

Management and Outcome of Testicular Torsion in Children: A Teaching Hospital Experience

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ABSTRACT

Background: Testicular torsion is a common cause of acute scrotum and may lead to ischemia of the testis. The aim of this study was to evaluate our experience in the management of children who had testicular torsion.

Materials and Methods: This was a retrospective study of children aged 15 years and younger who were managed for testicular torsion between January 2014 and December 2018 at the pediatric surgery unit of Enugu State University Teaching Hospital Enugu, Nigeria.

Results: A total of 79 cases of confirmed testicular torsions were treated during the study period. The median age of the patients was 9 years with a range of 2 weeks to 14 years. Majority of the patients presented 48 hours after onset of their symptoms. The patients received treatment within 24 hours of presentation and abdominal pain was a consistent symptom in all the patients. Half of the patients had a preoperative Doppler ultrasound. Right side of the testis was mostly involved and three-quarters of the patients had orchidopexy whereas one-quarter of the patients had orchidectomy. Surgical site infection was the most common post-operative complication. However, there was no mortality.

Conclusion: Delays in presentation may have resulted in testicular loss in 25% of the patients in the present study. We recommend high index of suspicion in children who present with scrotal pain.

Keywords: Children; Management; Experience; Outcome; Testicular torsion

INTRODUCTION

Testicular torsion is a urological emergency requiring an emergent intervention. Testicular torsion occurs when there is twisting of the spermatic cord along a longitudinal axis, with possible resultant ischemia due to compromised blood flow to the testicle [1]. The extent of rotation of the cord and the time interval of torsion determines the outcome of testicular torsion [2]. Testicular torsion can occur at any age but commonly occurs soon after birth or between the ages of 12-18 years with a peak incidence at the age of 13-14 years [3]. The incidence of testicular torsion in patients below the age of 25 years is about 1 in 4000 [3]. In children, who present with acute scrotal pain, testicular torsion could be diagnosed in 10 to 15% of the patients [4]. The exact etiology of testicular torsion cannot be placed in every case. However, there are some predisposing factors. These factors include genetic factors (testicular hypermotility), environmental factors (cold weather), preceding trauma and the clapper-bell deformity [3]. The clinical features of testicular torsion include sudden onset of severe

testicular pain which may be associated with nausea, vomiting, scrotal swelling, testicular tenderness, erythema, a high riding testis [4]. For the diagnosis of testicular torsion, a combination of colour Doppler ultrasonography and high-resolution ultrasonography have been found to have high sensitivity and specificity [5]. Prompt recognition and treatment of testicular torsion ensures an increase in testicular salvage and subsequent consequential pathology such as testicular infarction and infertility [3]. Treatment of testicular torsion entails scrotal exploration, detorsion of the testis and orchidopexy. Following testicular torsion, the maximum duration for testicular salvage has been a subject of much debate. Sharp et al reported that time interval for the development of ischemia was 4 to 8 hours [4]. Whereas, Laher et al documented that a history of more than 10 hours between onset of symptoms and surgery is a very strong indicator of testicular non-viability [3]. There is paucity of data on testicular torsion in Nigeria. Hence, there is need for this study. The aim of this study was to evaluate our experience in the management of children who were treated for testicular torsion.

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MATERIALS AND METHODS

This was a retrospective study of children aged 15 years and younger who were managed for testicular torsion between January 2014 and December 2018 at the pediatric surgery unit of ESUTH Enugu, Nigeria. Children who had intermittent testicular torsions were included in the study. Patients who have had surgery for testicular torsion at a peripheral hospital before referral to ESUTH for reoperation were excluded from this study. Patients with torsion of the testicular appendages were also excluded from the study. ESUTH is a tertiary hospital located in Enugu, South East Nigeria. The hospital serves the whole of Enugu State, which according to the 2016 estimates of the National Population Commission and Nigerian National Bureau of Statistics, has a population of about 4 million people and a population density of 616.0/km². The hospital also receives referrals from its neighboring states. Information was extracted from the case notes, operation notes, operation register and admission-discharge records. The information extracted included the age, presenting symptoms, duration of symptoms before presentation, investigations performed, time interval between presentation and intervention, intra-operative finding, operative procedure performed, complications of treatment, duration of hospital stay and outcome of treatment. Diagnosis of testicular torsion was made based on clinical, radiological and intra-operative findings. The follow-up period was 12 months. Ethical approval was obtained from the ethics and research committee of ESUTH and informed consent was obtained from the patients' caregivers.

