
20. Sood A, Li H, Suson KD, Majumder K, Sedki M, Abdollah F, et al. Treatment patterns, testicular loss and disparities in inpatient surgical management of testicular torsion in boys: a population-based study 1998–2010. *BJU international.* 2016;118(6):969-79.
21. Matteson JR, Stock JA, Hanna MK, Arnold TV, Nagler HM. Medicolegal aspects of testicular torsion. *Urology.* 2001;57(4):783-6.

22. Vargas-Blasco C, Martin-Fumadó C, Benet-Travé J, Fuz F, Romero G, Autran M, et al. Clinical Safety Recommendations for Testicular Torsion: Analysis of 101 Claims Settled with Compensation in Spain and France. *Urologia Internationalis*. 2022;106(11):1095-9.
23. Bass JB, Couperus KS, Pfaff JL, Moore GP. A pair of testicular torsion medicolegal cases with caveats: the ball's in your court. *Clinical Practice and Cases in Emergency Medicine*. 2018;2(4):283.
24. Ota K, Fukui K, Oba K, Shimoda A, Oka M, Ota K, et al. The role of ultrasound imaging in adult patients with testicular torsion: a systematic review and meta-analysis. *Journal of Medical Ultrasonics*. 2019;46:325-34.
25. Rampaul M, Hosking S. Testicular torsion: most delay occurs outside hospital. *Annals of the Royal College of Surgeons of England*. 1998;80(3):169.