

## **Paediatric Testicular Torsion - Clinical Evaluation and Role of Doppler Ultrasound**

Raed Hameed Al-Marzooq, MD, FRCSI\* Amal Ahmed Noor Al-Rayes, MD\*  
Fadi Mirza Altawash, MD\*\*

**Aim:** To investigate the symptoms and signs associated with testicular torsion and to study the role of Doppler ultrasound in the diagnosis of such a clinical entity in the pediatric age group.

**Design:** A retrospective study.

**Setting:** Salmaniya Medical Complex.

**Methods:** All patients younger than 16 years who presented with acute scrotum at Salmaniya Medical Complex between 1990 and 2000 were evaluated retrospectively. All symptoms, signs and laboratory findings related to acute scrotum were recorded. The findings of Color Doppler ultrasound were documented.

**Results:** A total of 123 patients were studied. Scrotal exploration was performed in 87 (70.7%) patients, 25 (20.3%) were found to have testicular torsion. Doppler ultrasound was performed in 41 (33.3%) patients, 11 of them underwent scrotal exploration for doubtful findings on Doppler ultrasound. Among these, testicular torsion was evident in six. The Doppler ultrasound had a sensitivity of 66.7% and a specificity of 94.3%.

**Conclusion:** Symptoms and signs that are strongly related with testicular torsion are sudden onset of persistent pain, unilateral swelling, testicular tenderness, testicular retraction, scrotal skin changes, tender and thickened spermatic cord. The presence of these symptoms and signs should alert the physician for the need of scrotal exploration. Color Doppler ultrasound is an excellent adjunctive investigation in situations where the clinical evaluation is doubtful or of low suspicion.

*Bahrain Med Bull 2003;25(4):*

An acute scrotum represents a diagnostic dilemma. Testicular torsion remains of primary concern to the caring physician because, if it is not corrected within 6 hours the testis may not be salvageable. Testicular salvage is critically dependent on the interval between onset of pain and surgical intervention<sup>1</sup>. Therefore, a high index of

---

\* Senior Resident

\*\* Clinical Attache

Department of Surgery  
Salmaniya Medical Complex  
Ministry of Health  
Kingdom of Bahrain

suspicion is warranted in dealing with this subject and any clinical symptom, sign or trend that will help expedite diagnosis and treatment is desirable<sup>2</sup>. Although Color Doppler ultrasound has been reported to be useful in ruling out testicular torsion in children, some investigators continued to report false positive and false negative results<sup>3</sup>.

In a paper presented by Kass et al; they have concluded that the majority of children with acute scrotum did not require immediate surgical exploration, Color Doppler ultrasound can reliably identify those children with an acute scrotum who require scrotal exploration and spare the majority needless surgery. Routine scrotal exploration is no longer necessary for all children with acute scrotum<sup>4</sup>. Lerner et al, recorded that Color Doppler ultrasound can accurately relate anatomy and perfusion, and may prove to be the definitive imaging technique for the diagnostic evaluation of acute scrotum<sup>5</sup>.

This study aims to investigate the various symptoms and signs associated with testicular torsion and to study the role of Doppler ultrasound in the diagnosis of such a clinical entity in the pediatric age group.

## **METHOD**

The records of all patients younger than 16 years who presented with acute scrotum at Salmaniya Medical Complex between 1990 and 2000 were evaluated retrospectively. The following information was included: age, pain, mode of onset, duration, presence of swelling, fever, urinary symptoms, abdominal pain, vomiting, skin changes, testicular tenderness, testicular retraction, testicular axis of lie, presence of hydrocele, cremastic reflex, cord thickness and tenderness, transillumination of scrotum, presence of leukocytosis and abnormal urine specimen microscopic examination. The findings of Color Doppler ultrasound were documented. Three types of patients were identified: (1) Those who were operated on directly for marked clinical features suggestive of testicular torsion. (2) Those who had doubtful clinical findings and were subjected to Doppler ultrasound examination and managed either by surgery or observation. (3) Those who had not enough clinical evidence of testicular torsion and were put under observation. The sensitivity and specificity of Doppler ultrasound in the diagnosis of testicular torsion was based on the operative findings, one week and three weeks follow up.