Statistical Package for Social Science (SPSS) version 21 (manufactured by IBM Corporation Chicago Illinois) was used for data entry and analysis. Data were expressed as percentages, median, mean, and range.

RESULTS

Patients' demographics

A total of 118 cases of pediatric scrotal explorations were performed during the study period but only 79 (66.9%) patients were confirmed to have testicular torsion at surgery and form the basis of this report. The remaining 39 (33.1%) scrotal explorations were for torsion of testicular appendages and were not considered in this report. Demographic features of the patients are shown in Table 1.

Table 1: Demographic characteristics of the patients (n=79).

Age group of the patients	
Neonate (less than one month)	8 (10.1%)
Older than one month	71 (89.9%)
Median age of the patients	9 years (2 weeks - 14 years)
Median duration of symptoms before presentation	2 days
Presented within 24 hours	10 (12.7%)
Presented between 24 and 48 hours	21 (26.6%)
Presented after 48 hours	48 (60.7%)
Mean time interval between presentation and intervention	6 hours (3-24)
Duration of hospital stay	5 (3-10)

Presenting symptoms

All the patients had testicular pain. Vomiting was present in 19 (24.1%) patients, abdominal pain 10 (12.7%) patients, scrotal swelling 8 (10.1%), and non-specific symptoms 5 (6.3%).

Associated anomalies

Six (7.6%) patients had undescended testis and 2 (2.5%) patients had hypospadias.

Investigations performed

Hematological Thirty-eight (48.1%) patients had hemoglobin level of less than 10 grams per deciliter (g/dl).

Imaging: Forty (50.6%) patients had ultrasound (with Doppler) of the external genitalia that confirmed twisting of the spermatic cord and state of testicular vasculature. Thirty-nine (49.4%) patients were taken straight to theatre without ultrasound investigation. The imaging investigation confirmed testicular torsion while the rest of the testicular torsions were confirmed at surgery.

Intra-operative finding, side involved and operative procedure performed: Twisting of the spermatic cord was confirmed in all the patients. However, the testis was found to be viable in 59 (74.7%) patients whereas 20 (25.3%) patients found to have non-viable testis. Testicular torsion involved the right side of the testis in 47 (59.5%) patients whereas 32 (40.5%) patients had their torsion on the left side. Patients with viable testis had bilateral orchidopexy and non-viable testes were removed (orchidectomy).

Complications of treatment

Fifteen (19%) patients had surgical site infection, 10 (12.7%) patients developed suture related complications such as stitch sinus and stitch granuloma. Recurrent torsion was seen in the ipsilateral testis in 2 (2.5%) patient.

Outcome of treatment

All the patients achieved full recovery and were discharged home. The 2 patients that had recurrent testicular torsion had a repeat orchidopexy which were successful. No patient developed testicular torsion during the follow period.

DISCUSSION

In 1810, Hunter described a typical case of testicular torsion and in 1840, Delasiauve presented the first case of surgically treated testicular torsion [6]. Lauenstein in 1894 published the first illustration of testicular torsion occurring in an undescended testis [6]. Orchidopexy as a surgical procedure in which the testis is anchored to the scrotal wall was first successfully performed in 1877 by Thomas Annandale [7].

Acute scrotum results from acute conditions of the testis or testicular appendage such as testicular torsion or torsion of the appendix testis. Testicular torsion accounted for two-thirds of all the cases of acute scrotum in the current series. Fujita et al in their series also reported testicular torsion as a more common cause of acute scrotum [8]. However, Ringdahl et al reported that torsion of the appendix testis is more common than testicular torsion [9]. The exact reason for these differences in findings is not known. The age group of the patients considered by the different studies may account for these findings.

