

Testicular torsion - symptomatology and outcomes of 101 scrotal explorations

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Abstract

Objective: The objective was to study the symptomatology of testicular torsion of patients operated in our hospital and their operative results in relation to the duration of symptoms.

Materials and Methods: Data of all patients operated for acute scrotum at all ages over a 14 months' time were collected from hospital records. Symptomatology and operative results were studied.

Results: Out of 101 consecutive scrotal explorations done in this time, 63.4% of all scrotal explorations were testicular torsion ($n = 64$). 22.8% were appendage torsion ($n = 23$) and 13.9% were epididymo-orchitis ($n = 14$). The peak age of testicular torsion was in the 11–15 years range and the left side is more common (65.6%). Symptoms of scrotal pain (92.2%), abdominal pain (18.8%), nausea/vomiting (18.8%), fever (9.4%), and urinary symptoms (3.1%) were seen in decreasing order of frequency. Among acute scrotum patients who had symptoms of nausea/vomiting or abdominal pain, testicular torsion was found to be significantly higher compared to those who did not have these symptoms ($\chi^2 = 0.044$, $P < 0.05$). In all cases presented within 6 h of symptom onset, testicles were saved and salvage rates reduced with delay in presentation. The testicular salvage rates were 28.1% (18 out of 64 torsions). Patients below 18 years had more chance of going for orchiectomy than others (75% vs 66.7%). Patients who presented after 24 h had a statistically significantly lower salvage rate of 7.7% compared to those who presented within 24 h duration, 52.2% ($\chi^2 = 0.001$, $P < 0.05$). Those with orchiopexy had a median duration of symptom of 6.5 h and the same for orchiectomy patients were 72 h. Our median symptom duration for testicular torsion was 36 h and it is higher than many other countries.

Conclusions: Delay in presentation to the health-care facility is the major cause of poor salvage rates in the state and its improvement requires public health interventions and health education.

Keywords: Orchiectomy, scrotal exploration, testicular torsion

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Received: 05.09.2020, **Accepted:** 21.12.2020, **Published:** 18.04.2022.

INTRODUCTION

Testicular torsion is a surgical emergency where the testicles twist inside the scrotum with spermatic cord vessels getting occluded and gangrene of the testicle appears.

In 100,000 male population aged <25 years, 4.5 cases of torsion occur per year in the United States of America which is more than the incidence of testicular tumors.^[1] This presents with acute onset scrotal pain and associated

Access this article online	
Quick Response Code:	Website: www.urologyannals.com
	DOI: 10.4103/UA.UA_142_20

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How to cite this article: Murali TV, Jaya KV, Kumar R. Testicular torsion - symptomatology and outcomes of 101 scrotal explorations. *Urol Ann* 2022;14:167-71.

symptoms of abdominal pain, nausea, vomiting, and fever.^[2] Other differential diagnoses of acute scrotum include torsion of testicular or epididymal appendages, epididymo-orchitis, inguinal hernia, hydrocele, varicocele, testicular trauma, and other rare causes.^[3] As time progresses after the onset of symptoms testicles develop irreversible damage and at exploration may end up doing orchiectomy for gangrenous ones. Bell clapper deformity, horizontal lie, and Long mesorchium are the commonest found anatomical abnormalities and a genetic component is also suggested.^[4-6] During exploration for testicular torsion orchiopexy is done if testicles are viable, and orchiopexy is done on the normal side in all cases as the anatomical and other etiologies leading to torsion are usually bilateral.^[4] The appendix testis and appendix epididymis are the embryological remnants of the Mullerian and Wolffian systems respectively and can be excised if found torsed. In developing countries lack of public awareness and limited health-care access increases the time delay in hospital presentation further worsening the testicular salvage rates. In this scenario, we are studying the symptomatology, testicular salvage rates, and delay in presentation in a tertiary care center.

