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Factors influencing outcome in testicular torsion - A retrospective analysis from tertiary care center

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Introduction

Testicular torsion (TT) is an acute emergency where urgent surgical intervention is necessary to prevent orchidectomy. 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 age 13–14 years. The incidence of torsion in males below the age of 25 years is approximately 1 in 4000[1].

Testicular torsion can be intravaginal and extravaginal [2]. Intravaginal TT occurs when the testis twists completely within the tunica vaginalis [3]. This mechanism is the most common etiology and is usually seen in individuals with a bilateral anatomic defect known as the bell clapper deformity [3]. In extravaginal TT, there is a loose attachment between the tunica vaginalis and the scrotal wall early in prenatal development that increases the likelihood of the tunica vaginalis and its contents to twist around the spermatic cord, most commonly in the neonatal period [4].

Management is centered around prompt surgical exploration for every patient with a definitive diagnosis as well as those with inconclusive imaging due to the morbidity associated with delay in management [5]. Delayed intervention can result in permanent ischemic injury of the testis. Despite prompt diagnosis and orchidopexy, infertility remains a major issue after the treatment of testicular torsion. [6-7].

Irreversible ischemia from torsion begins in 6 hour from symptom onset and the likelihood of testicular salvage is the highest within the first 6 hours [5, 8]. Based on prior literature, treatment within 6 hour of symptom onset correlates with 90–100% chance of testicular salvage [9]. Treatment within 6–12 hour decreases salvage rates to 20–50%, and treatment in the 12–24 hour period affords only a 0–10% chance of testicular salvage [9]. If surgery is delayed more than 24 h following symptom onset, testicular non-viability is almost inevitable [10]. Developing country like India due to factors such as patient preference, ignorance about the severity of condition, poor educational status, low socioeconomic condition and access to surgical specialist capable of managing TT, over 2/3rd of patients with suspected TT had delayed presentation, which increases total time of ischemic damage and morbidity [8]. The aim of our study is to estimate the surgical outcome in TT patients and correlate it with duration of symptom from onset to presentation. We

hypothesied that delayed presentation of TT patients resulted in orchidectomy even at tertiary care center.

Methods

After Institutional Ethical Committe approval, a retrospective analysis of patient records at our center was performed of patients with diagnosis of testicular torsion from January 2017 to January 2021. Total of 20 patients were included in the study. Time from symptoms onset to presentation at our hospital was noted. We also studied laterality of affected testicle, residential location, socioeconomic condition and educational status of the patients.

The inclusion criteria were as patients with diagnosis of testicular torsion made by color Doppler ultrasound and confirmed intraoperatively. Patients with torsion of the testicular appendage were excluded.

After complete physical examination all patients underwent emergency colour doppler ultrasonographic evaluation to confirm the diagnosis and vascularity of affected testicles.

All patient underwent urgent surgical exploration of scrotum. Affected testes derotated and wrapped with warm saline gauze for 15 minutes to promote recovery of the blood circulation. Changes in testicular color were observed. Patients with gangrenous and non viable testes underwent orchidectomy and in viable testes orchidopexy was done. Contralateral testis had routine testicular fixation in all cases.

Statistical Analysis were performed as mean (SD) for continuous variables and frequencies (percentage) for categorical variables. Data were evaluated with IBM SPSS Statistics for Windows, Version 20.0, IBM Corp.

Results

The age at presentation was from the youngest being 5 years and oldest was 50 years. Mean age of patients was 18.4±10.47 years. Demographic characteristics of patients are shown in table 1. In this study 35% of patients were affected on the right testicle and 65% were affected on the left testicle. 60% of the patients were from urban area and 40% from rural area. 80% of the patients had completed their primary education. In this study, most of the patients belonged to poor and middle socioeconomic status, only 15% patients were from higher status group. Colour Doppler ultrasound was performed in all 20 patients prior to surgical intervention. Mean duration from symptoms onset to arrival at hospital for all patients were 20.8±15.26 hours, with range from 2 to 46 hour. Only 25% of the patients reached in hospital within golden period of 6 hour of symptom onset.

In this study orchidopexy was performed in 30% of the patients and orchidectomy in 70% cases. Surgical outcome based on demographic character are shown in table 2. Rate of orchidopexy was more in urban (41.66%), educated (31.25%) and high socioeconomic status (66.6%). In this study 45% of the patients were under 15 year of age, out of which 4(44.45%) patients undergone orchidopexy. 11 patient were more than 15 year of age, out of which orchidopexy was done in 2(18.18%) cases.

Surgical outcome according to duration of symptoms onset and patient presented in surgical OPD are described in table 3. Patients who present within 6 hour of symptoms onset, all undergone orchidopexy. Three patients reached between 6-12 hour duration, in which orchidopexy was done in one case (33.3%). Orchidectomy was done in rest 12 patients who reached after 12 hour of symptoms onset.

Discussion

Mean age of patients was 18.4±10.47 years with range from 5 to 50 year. We found a similar incidence with peaks in infancy and adolescence. Both peaks were the

time of appearance of primary and secondary sex characteristics. It may reflect the clinical distinction between extravaginal torsion in newborns and children.[11].

In this study rate of orchidopexy was more in urban (41.66%), educated and high socioeconomic status patients. This may probably due to available of better healthcare facility and transport in urban area. Educated and high socioeconomic status patients are more concerned about their health status so are more likely to early approach surgical specialist. In rural area and in lower social status people in India generally seeks medical advice from local (Jhola chhap and Neem Hakim) practitioners which causes delay in diagnosis and reduce the chances of testicular salvage. Patients who live in rural areas and presents to rurally located hospitals first require transfer and travel time that is more likely to result in delays in definitive management. Government health center located in rural area in India are staffed with MBBS doctors only and there is no or less availability of specialist surgeon. It is be a common reason for delayed referral in rural area.

