RESIDENT'S CORNER

Testicular torsion in brothers

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TABAKIN AL, FARBER NJ, BARONE J. Testicular torsion in brothers. *Can J Urol* 2020;27(1):10135-10137.

Testicular torsion is a common pediatric emergency. Predisposing factors and other risk factors for testicular torsion have not been fully elucidated. This case report highlights teenage brothers who each experienced rightsided testicular torsion at nearly the same age, just 1

Introduction

Testicular torsion accounts for over 1,400 emergency room visits each year.¹ Testicular torsion is often extravaginal in newborns and intravaginal in older children, and exhibits a bimodal age distribution peaking at both 1 month and adolescence.² Once torsion of the spermatic cord occurs, there is a 4 to 8 hour window during which the torsed testicle may be salvaged. Diagnosis is confirmed by physical examination and color Doppler ultrasound to identify testicular characteristics and blood flow. Prompt diagnosis and surgical exploration with orchiopexy are necessary for testicular salvage. Delayed diagnosis and

Accepted for publication October 2019

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year apart. Because of their parents' urgency in seeking medical attention, the affected testicles in both patients were salvaged. We also review the current literature in regards to etiology, inheritance, and patient and parental education.

Key Words: testicular torsion, familial torsion, acute scrotum; pediatric urology

treatment can lead to testicular atrophy and potentially hypogonadism or infertility.³ Here we discuss a case report of familial testicular torsion; we review the risk factors as well as possible barriers to timely care.

Case report

A 12-year-old male presented to the emergency department 1 hour after the acute onset of severe right testicular pain associated with nausea and vomiting. He denied any dysuria, hematuria, fevers, chills, or recent testicular trauma. He had never had similar pain before.

His past medical, surgical, medication, and social history were all unremarkable. His 14-year-old brother had a history of right testicular torsion approximately 1 year prior, which was successfully managed with surgery.

Physical examination revealed an edematous, tender right testicle and a normal left testicle. Urinalysis was negative for infection. A scrotal color Doppler ultrasound demonstrated a homogenous right testicle without any blood flow and a normal contralateral testicle. He was taken emergently to the operating room. A trans-scrotal incision was made and the torsed testicle was delivered on to the field, where it was found to be slightly dusky, but viable, with approximately 360 degrees of torsion. After detorsion the testicle became pink, and bilateral orchiopexies were performed. The patient's postoperative course was unremarkable, and he was discharged home later that day.

Discussion

Testicular torsion occurs at an incidence of 4.5 per 100,000 men under age 25 each year.³ By the age of 18, 1 in 1,500 boys will require surgical exploration for presumed testicular torsion,² a significant cause of morbidity in the pediatric population.

In this case, the patient did not hesitate to discuss his symptoms with his parents, as he was educated about the symptoms of torsion from his brother. By the same token, his parents urgently sought a medical evaluation for their son. Their combined actions resulted in a salvaged testicle.

Etiology: environment, genetics, and inheritance Several theories exist for the development of testicular torsion such as trauma to the scrotum and strenuous exercise.³ Others have suggested rapid contraction of the cremasteric muscle in response to stimulation⁴ and cold weather.⁵

The "bell clapper deformity", an anatomical variant in which the testicle is not properly anchored to the scrotum, is the most important risk factor for torsion. The anomaly increases a man's risk for torsion by four to ten times. At autopsy, between 12% and 80% of men are found to have the bell clapper deformity,^{3,6,7} though the incidence of testicular torsion is far lower.³ The details of how bell clapper deformities form have not been fully explained, and it is unknown if genetic or environmental factors play a role in the subsequent precipitation of torsion. Other anatomic abnormalities including cryptorchidism and a long mesorchium have also been linked to torsion.³

Other cases of familial torsion, spanning up to three generations, have been reported, suggesting a possible genetic cause.⁶⁻⁸ In a prospective series of 70 patients presenting with torsion, 11.4% had a family history of testicular torsion.⁸ However, given the small number of reported index patients with a positive family history, no definitive inheritance pattern is currently discernable. Additionally torsion may be polygenic, possibly accounting for variations in heritability.⁷ While no definitive genes for inheritance have been identified, mouse knockout models of insulin-like 3 (INSL3) and its receptor relaxin family peptide receptor 2 (RXLF2) have an increased risk of cryptorchidism and torsion.³ INSL3 and RXLF2 influence testicular intra-abdominal descent and may encourage the development and thickening of the gubernaculum.^{3,4} Variations in INSL3 and RXLF2 have been shown to play a role in the development of cryptorchidism in humans. In a small series sampling the blood of 25 patients with torsion, 3 patients were found to have polymorphisms in the INSL3 gene.⁴ Future research should be aimed to further clarify the role of these two proteins, and others, in developing torsion.

Counseling and education

In a cohort study of 2,443 boys under age 18 with testicular torsion, orchiectomy was performed in 41.9% of patients.² Up to 50% of testicular loss has been reported in patients presenting with testicular torsion with a known family history of torsion.8 Significant predictive factors leading to orchiectomy may include young age (age 10 and under), black race, Medicaid insurance, and admission to a nonemergency room, highlighting possible socioeconomic disparities in treatment.² Patients presenting in the South and Midwest were also more likely to undergo orchiectomy.² One group associated increased comorbidities, self-pay status, and weekday presentation with higher risk for orchiectomy but did not find any racial or regional patterns. There was no difference in rates of testicular salvage over the 12 years included in this study.9 Moreover, a heterogeneous testis on ultrasound may predict need for orchiectomy. In a study of 55 boys with torsion confirmed via absent diastolic or color flow in a symptomatic testis on Doppler ultrasound, 67% of testes were classified as heterogeneous. At exploration 100% of the heterogeneous testes were determined to be non-viable, demonstrating that ultrasound findings may guide patient and parent preoperative counseling.¹⁰

Despite its significant morbidity, patient and education regarding acute scrotal pain and testicular diagnosis is deficient, as is evident with a stable rate of orchiectomy.⁹ A study that surveyed parents in pediatric outpatient offices revealed that only 34% of parents had heard of testicular torsion; moreover, only 13% of parents had discussed torsion with their sons. The majority of parents reported that they would take their child for emergency medical attention for acute scrotal pain (75% and 82%, during the day and night, respectively). However, this study did not include any demographic information for those surveyed.¹¹

These findings show a clear need for improved counseling regarding acute scrotal pain. Further efforts to educate at-risk patients and parents may be conducted in adolescent health classes or in the pediatrician's office. Future studies should be designed to determine if increased patient education improves patient outcomes and rates of testicular salvage.^{9,11}

Conclusion

Testicular torsion is a common cause of acute scrotal pain. When not treated immediately it can lead to orchiectomy and compromise fertility. Some patients may have a genetic predisposition leading to testicular torsion, while it may occur spontaneously in others. Seeking emergent medical treatment is key to testicular salvage. Public health efforts to increase awareness of acute scrotum and testicular torsion are necessary to improve recognition and encourage urgent action to seek care.

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