## **RESULTS**

A total of 123 patients were studied. Scrotal exploration was performed in 87 (70.7%) patients, 25 (20.3%) were found to have testicular torsion. Doppler ultrasound was performed in 41 (33.3%) patients, 11 of them underwent scrotal exploration for doubtful findings on Doppler ultrasound. Testicular torsion was evident in six. The mean age of presentation was 6.7 years.

The symptoms that significantly associated with testicular torsion were pain 25/25 (100%); especially of abrupt onset 15/16 (93.8%) and of persistent nature 16/17 (94.1%), and swelling 22/24 (91.7%). Among previous patients, absence of urinary complaints 21/23 (91.3%), absence of history of fever 20/24 (83.3%) and absence of

history of abdominal pain 17/21 (81%) were suggestive of testicular torsion but were not diagnostic (Figure 1).

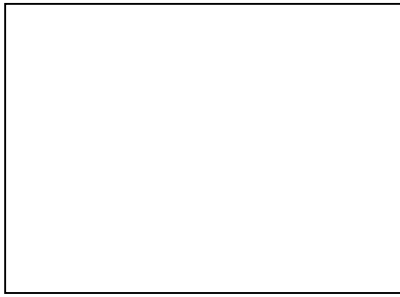


Figure 1.

The signs associated with testicular torsion were generalized testicular tenderness 23/23 (100%), swelling on examination 23/25 (92%); particularly a unilateral swelling 23/23 (100%), testicular retraction 7/8 (87.5%), skin changes 15/20 (75%), cord tenderness 6/8 (75%), cord thickness 7/10 (70%) and absent cremastic reflex 3/3 (100%). A negative urine microscopy 10/12 (83.3%) was suggestive of testicular torsion but was not diagnostic. The white blood count did not aid in the diagnosis (Figure 2). Transillumination of the scrotum was performed in 2/25 and found negative. Therefore, it was excluded from the study.



Figure 2.

The Doppler ultrasound findings had a sensitivity of 66.7% and a specificity of 94.3% based on operative findings, one week and three weeks follow up (Table 1).

**Table 1. Findings of Doppler u/s compared to findings at operation or 1 and 3 week follow up**

Findings of Doppler u/s vs. finding in the Op. notes or normal follow up	testicular torsion	No testicular torsion	Total
Decreased flow	4 (66.7%)	2 (33.3%)	6 (100%)
Increased flow	2 (5.71%)	33 (94.29%)	35 (100%)

## DISCUSSION

A total of 123 patients' records were evaluated retrospectively with regards to their symptoms and signs. Doppler ultrasound examination was done in 41 patients. Eighty seven patients underwent scrotal exploration based on clinical features

plus/minus Doppler ultrasound, out of which torsion of the testis proper was found only in 25.

Acute scrotum continues to represent a diagnostic challenge to the caring physician. Testicular torsion is of primary interest because of its effects on the patient's fertility and medico-legal issues for the surgeon<sup>6</sup>. In cases of acute scrotum where the clinical evaluation is doubtful or of low suspicion, most surgeons will perform scrotal exploration. This practice has undoubtedly resulted in an increase in the number of negative explorations.

There are several studies focused on clinical features of testicular torsion and others to evaluate the role of Doppler ultrasound in such an important clinical entity. Testicular pain; the abrupt onset and persistent nature of such a pain, as well as testicular swelling were the prominent features which were highly suggestive of testicular torsion.

Although the absence of urinary complaints, fever and abdominal pain were suggestive of testicular torsion; these were not diagnostic. Generalized testicular tenderness, unilateral swelling, testicular retraction, scrotal skin changes, tender and thickened cord were strongly associated with testicular torsion. Absent cremasteric reflex was a consistent feature in testicular torsion. However, since it was recorded in 3/3 in this study, its accuracy as an indicator may not be reliable. In a paper presented by Galejs and Kass; of 13 patients with testicular torsion, all had tender testicle and absent cremasteric reflex<sup>3</sup>. Kadish and Bolte reported that absent cremasteric reflex was the most sensitive finding for diagnosing testicular torsion<sup>7</sup>.

