The Acute Scrotum: A Review of 40 Cases

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Key Words

Acute scrotum · Testis · Epididymitis · Torsion · Testicular appendage

Abstract

Objective: To determine the relative importance of clinical presentation, laboratory studies, and ultrasonography in the diagnosis of acute scrotum, and to suggest an effective method of management. **Subjects and Methods:** Forty patients who were hospitalized between January 2002 and December 2002 for acute scrotum were studied with respect to history, physical examination, blood tests, urine analysis including culture, and scrotal ultrasonography with color Doppler study. **Results:** Epididymitis (n = 24) was the commonest cause of acute scrotum followed by testicular torsion (n = 11), torsion of testicular appendages (n = 4), and idiopathic scrotal edema (n = 1). Both mean age (40.7 vs. 13.8 years), and average duration of pain at presentation (4.5 days vs. 19.1 h) were higher in patients with epididymitis than in torsion. Onset was usually insidious in epididymitis, sudden in testicular torsion, and variable in torsion of testicular appendages. The majority (87.5%) of patients with epididymitis were managed conservatively. The testis was salvaged in 81.8% of patients with testicular torsion. The accuracy of ultrasonography was only 72.7% in testicular torsion, but was good in epididymitis. **Conclusion:** Our results show that a careful clinical evaluation, by an experienced examiner, provides the correct diagnosis in

acute scrotum rather than ultrasonography. It is of utmost importance to exclude testicular torsion in those who are younger than 16 years and whose pain duration is less than 24 h.

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Introduction

Acute scrotum is a clinical syndrome that is defined as an acute, painful swelling of the scrotum or its contents accompanied by local signs and general symptoms. The differential diagnosis includes testicular torsion, torsion of testicular appendage, epididymitis, hernia, idiopathic scrotal edema, and occasionally tumor. Of these conditions, the main aim is to diagnose testicular torsion rapidly, as any delay can lead to testicular loss. Clinical presentation, laboratory studies, and radiological imaging are the tools available to help make the diagnosis. The present study was undertaken to determine the relative importance of these tools, and to propose an effective method of managing these patients.

Subjects and Methods

Forty patients who were hospitalized between January 2002 and December 2002 for acute scrotum formed the material of this study. Patients who were managed as outpatients as their symptoms and signs were mild, and those whose presentation could be attributed to significant direct trauma to the testes were excluded.

Fig. 1. Age distribution of 40 patients with acute scrotum.

Table 1. Causes of acute scrotum

Diagnosis	Patients	
	n	%
Epididymitis	24	60
Testicular torsion	11	27.5
Torsion of appendages	4	10
Idiopathic scrotal edema	1	2.5
Total	40	

There were no patients below 7 years of age, as they were treated at the pediatric hospital. History, physical examination, blood tests, urine analysis including culture, and scrotal ultrasonography with color Doppler study were performed at admission. Radionuclide scan was done in only 1 case.

Conservative treatment for epididymitis included bed rest, scrotal elevation, antibiotics and analgesics. Exploration was done in 3 patients who were not clinically resolving as a result of abscess formation. Fifteen patients in whom testicular torsion could not be excluded underwent immediate exploration. When testicular torsion was confirmed, the affected testis was detorted and observed. Orchidopexy was done in 9 patients with viable testis, and orchiectomy in 2 with necrotic testis; together with fixation of the contralateral testis. Patients in whom a diagnosis of torsion of testicular appendage was made clinically with certainty were managed conservatively. However when found only on exploration, excision of the appendage was performed; the contralateral testis was not explored in these cases. Follow-up data was studied, with particular emphasis to symptoms and incidence of testicular atrophy.

