



Abdominal pain in teenagers: Beware of testicular torsion

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ABSTRACT

Background/Purpose: Testicular torsion (TT) remains an important cause of testicular loss. Subtle presentations, such as abdominal pain, may be responsible for late diagnosis and increased testicular loss. This study assesses the influence of pain onset location over testicular outcome.

Methods: Data of children 17 years and younger submitted to surgical treatment for TT by our department from January 2017 to December 2018 were collected. Demographics, clinical presentation and outcome were reviewed.

Results: 73 patients (median age of 15.3 years old) were included in the study. 22% (16/73) patients presented with abdominal pain. When compared to patients with initial testicular pain, patients with abdominal pain showed a significant delay in TT diagnosis/treatment (median pain duration of 36 h vs 5 h) and a significantly higher rate of testicular loss [81% (13/16) vs 4% (2/57), $p < 0.001$]. The majority of testicular losses (68%, 13/19) occurred in patients with abdominal pain. In patients with abdominal pain, TT was initially overlooked in 69% (11/16) of cases, resulting in 81% (9/11) gonadal loss; none of these 11 patients were initially evaluated by a surgeon. All patients with testicular pain were evaluated in order to exclude TT.

Conclusions: Abdominal pain is a frequent presentation of TT, being an important cause of delayed diagnosis/treatment and associated higher testicular loss rate.

Type of study: Treatment study.

Level of evidence: Level III.

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Testicular torsion (TT) remains an important cause of testicular loss in adolescent males [1]. As this outcome is time-related, many strategies have been used to improve the results, namely early referral to a pediatric surgical center of all the cases of testicular pain; immediate surgical exploration and/or manual detorsion during first clinical assessment of acute scrotum [2,3].

Although all of the above strategies have improved the outcome of patients with TT, some more subtle presentations could be neglected and result in delayed diagnosis and a high rate of testicular loss.

The aim of this study is to evaluate the influence of pain onset location over testicular outcome in TT.

Herein we stress the importance of including abdominal pain as a frequent presentation of TT and we clearly demonstrate that not performing a testicular examination in boys presenting with abdominal pain increases testicular loss.

1. Materials and methods

A retrospective study was performed of data of all pediatric patients (aged 0 to 18 years) surgically treated for TT in our emergency department (ED) between January 2017 and December 2018. Our ED is the only in the region with a pediatric surgery/pediatric urology team on call every day, 24 h /day. It covers 2.5–3 million inhabitants.

Individual patient data were obtained from electronic medical records. Data collected included patient's demographics, initial clinical presentation, physical examination, emergency Doppler ultrasound (DUS), operative findings and presence of gonadal atrophy during follow-up.

The diagnosis of TT was confirmed by scrotal exploration in all cases. All excised testicles underwent pathology examination that confirmed testicular necrosis.

Testicular loss comprehended patients that underwent emergent orchiectomy and those who developed testicular atrophy during follow up.

A comparison between patients that presented with abdominal pain versus testicular pain as the main complaint was performed.

A limitation of this study is possible information bias. Data concerning the clinical presentation were obtained from the clinical

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Table 1
Patients' demographics and outcomes.

	Total (n = 73)	Abdominal pain (n = 16, 22%)	Testicular pain (n = 57, 78%)	Abdominal vs testicular pain (P value)
Age, years (median, range and [IQR])	15.3 [5–17] [13.5;16.3]	15.4 [11–17] [13.8;16.5]	15.1 [5–17] [13.5;16.3]	.75
Pain duration, hours (median [IQR])	5 [3.0;15.0]	48 [16.5;72]	5 [2;6]	<.001
Affected testicle, No. (%)				.089
Right	35 (48)	11 (69)	24 (42)	
Left	38 (52)	5 (31)	33 (58)	
Type of pain onset, No. (%)				<.001
Sudden	59 (81)	5 (31)	54 (95)	
Gradual	14 (19)	11 (69)	3 (5)	
Orchiectomy/Atrophy, No. (%)	15 (21)	13 (81)	2 (4)	<.001

IQR: interquartile range.

records. No personal data from patients were collected, so there were no ethical implications.