MATERIALS AND METHODS

This study was conducted in a tertiary care medical college hospital in India. Data regarding acute scrotum cases operated in the institution were collected from hospital case records using semi-structured proforma. There was no age restriction for study participants. Patients who had undergone exploration for acute scrotum were included in the study and those who were conservatively managed for acute scrotum were excluded. After obtaining ethical committee approval from the institution, the study was initiated. As per hospital protocol children <12 years with acute scrotum presented to pediatric surgery emergency whereas all cases of more than 12-year children and adults were managed in the General Surgery Emergency Department. Doppler evaluation was not done in all cases. In acute scrotum cases of high clinical suspicion of torsion testis, they were operated directly without Doppler evaluation. In patients with acute scrotum which clinically were suggestive of other differential diagnosis and torsion was less likely were evaluated with Doppler. The decision to explore was a clinical decision by the treating surgeon on a case-to-case basis. A urine evaluation was done in some of them especially when symptomatology is equivocal or epididymo-orchitis is suspected.

The information collected were age, symptomatology, side of pain, history of trauma, duration of symptoms, the result

of exploration and type of procedure done, and hospital stay. Adults and elder children were operated under local anesthesia and younger children under General anesthesia. After scrotal incision and opening the tunica vaginalis sac testis are examined. In cases of epididymo-orchitis, no procedure was done and the wound closed after a wash. In cases of appendage of testis or appendage of epididymis torsion, the torsed appendage was excised. In torsion testis, after exploration and confirmation of the diagnosis intra-operative detorsion was done and testicles were assessed for vascularity. Grossly gangrenous testicles were excised (orchiectomy) and those with questionable viability were observed with warm mop packs around it during surgery for some time before opting for orchiectomy. Orchiopexy is done in all cases of the saved testis to prevent further occurrence of torsion. This is done generally by means of nonabsorbable sutures fixing the tunica albuginea with the scrotal wall and there are some differences in surgical techniques of fixation among different surgical units and pediatric surgeons. While operating on one side testicular torsion, the other side testis is also explored and orchiopexy is done.

RESULTS

Hundred and one cases of scrotal explorations were done in this time including a bilateral torsion. Among them 63.4% ($n = 64$) cases turned out to be testicular torsion, 22.8% ($n = 23$) were appendage torsion and 13.9% ($n = 14$) were epididymo-orchitis [Figure 1]. Out of all testicular torsions, the youngest was 7 months old and the eldest was 49 years of age. Below 18 years constituted 62.5% ($n = 40$) of the torsion cases in this study. The peak age of incidence of torsion was found to be in the 11–15 years range followed by 16–20 years [Figure 2]. The median age of testicular torsion in this series is 16.5 years [Table 1]. Appendage torsion was seen in only children below 12 years with a median of 8 years. In testicular torsion 65.6% (42 out of 64) were left sided,

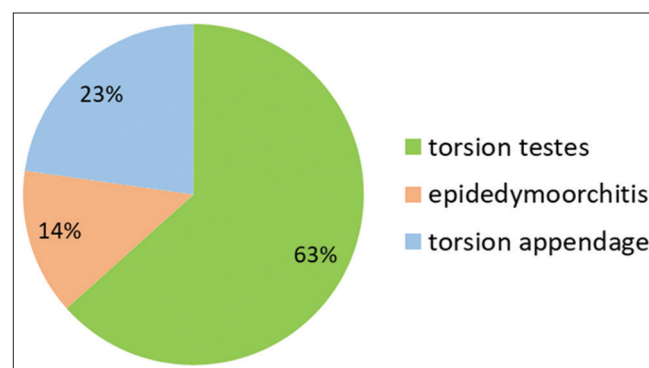


Figure 1: Diagnosis of the acute scrotum on exploration

whereas in torsion appendage almost equal on both sides. Left side 52.2% (12 out of 23).

The symptoms seen in testicular torsion were in the order of decreasing frequency scrotal pain (92.2%), Abdominal pain (18.8%), vomiting (18.8%), fever (9.4%), and urinary symptoms (3.1%). Abdominal pain and vomiting were the second most common presentation [Table 2]. Abdominal pain was the major symptom in those patients where scrotal pain was absent or less. Out of all patients with pain abdomen, only one had a nontorsion diagnosis (appendage torsion), similarly of all the patients with nausea and vomiting, only one patient had a nontorsion diagnosis (epididymo-orchitis). Among acute scrotum patients who had symptoms of nausea/vomiting or abdominal pain, testicular torsion was found to be significantly higher compared to those who did not have these symptoms ($\chi^2 = 0.044, P < 0.05$). Four patients with torsion had history of trauma (6.2%). In cases of epididymo-orchitis, the second most common symptom after scrotal pain was fever.