Only a few of the patients in the current study were neonates. Majority were older than one month of age. The age distribution of testicular torsion is described as bimodal with one peak in the neonatal period and another peak is around puberty [10]. There are also reports of testicular torsion in children occurring in other age groups [11]. The mean age of the patients in the current study is comparable to the report of other studies [12,13]. Xiang reported a mean age of 5.7 years [14]. The mean age of testicular torsion varies from one group of patients to another [15]. The late presentation of our patients is manifest in the 2-days mean lag period between onset of symptoms and presentation. Poverty and lack of awareness on the part of the parents may explain this late presentation of the patients. Majority of the patients received treatment within hours of presentation. Delays, where they occurred, were due to time spent on investigations and procuring materials required for surgery. The length of hospitalization of children who underwent scrotal exploration for testicular torsion may depend on the extent of the procedure performed. The type of surgical procedure performed may determine the duration of stay of the patients in the hospital.

In the current study, testicular pain was the consistent symptom of testicular torsion in the patients. The pain of testicular torsion is of sudden onset and persists even when the patient sits down [16]. Testicular pain may be associated with nausea, vomiting and fever [17]. Atypical presentation and non-specific symptoms of testicular torsion can occur and may result in delayed diagnosis [3]. Other urogenital anomalies such as undescended testis and hypospadias may be associated with testicular torsion. This is consistent with the findings of the present study and other series on testicular torsion [18].

Baseline investigation such as hemoglobin estimation was done before the patients were taken to theatre. About half of the patients were found to have a hemoglobin level of less than 10g/dl. Poor nutrition and parasitic infestations common in developing countries like Nigeria may be responsible for the high number of anemic children. Following testicular torsion, Doppler ultrasound is required for the assessment of the testicular vascularity. Doppler ultrasound is the initial imaging modality employed in the evaluation of patients with suspected testicular torsion but the gold standard in the diagnosis of testicular torsion remains surgical exploration [18]. Other imaging modalities such as computed tomography scan, magnetic resonance imaging and scintigraphy may also be used for the evaluation of patients with testicular torsion. However, non-availability, cost and risk of radiation exposure limit their use in children.

One-quarter of the patients in the present study had non-viable testis. As a result, ipsilateral orchidectomy and contralateral orchidopexy were done. The high number of patients that underwent orchidectomy may be a reflection of the late presentation of the patients. Zvizdic et al reported that duration of symptoms is the only predictor of testicular salvage [10]. Howe et al found the degree of twisting and duration of symptoms as the prognostic factors of testicular salvage during testicular torsion [1,19]. Early presentation is advised to avoid testicular loss and other undesired consequences. In about three-fifth of the patients, the right testes were involved. The exact reason for this is difficult to explain. Obi et al reported more testicular torsions on the left testis [20]. Mukendi et al documented that left sided torsion was more frequent in patients younger than 16 years while right sided torsion was more frequent in those older than 16 years [21]. Treatment of non-viable testis following testicular torsion requires orchidectomy due to the

breach of blood-testes barrier that results in the production of anti-sperm antibodies that leads to male infertility [22].

Surgical site infection was the most common post-operative complication recorded in the index study. Other studies also reported surgical site infection as a complication of scrotal exploration for testicular torsion [23,24]. The proximity of the scrotum to the anal area may explain this high incidence of surgical site infection.

None of the studied patients in the current series expired. Other studies on testicular torsion also reported no mortality [25,26]. However, morbidity of testicular damage may occur if prompt treatment is not rendered.

CONCLUSION

Delays in presentation may have resulted in testicular damage in 25% of the patients in the present study. We recommend high index of suspicion in children who present with scrotal pain. Parents should be counseled on the dangers of late presentation. When there is doubt about the cause of scrotal pain, scrotal exploration should be undertaken.

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