Negative urine microscopic examination was suggestive but not diagnostic of testicular torsion. The presence of leukocytosis was not of any help in the diagnosis. In a study presented by Dunne and O'Loughlin; they have reported similar findings; however, their Doppler ultrasound examination sensitivity was 57%<sup>6</sup>.

In our series, the Doppler ultrasound examination was found to have a sensitivity of 66.7% and specificity of 94.3%. The ability of the test to rule out testicular torsion was measured by both operative findings as well as normal testis on examination at 1 and 3 weeks follow up. Although this follow up period may appear to be relatively short, it represents the trend of pediatric surgery service in Salmaniya medical complex.

In a study by Baker et al; Doppler ultrasound sensitivity and specificity were reported as 88.9% and 98.8% respectively<sup>8</sup>. In another study by al Mufti; the sensitivity and specificity were 100% and 97% respectively<sup>9</sup>.

These findings emphasize the fact that clinical symptoms and signs are the most important measures in decision making for scrotal exploration and it is necessary for the surgeon to take a good history and perform a thorough clinical examination.

## **CONCLUSION**

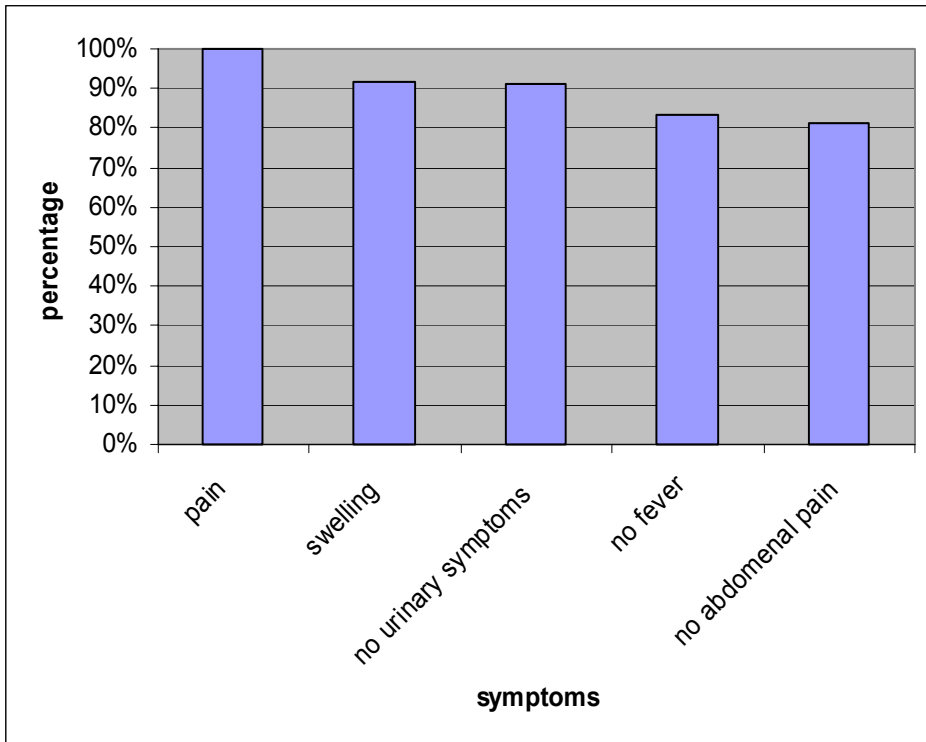
**The symptoms and signs that are strongly related to testicular torsion are sudden onset of persistent pain, unilateral swelling, testicular tenderness,**

**testicular retraction, scrotal skin changes, tender and thickened spermatic cord. The presence of these features should alert the physician to the possible need of scrotal exploration.**

**Color Doppler ultrasound is an excellent investigation in situations where the clinical evaluation is doubtful or of low suspicion.**