Out of 64 cases of testicular torsion 46 underwent orchiectomy and 18 underwent orchiopexy. The testicular salvage rates were 28.1%. Half the patients with symptoms of abdominal pain and vomiting had testicles salvaged but in the less common symptoms of fever and urinary symptoms, they had zero salvage. In all four patients with trauma history, testis was gangrenous and orchiectomy was done.

Data on time duration of symptoms were available only in 49 cases out of 64 torsions. In testicular torsion, the median symptom duration was 36 h. Those who had <6 h of symptom duration had the best results – all testicles were saved. As time progressed salvage rates went down [Table 3]. Orchiectomy rates were higher in the below 18 age group 75% compared to 66.7% in the above 18 years. Those torsion patients who presented after 24 h

had a statistically significantly lower salvage rate of 7.7% compared to those who presented within 24 h, 52.2%. ($\chi^2 = 0.001$, odds ratio of 0.076, 95% CI: 0.015–0.401, $P < 0.05$), [Table 4]. Bilateral torsion was there for a 17-year-old where the pain started on the right side 12 days back and pain appeared in the left side half a day back before presenting to the emergency department. On exploration, he was found to have bilateral testicular torsion with right side gangrenous. Right orchiectomy and left orchiopexy were done. For patients who underwent orchiopexy median duration of symptoms was 6.5 h compared to orchiectomy median of 72 h. In testicular appendage or epididymal appendage torsion, the median symptom duration was 72 h (data available in 18 out of 23 cases) and even the earliest presented patient was 8 h after symptom onset. The mean hospital stay was 3.1 days for testicular torsion, 2 days for epididymo-orchitis, and 1.31 days for torsion appendage.

DISCUSSION

In cases where testicles twist inside the tunica vaginalis sac is called intravaginal torsion and it is the commonest variant. Extravaginal torsion happens in the antenatal or early postnatal period when the processes vaginalis twists together with testis.^[7] After surgical detorsion and resolution of supply, the testicles inside the tunica albuginea have high pressures inside suggested by the name testicular compartment syndrome, a damage sufficient enough to produce lesser size testis and reduced spermatogenesis.^[8-10] All the cases in this series were intravaginal torsions. There was a left sided predominance in testicular torsion (65.6%). The only symptom included in the Testicular Workup for Ischemia and Suspected Torsion score which helps in torsion diagnosis is

Table 1: Mean and median age of torsion, epididymo-orchitis, and appendage torsion

Diagnosis	n=101	Median	Mean±SD (years)
Torsion	64	16.5 years	18.1±8.5
Epididymo-orchitis	14	8 months	8.4±13.2
Torsion appendage	23	8 years	7.9±3.9

SD: Standard deviation

Table 2: Symptom distribution in relation to diagnosis

Diagnostic group	Scrotal pain	Abdominal pain	Fever	Vomiting/nausea	Urinary symptoms
Epididymo-orchitis. (n=14)	13	0	4	1	0
Torsion appendage (n=23)	23	1	2	0	0
Torsion testis (n=64)	59	12	6	12	2

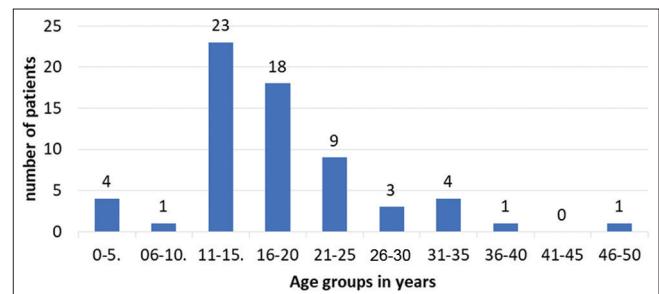


Figure 2: Age distribution of testicular torsion

Table 3: Testicles saved in relation to the symptom duration

Symptom duration (h) (n=49)	Testicular salvage, n (%)
1-6 (n=7)	7 (100)
7-12 (n=7)	4 (57.1)
13-18 (n=5)	0 (0)
19-24 (n=4)	1 (25)
25-48 (n=7)	1 (14.2)
>48 (n=19)	1 (5.2)