Categorical variables were compared with Fisher's exact test; continuous variables, expressed as median [interquartile range (IQR)], were compared using two-tailed unpaired U Mann–Whitney test. The significance level was set at 0.05.

2. Results

In the selected study period, a total of 84 patients underwent emergent surgery for testicular torsion. Four patients were excluded owing to undescended testis and neonatal presentation. Seven patients were excluded owing to lack of information about the precise location of pain onset.

Hence, the data of 73 patients were analyzed. Patients' demographics and outcomes, and data comparing patients that presented with abdominal pain or testicular pain, are presented in Table 1. Nearly 22% of patients (16 boys) presented with abdominal pain.

There were no cases of TT overlooked owing to a negative DUS.

Table 2
Misdiagnosed patients.

Patient number	Age (years)	Site of first evaluation	Time until medical evaluation (hours)	Abdominal US?	Scrotal DUS?	Presumptive diagnosis	Discharge destination	Time between medical and surgical evaluation (hours)	Gonadal outcome
1	13	E.D.	Day of pain onset ^a	Yes, mesenteric adenitis	No	Mesenteric adenitis	Home	48	Loss
2	11	E.D.	24	No	No	Nonspecific abdominal pain	Home	48	Loss
3	11	E.D.	Day of pain onset ^a	No	No	Constipation	Home	15	Loss
4	14	E.D.	72	No	No	Nonspecific abdominal pain	Home	72	Loss
5	13	G.P.	48	No	No	Nonspecific abdominal pain	Home	24	Survival
6	15	E.D.	0	Yes, mesenteric adenitis	No	Mesenteric adenitis	Home	17	Loss
7	16	G.P.	24	No	No	Scrotal edema	Home	72	Loss
8	17	E.D.	Day of pain onset ^a	No	No	Acute appendicitis	Pediatric surgery center	7	Survival
9	16	E.D.	Day of pain onset	No	No	Constipation	Home	72	Loss
10	17	E.D.	Day of pain onset ^a	Yes, normal	No	Constipation	Home	20	Loss
11	17	E.D.	Day of pain onset ^a	No	No	Nonspecific abdominal pain	Home	168	Loss

US, ultrasound; DUS, Doppler ultrasound; E.D., emergency department; G.P., general practitioner; NSAID, nonsteroidal anti-inflammatory drug.

^a Precise time of evaluation since pain onset unknown.

Time to diagnosis was significantly higher in patients presented with abdominal pain ($p < .001$) (Table 1).

During emergency surgical exploration, orchiectomy was done in 8 cases, all in patients that presented with abdominal pain. After a median follow up of 16 [5–28] months, further 7 gonads had suffered atrophy. As presented in Table 1, global gonadal loss rate was 20.5% (15/73), 81% (13/16) in the group presenting with abdominal pain versus 2% (4/57) in the group presenting with testicular pain ($p < .001$). There were no relevant postoperative complications.

During initial evaluation of the 16 patients with abdominal pain, the pain was ipsilateral to the torsed testicles in all cases; nine patients had nausea and/or vomiting associated, and of these only 1 had a salvageable gonad; only one boy did not show scrotal edema; preoperative manual detorsion was attempted in 6 cases, but all were unsuccessful; four boys underwent immediate scrotal exploration without previous DUS.

The majority of patients with abdominal pain onset (87.5%, 14/16) had been previously evaluated by a medical doctor (either in another ED or by the General Practitioner / Family doctor), and only 3 patients were immediately referred to our hospital in order to exclude TT. One patient was referred owing to acute appendicitis suspicion, and then TT diagnosis was made by a pediatric surgeon.

So, 11 male teenagers that presented with lower abdominal pain did not have scrotal evaluation done at the initial presentation and were initially misdiagnosed (Table 2). The main diagnosis was constipation and nonspecific abdominal pain. They were not referred to an ED with pediatric surgery availability in order to confirm/exclude TT. This resulted in a gonadal loss of 81.8% (Fig. 1) in this group of patients.

