Acute Scrotum in Children: Jordan University Hospital Experience

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Abstract

Introduction: Acute scrotum is one of the common surgical emergencies in pediatric age group. Although the differential diagnoses are many, most of the conditions are not urgent; of paramount importance is the prompt diagnosis and surgical treatment of torsion of the test is to avoid permanent ischemic damage. In this study we present our experience at University of Jordan Hospital in management of acute scrotum in children.

Methods: A retrospective review of the pediatric patients who were admitted to the pediatric surgical unit at Jordan University Hospital with acute scrotum from March 2008 to March 2013. The characteristics of symptoms, clinical and imaging findings prior to operation, operative findings and type of management were recorded.

Results: A total of 59 patients with acute scrotum were admitted and constituted the basis of this study. Operative exploration was performed in all of the 59 cases: Four patients (7%) had testicular torsion, 28patients (48%) had torsion of testicular appendix, 13 patients(22%), had epididymo-orchitis, three patients had idiopathic scrotal edema; three patients (5%) had scrotal hematomas due to trauma; two patients(3%) had incarcerated inguinal hernias; two patients(3%) had hydroceles and four patients (7%) had normal findings.

Conclusions: testicular torsion is a common surgical emergency in children which should be treated promptly with early scrotal exploration; since no diagnostic test in the pre-operative work up could differentiate between the different causes and excludes torsion testis which is the major concern. A prospective study to evaluate the diagnostic accuracy of Doppler ultrasonography is suggested based on the results of the predictive values seen in our study.

Keywords: Acute scrotum in children; Testicular torsion; Testicular appendix; Epididymitis.

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Introduction

Testicular torsion is an abnormal rotation of the testis and spermatic cord resulting in acute, severe scrotal pain due to decreased or even complete loss of blood flow to the affected

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testicle. The incidence of testicular torsion increases between the ages of 12 and 18 years, but it can be seen in any age group, and it is estimated that 1 out of 4000 men below the age of 25 will have torsion of the testis.[1]

The proper management for a patient with testicular torsion requires prompt diagnosis, and operative intervention. The surgical procedure would be scrotal exploration, orchiectomy for nonviable testicle, and orchidopexy for viable testes well as orchidopexy of the contralateral side.

The diagnosis of testicular torsion depends on the patient's history, physical examination and imaging studies. Color Doppler Ultrasonography (DUS). Unfortunately there is no imaging study which can exclude testicular torsion for sure[2].

Methods

A retrospective study of the medical records of all the children admitted to JUH with acute scrotum (pain, associated with any physical finding such as, swelling, redness, tenderness) between March 2008 and March 2013 were reviewed. History, physical examination notes, DUS findings (when performed), and routine laboratory (leukocyte count and urine analysis) were reviewed. Age distribution, duration of symptoms, associated conditions, time of surgical exploration, and details of surgery performed, final diagnosis, use of antibiotics, and follow up results were also studied. All cases underwent surgical exploration.

Ethical approval for the study was obtained from the ethical authority of the University of Jordan (JUH).

Results

Four patients (7%) were proved to have testicular torsion, 28 patients(48%) had torsion of testicular appendix, 13 patients(22%), had epididymo-orchitis, three patients had idiopathic scrotal edema; three patients (5%) had scrotal hematomas due to trauma; two patients (3%) had incarcerated inguinal hernias; two patients (3%) had hydroceles and four patients (7%) had normal findings. as shown in Table 1.

Table 1. The causes of acute scrotum

Diagnosis	Number	Percentage
Testicular torsion	4	7%
Epididymo-orchitis (EO)	13	22%
Idiopathic scrotal edema	3	5%
Scrotal hematomas due to trauma	3	5%
Incarcerated inguinal hernia	2	3%
Hydroceles	2	3%
Torsion of testicular appendix	28	48%
No pathological finding	4	7%

The ages ranged from 1 day to 15 years with a mean age of 8.4 years; 69% of the cases were between 6 and 12 years.