Table 4: Outcome of surgery compared to symptom duration <24 h and >24 h

	Procedure		Total
	Orchiectomy	Pexy	
<24 h			
Patients	11	12	23
Percentage in group	47.8	52.2	100
>24 h			
Patients	24	2	26
Percentage in group	92.3	7.7	100.0

nausea/vomiting.^[11-13] Our data also suggest that among all symptoms in the acute scrotum, nausea/vomiting along with abdominal pain had the most statistically significant relation to testicular torsion. Intermittent torsion is an entity where there is acute onset torsion and pain followed by spontaneous detorsion with the relief of symptoms.^[14,15] In our data set, there were a few cases of delayed presentation of the acute scrotum which on exploration were torsed but viable after surgical detorsion. The maximum duration of such presentation was 180 h. Survival of the testicles after the prolonged symptom duration can be explained by spontaneous detorsion and recurrent torsion and the history of symptom relief in between may have been overlooked.

Molokwu *et al.* report a median age of 15 years for testicular torsion in their series of 173 scrotal explorations.^[16] This matches with our findings of peak incidence in the 11–15 years range. In our series, the median age of testicular torsion is 16.5 years and the mean is 18.1 years (standard deviation ± 8.5). Abdominal pain as the presenting symptom in testicular torsion has a higher rate of testicular loss.^[17] In our study, there was no increased rate of testicular loss with pain abdomen, though that was the second most common symptom of presentation. History of trauma does not exclude a torsion testis.^[18] Four of our patients with testicular torsion had history of trauma and all had testicular ischemia requiring orchiectomies. Manual detorsion was classically described toward the lateral direction (open book) as the twist is toward the medial aspect. But some studies have confirmed that a good number of cases have the lateral direction for torsion.^[19] Our institution protocol was to proceed with emergency exploration if the testicular torsion is suspected and in

none of these cases manual detorsion was done before exploration.

Zhao *et al.* report an incidence of 42% of orchiectomies in operated cases of testicular torsion from a national database, USA.^[20] 26% orchiectomies are reported from Taiwan and a salvage rate of 76% was reported from Korea, whereas salvage rates reported from china were 30%.^[21-23] Our testicular salvage rates were 28.1%, Out of 64 torsion testes only 18 could be saved which is much below that of the above said countries. Delay in hospital presentation seems to be the major factor responsible for this low salvage rate. The mean duration of pain in the USA was 4 h (40 min to 12 h) as reported by Jefferson *et al.* and that study quoted a salvage rate of 61%.^[24] Barada *et al.* from new York report a delay of 20 h for those below 18 years of age making them a target population for education regarding testicular health.^[25] When compared to these, our median symptom duration of 36 h is definitely high for testicular torsion. Surgical salvage is inversely proportional to the duration of pain.^[26] Less than 6 h has the maximum chance of salvage and chances decrease as time progress.^[27] In our study the difference in mean of the duration of symptom in orchidectomy done patients and orchidopexy done patients were 62.6 h. Our testicular salvage rates are poor and the delay in the presentation which is high seems to be the major culprit. As below 18 years, patients have shown higher rates of orchiectomies (75%) we support that they are the primary targets of health education in this regard.

Testicular torsion is one of the major cases in malpractice lawsuits.^[28] Unless presented early there is a chance of gonadal loss and attending doctors should be aware of the legal side of these scenarios where time matters most.^[29] Duration of symptoms is more important than the time to treat that hospital takes.^[30] Results in our study is an evidence suggesting that the salvage of testicles is influenced by the duration of symptoms. Hence, though quality improvement to reduce the time to treat in hospital is an important factor, the results depend on the duration of symptoms and hence indirectly pointing to the awareness in public and access to health facility deciding the salvage rate. Lack of private insurance is a factor increasing the orchidectomy rates.^[31] Indirectly, this shows the difficulty in health access being a factor. In developing countries poor socioeconomic status of the patient population, nonavailability of easy health-care access, and poor knowledge of the testicular health contributes to the higher rates or orchiectomies.

CONCLUSIONS

This study helps us to define the exact delay in presentation after the onset of symptom in our part of the country

leading to the low testicular salvage rates compared to developed nations and thus directing us to formulate better policies in public health and awareness in testicular health.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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