When comparing abdominal with testicular pain onset, abdominal pain resulted in higher chance of gonadal loss (Odds Ratio 178.75 with [22.99–1390.02] 95% confidence interval and $p < .0001$).

3. Discussion

Abdominal pain is a known possible presentation of TT but if there are still cases of testicular loss owing to lack of testicular examination in these patients, it should be addressed to the medical community. [4–8]

The differential diagnosis of abdominal pain in children varies widely, with main etiologies coming from intraabdominal causes (such as constipation, enteritis or peritonitis). However, extraintestinal

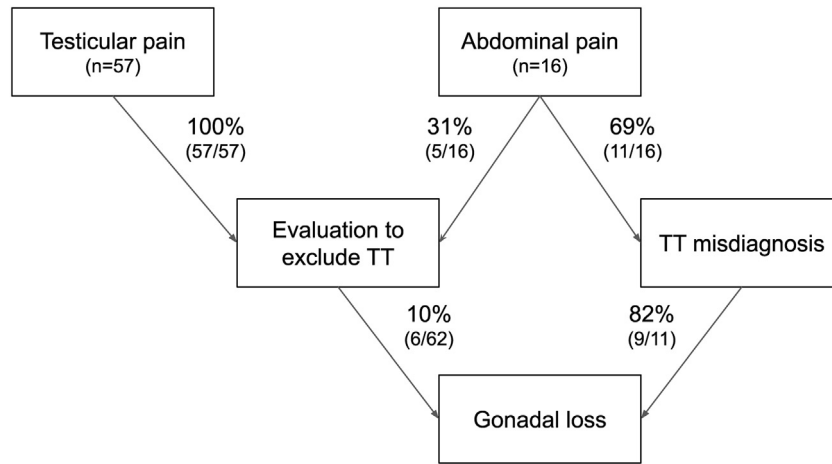


Fig. 1. Clinical presentation and gonadal loss.

pathologies may lead to abdominal pain, for instance pneumonia or mesenteric adenitis secondary to tonsillitis [9].

Nevertheless, one must not forget that also scrotal pathology may also lead to abdominal pain. In fact, our results show that more than 20% of patients with TT present initially with abdominal pain, which comes in line with some previous published data (7% to 28%) [10]. The extrascrotal pain in TT is explained by simple anatomy: the testicle is innervated by T10 and T11 spinal segments, but the scrotum is supplied by L1 anteriorly and S2–S3 in its posterior aspect; moreover, the twisted spermatic cord may pull and stimulate the parietal peritoneum [8].

The majority of patients complaining of abdominal pain are initially evaluated by general practitioners or pediatricians. A report on testicular torsion malpractice showed that the most common claim for a breach of the standard of care was a delay for a referral to the emergency room and failure to do a testicular examination on first presentation [11]. Findings on physical examination like scrotal edema/redness, absent cremasteric reflex and testicular tenderness and horizontal positioning are crucial to immediately suspect and treat TT, preventing gonadal loss.

Since testicular salvage in TT is inversely correlated with duration of symptoms [12], one must not forget that TT may also present as abdominal pain, masking TT and delaying its treatment, lowering gonadal salvage rates. In 1986, Corbett appealed to genital examination in young males presenting with abdominal pain in order to confirm/exclude TT [9], and has been sporadically reinforced [4–8]. However, it seems that nowadays this remains undermined: there are scarce reports in literature about TT misdiagnosis [4,5,8].

So, with the present study, we aim to reinforce the need to further alert the medical community to this reality: abdominal pain onset may mask TT and lead to high rates of gonadal loss.

4. Conclusion

Isolated abdominal pain may mask nearly 20% of testicular torsion cases. These patients, who lost their testicle, were sent to hospital “too late”. Medical community must be further aware of this, and we strongly recommend that all young males presenting lower abdominal pain should have immediate genital examination in order to exclude/confirm testicular torsion.

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