In the US, Zhao et al.[12] reported that age, insurance type, and living area influence testicular salvage rate. This better salvage rate in Korea is presumed to be due to the result of small size of territory, densely distributed hospitals, and National Health Insurance of Korea (NHI). The NHI system initially offered plans with low premiums, low benefits, and low doctors' fees to contribute to eliminating inequities based on socioeconomic status. This approach improved access to medical services, eliminated gaps between urban and rural areas and between different classes with respect to the use of services.[13].

In this study, 45% of the patients were under 15 year of age, out of which 4(44.45%) patients undergone orchidopexy. 11 patient were more than 15 year of age, out of which orchidopexy was done in 2(18.18%) cases. In India persons generally show lack of awareness about their own health and ignore the initial symptoms but they are more concern about their children. This may be a reason that in this study patients below 15 year of age have more chances of orchidopexy as compared to older patients.

In the United States, four studies reported testicular torsion and testicular salvage rate in relation of age. Cost et al.[14] reported a 68.1% salvage rate from patients aged 1-17 yr old and Zhao et al.[12] reported 58.1% salvage rate in patients <18 yr of age. Mansbach et al.[15] reported a 66.6% salvage rate in patients ≤25 yr of age. Cummings et al.[16] studied testicular salvage rate in age group of 17-20 and 21-34 year. The salvage rate differed with 70.3%, of testes salvaged in the younger group versus only 41% in the older group

This study focuses on the relationships between duration of symptoms onset to presentation in surgical OPD of our hospital and surgical outcomes in patients with testicular torsion. The hypothesis that patients who presented late to our hospital would have a longer delay in surgical intervention and a higher rate of orchiectomy. In this study patients who presented in OPD within 6 hour of symptoms onset, all underwent orchidopexy. Three patients reached between 6-12 hour duration, in which orchidopexy was done in one case (33.3%). Orchidectomy was done in remaining 12 patients who reached after 12 hour of symptoms onset.

Time is important for treating testicular torsion. Testicular ischemic necrosis due to testicular torsion is related to the duration and angle of torsion. Anderson et al.[17] showed that testicular necrosis occurred in 4% of patients with a duration of testicular torsion <12 hours, while testicular resection was

required in 75% of cases with a duration of testicular torsion >12 hours.

One study showed that the median duration of symptoms was 12 hours in testes that could be preserved and 90 hours in testes that had to be removed.[18] It generally believe that the maximum time limit for salvage of testis is 6 hours.

Gatti and Murphy[19] reported the relationship between testicular torsion and duration. They found that 90% to 100% of testes were retained if treatment was implemented within 6 hours of testicular pain and 20% to 50% of testes were retained if treatment was implemented within 6 to 12 hours of testicular pain. Furthermore, the retention rate was reduced to 20% if treatment was implemented at >12 hours of testicular pain, and the retention rate was 0% if treatment was implemented at >24 hours after testicular pain. Sheldon[20] believed that survival of the testes could be up to 95% if the testes were treated at <4 hours after the onset of symptoms, and could be reduced to 90%, 80%, 40%, and 10% if the testes were treated at <8, <12, <24, and >24 hours after the onset of symptoms, respectively.

One study implemented a standardized protocol called “Straight to the Operating Room” with a goal of reducing time to surgery, decreased hospitalization costs, and less overall testicular loss [8]. We followed the same approach.

These results suggest the need for community and rural based clinician’s education on recognizing the signs and symptoms of testicular torsion.

Limitations of the study:The main limitation is that it is retrospective study. Any retrospective study design may lead to sampling errors or selection bias. Second is the small sample size. Third, there are no follow up data. Therefore, further studies with a large sample size are required.

Conclusions

Delayed presentation of patients with TT have higher rates of orchiectomy. These results imply that patients who live in rural areas are less educated and from poor or middle socioeconomic status may have an increased likelihood to face negative outcomes. This study highlights the need for streamlined access to prompt expert surgical care and improved knowledge in rural areas to minimize the morbidity associated with delay.

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Legend Tables

Table 1: Demographic character of patients

Mean age (range)	18.4±10.47(5-50) years
Mean duration from symptom onset	20.8±15.36 (2-46) hour to presentation in surgical opd
Laterality	
Right	7(35%)
Left	13(65%)
Residential location	
Urban	12(60%)
Rural	8(40%)
Socioeconomic status	
High	3(15%)
Middle	8(40%)
Poor	9(45%)
Education	
Literate	16(80%)
Illiterate	4(20%)

Table 2: Surgical outcome based on demographic character

		Orchidopexy	Orchidectomy
Age of Patients (Years)	<15 year	4(44.45%)	5(55.55%)
	>15 year	2(18.18%)	9(81.82%)
Residential location	Urban	5(41.66%)	7(58.34%)
	Rural	1(12.5%)	7(87.5%)
Socioeconomic status	High	2(66.67%)	1(33.33%)
	Middle	3(37.5%)	5(62.5%)
	Low	1(11.11%)	8(88.88%)
Educational status	Literate	5(31.25%)	11(68.75%)
	Illiterate	1(25%)	3(75%)

Table 3: Surgical outcome based on duration of symptoms onset and patient presented in surgical OPD

Duration	Number of Patients	Orchidopexy	Orchidectomy
<6 hour	5	5(100%)	0
6-12 hour	3	1(33.33%)	2(66.67%)
12-24 hour	4	0	4(100%)
>24 hour	8	0	8(100%)