14 patients (24%) presented within 6 hours from the onset of symptoms, while the rest presented beyond 6 hours. 24 patients (41%) of the cases had delayed presentations (beyond 24 hours of symptoms). two of the testicular torsion cases presented within 6 hours, while the other two presented in 10 hours and 16 hours, respectively.

The main presenting symptom among the patients who had testicular torsion was pain.

While swelling and redness in addition to pain were seen in the two cases that presented beyond 6 hours. There was only one case that scrotal pain was associated with right lower quadrant abdominal pain which made the delay in presentation and this was one of the testicular torsion cases. History of recent scrotal trauma was found in 3 patients (5%) of the patients.

Side of presentation was mainly unilateral (85%) with equal distribution between right and left sides. Bilateral presentation was in 15% of the cases. Urine analysis was positive in one case among all of our cases and found later to have epididymo-orchitis.

Forty two (70%) of the patients underwent DUS examination. Five of which had decreased arterial flow, two of the five proved to have testicular torsion with a Positive Predictive Value (PPV) of 40%.The rest 37 patients had normal or increased arterial flow and proved to have no torsion with a Negative Predictive Value (NPV) of 100%. 17 patients did not undergo examination by DUS for uncertain reasons two of which proved to have testicular torsion. These statistical results especially the Negative predictive Value should be interpreted with caution as the number of patients with torsion testis is relatively small and a prospective study should be carried out to draw more solid conclusions.

Torted testicular appendices constituted 28 (47%) cases the presenting symptoms were pain (96%) and swelling (75%). Tenderness was reported in 82% of the cases and in none of them the blue dot sign was reported , DUS findings were none specific as well. In concordance with the retrieved data and despite that these cases can be treated conservatively, they mimicked the clinical presentation and physical examination findings retrieved from those with testicular torsion which suggests that all of those cases should be treated with early scrotal exploration since no solid evidence in the pre-operative work up could differentiate between both pathologies.

Most of the surgical explorations were held in an urgent manner without unjustifiable delays. 31% of these surgeries were done at the day time between 8am and 4pm, 44% before midnight (4pm to 12am), and 25% after midnight till 8am. The patients were discharged home in 1 to 5 days. The patient were followed up one week after discharge with no reported complications.

Discussion

Testicular torsion in children is a pediatric surgical emergency and requires immediate and accurate diagnosis[3]. 12% to 15% of children presenting with acute scrotum suffer from testicular torsion. Since the early 1990s, there has been an increased use of DUS in the diagnosis of acute scrotum[4]. Color Doppler ultrasonography demonstrating complete absence of detectable flow in the affected testis and epididymis may be helpful to confirm the diagnosis. In our study forty two patients (70%) out of the 59 patients underwent DUS examination. Five of them had decreased arterial blood flow, two of the five proved to have testicular torsion with a Positive Predictive Value (PPV) of 40%.The rest 37 patients had normal or increased arterial flow and proved to have no torsion with a Negative Predictive Value (NPV) of 100%. Seventeen patients did not undergo examination by DUS for uncertain reasons two of which proved to have testicular torsion. These statistical results especially the Negative predictive Value

should be interpreted with caution as the number of patients with torsion testis is relatively small and a significant number of patients did not have a Doppler examination including two of the patients who proved to have torsion testis.

This method has variable sensitivity (63-100%) but high specificity (97-100%).Sensitivity depends largely on the investigator's experience[5]. Because of reports about the presence of blood flow in the torted testis and subsequent testicular necrosis, the initial optimism regarding the value of DUS was dampened. It has been shown that peripheral perfusion may remain in torted testicles, and misinterpretation was the reason for most of false negative results in previous studies. The conclusion of all studies on DUS that it has false positive as well as false negative results[4-10].

The selective use of surgical exploration based on clinical findings and/or the results of investigations may delay surgery, and has resulted in testicular loss. Exploration of the scrotum is a relatively safe and simple procedure, with good cosmetic results. It allows an accurate diagnosis to be made. It will result in the highest possible salvage rate for testicular torsion, and allows fixation of the contra-lateral testicle[12].