## **REFERENCES**

1. Lewis AG, Bukowski TP, Jarvis PD, et al. Evaluation of acute scrotum in the emergency department. *J Pediatr Surg* 1995;30:277-81. [Discussion 281-2].
2. Williams CR, Heaven KJ, Joseph DB. Testicular torsion: Is there a seasonal predilection for occurrence? *Pediatric Urology* 2003;61:638-41.
3. Galegs LE, Kass EJ. Color Doppler ultrasound evaluation of the acute scrotum. *Tech. Urology* 1998;4:182-4.
4. Kass EJ, Stone KT, Cacciarelli AA, et al. Do all children with an acute scrotum require exploration? *J Urol* 1993;150:667-9.
5. Lerner RM, Mevorach RA, Hulbert WC, et al. Color Doppler US in the evaluation of acute scrotal disease. *Radiology* 1990;176:355-8.
6. Dunne PJ, O'Loughlin BS. Testicular torsion: time is the enemy. *Aust NZ J Surg* 2000;70:441-2.
7. Kadish HA, Bolte RG. A retrospective review of pediatric patients with epididymitis, testicular torsion, and torsion of testicular appendages. *J Pediatr* 1998;102:73-6.
8. Baker LA, Sigman D, Mathew RI, et al. An analysis of clinical outcome using Color Doppler testicular ultrasound for testicular torsion. *J Pediatr* 2000;105:604-7.
9. Al Mufti RA, Ogedegde AK, Lafferty K. The use of Doppler ultrasound in the clinical management of acute testicular pain. *Br J Urol* 1995;76:625-7.



*Figure 1. A graph showing the percentage of symptoms found in testicular torsion.*

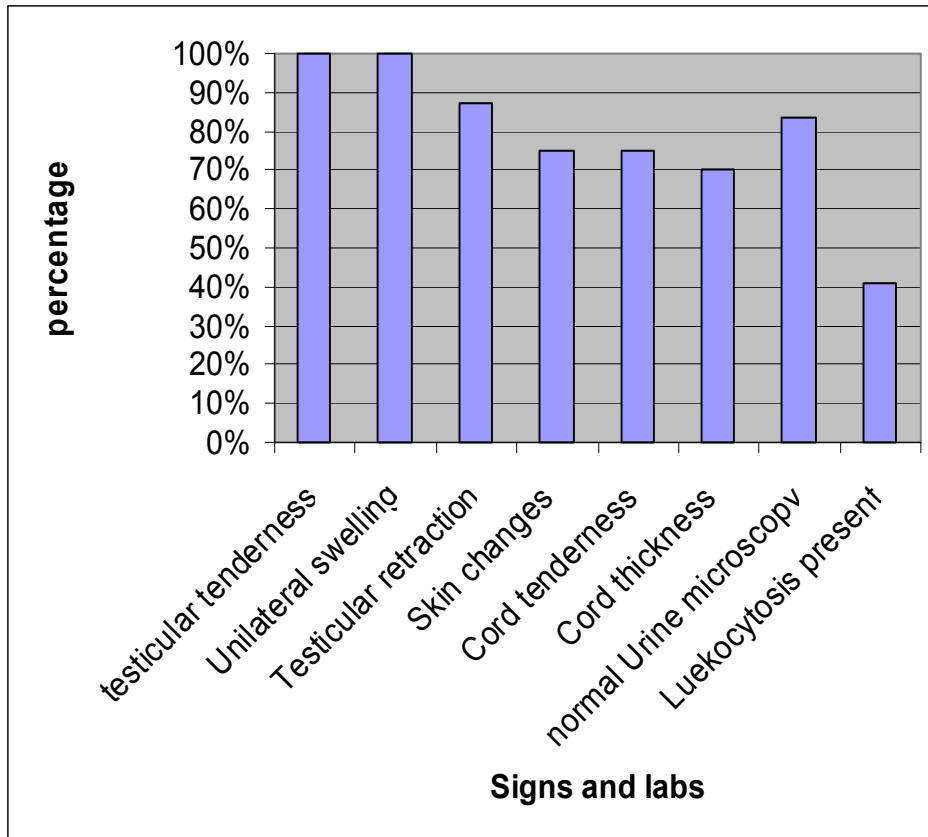


Figure 2. A graph showing the percentage of signs and laboratory Findings in testicular torsion.