Surgical exploration also allows accurate selection of those boys who require antibiotics and further investigation of EO[13]. When the low morbidity of scrotal exploration and the implication of a missed diagnosis are considered, a negative exploration is not unreasonable and one would be reluctant to change the current policy. However, it has been suggested that pathognomonic features of acute scrotal conditions would be recognized more often if doctors were more aware of what to look for[11]. In our experience as others DUS is an indispensable imaging modality for the clinical assessment of patients with acute scrotum; however, the informations it can afford are operator-dependent and have to be supported by the history and physical examination. DUS findings constitute probably an important medico-legal support when the necessity of surgical intervention is excluded; anyway, in presence of a clinical suspicion of testicular torsion, even with an apparently normal DUS, the surgical exploration is mandatory, above all in children[14]. Most clinicians use these studies to help confirm a clinical diagnosis other than testicular torsion. Historically it was nuclear scan and now it is Doppler Ultrasound (DUS) with all its innovative modifications has become more popular. These studies are adjunctive to the clinical evaluation of testicular torsion and are used when the diagnosis is equivocal.

Since no test today is 100% specific and sensitive in the diagnosis of testicular torsion many of those who care for children with acute scrotum will adopt the policy of exploring any acute scrotum with the slightest physical finding.

It is well known that the incidence of testicular torsion is no more than 12-15% (7% in our series) of cases of acute scrotum, with the increases awareness of medico legal issues among public as well as the treating physicians, adoption of early exploration for those who need it is a wise idea.

Conclusion

Testicular torsion is a common surgical emergency in children which should be treated

promptly with early scrotal exploration; since there is no diagnostic modality in the pre-operative work up could differentiate between the different causes and excludes torsion testis.

Exploration of scrotum is a relatively safe, simple, minimally morbid procedure with good cosmetic results and allows an accurate diagnosis to be made. A prospective study to evaluate the diagnostic accuracy of Doppler ultrasonography is suggested based on the results of the predictive values seen in our study.

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الصفن الحاد عند الأطفال؛ خبرتنا في مستشفى الجامعة الأردنية

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الملخص

المقدمة: الصفن الحاد واحدة من حالات الطوارئ الجراحية الشائعة في الأطفال. وعلى الرغم من العديد الاحتمالات في التشخيص التفاضلي، معظم الظروف ليست عاجلة؛ المهم هنا هو التشخيص السريع والعلاج الجراحي لالتواء الحبل المنوي لتجنب الأضرار الناتجة عن نقص التروية الدائمة للخصية. مع تاريخ دقيق، والفحص السريري، والتصوير بالسونار إذا اقتضى الأمر ذلك، ويمكن عادة إجراء تشخيص دقيق. في هذه الدراسة نقدم خبرتنا في مستشفى الجامعة الأردنية في علاج الصفن الحادة في الأطفال.

الطريقة: تم استعراض السجلات الطبية لجميع الأطفال الذين قدموا قسم الطوارئ بالصفن الحادة من آذار 2008 إلى آذار 2013. وسجلت خصائص الأعراض، والنتائج السريرية والتصوير قبل العملية والنتائج ونوع العلاج المقدم.

النتائج: أجريت عملية الاستكشاف للصفن في 59 حالة، أربعة منها كانت التواء الخصية (7%). 28 حاله التواء زائدة الخصية (48٪)، اثني عشر حالة (22%) من التهاب البربخ ، حالتين من فتق اربي منسد (3%)، وثلاث حالات تجمع دموي بالخصية (5%) وحالتان استسقاء الخصية (3%)، وأربع حالات (7%) كانت طبيعية.

الاستنتاجات: نسبياً ارتفاع نسبة الحالات الجراحية الإيجابية (التواء الخصية، الخصية التواء التذييل، الفتق المسجون) بين الحالات من الصفن الحاد عند الأطفال حيث يتم التشخيص قبل الجراحة وهذا يبرر ممارستنا في الاستكشاف المبكر لحالات الصفن الحاد.

الكلمات الدالة: الصفن الحاد، الأطفال، مستشفى الجامعة الأردنية.