Results

Epididymitis was the commonest cause of acute scrotum followed by testicular torsion (table 1). The age distribution is shown in figure 1. The mean age of patients with epididymitis (40.7 years) was significantly higher than in those with torsion (13.8 years). The mean age of patients with testicular torsion (15.4 years) was slightly higher than those with torsion of testicular appendage (9.25 years). The average duration of pain at presentation was longer in patients with epididymitis (4.5 days) than in patients with torsion (19.1 h). Also the duration of pain was slightly longer in patients with torsion of appendage (30 h) than in patients with testicular torsion (15.1 h). Onset of pain was insidious in all but 2 patients with epididymitis, and was sudden in all but 2 patients with testicular torsion. In 4 patients with torsion of testicular appendage, onset was sudden in 2, and insidious in the other 2. History of previous mild episodes of pain was present in 2 patients with epididymitis, and in 3 patients with testicular torsion. Two patients with testicular torsion had pain also in the iliac fossa. Fever ($n = 14$) and dysuria ($n = 10$) were more common in patients with epididymitis than in patients with torsion (table 2). One patient with testicular torsion and one with torsion of testicular appendage gave a history of trivial trauma. One patient with testicular torsion gave a history of previous orchidopexy on the same side. Scrotal erythema was seen more often in patients with epididymitis. There was, however, considerable overlap in the other clinical signs.

Leukocytosis ($n = 17$) and pyuria ($n = 13$) were more common in patients with epididymitis than in patients with torsion (2 and 1, respectively) (table 2). Urine culture was available in 14 patients with epididymitis; *Escherichia coli* was cultured in 4 patients and the remaining were sterile. Urine culture was available in 3 patients with testicular torsion and 2 patients with torsion of testicular appendage; all were sterile.

Scrotal ultrasonography was done on all patients. In the 24 patients with epididymitis varying degrees of enlargement and hypoechogenicity of the testis and epididymis were reported; involvement of the epididymis alone was reported in 9 (37.5%) patients whereas epididymis and testis were involved in the remaining 15 (62.5%) patients. A hydrocele was present in 7 patients, and abscess formation was seen in 4 patients. Of the 14 patients in whom Doppler study was available, there was normal flow in 7, increased flow in 6 and decreased flow in 1 patient with a necrotic testis. In the 11 patients with testicular torsion, varying degrees of enlargement of the tes-

Table 2. Comparison of epididymitis, testicular torsion and torsion of testicular appendage

Variable	Epididymitis (n = 24)	Testicular torsion (n = 11)	Torsion of appendage (n = 4)
Mean age, years (range)	40.7 (11–69)	15.4 (9–27)	9.25 (7–11)
Side, right/left	14/10	5/6	2/2
Mean duration of pain at presentation (range)	4.5 days (0.5–14)	15.1 h (0.5–72)	30 h (24–48)
Fever, %	58.3 (n = 14)	18.2 (n = 2)	0 (n = 0)
Dysuria, %	41.7 (n = 10)	0 (n = 0)	0 (n = 0)
Leukocytosis, %	70.8 (n = 17)	18.2 (n = 2)	25 (n = 1)
Pyuria, %	54.2 (n = 13)	9.1 (n = 1)	0 (n = 0)
Hospital stay, days (range)	4.3 (2–10)	3.1 (2–5)	2.9 (2–4)

tis was seen, and abnormal location of the epididymis was observed in only 1. Doppler study was available in all the patients and showed decreased flow in 8 (72.7%) and normal flow in 3 (27.3%). Ultrasonography and Doppler were normal in the 4 patients with torsion of appendages except for a minimal hydrocele in 2. Radionuclide scan was done in only 1 patient of missed torsion in order to confirm the diagnosis, and showed a nonperfused testis.

Of the 24 patients with epididymitis, 3 (12.5%) required surgical exploration (drainage of abscess in 2, and orchidectomy for a necrotic testis in 1), and 21 (87.5%) were managed conservatively including 1 with a small abscess. Of the 11 patients with testicular torsion, detorsion and orchidopexy was done in 9 (81.8%) and orchidectomy for a nonviable testis in 2 (18.2%). Orchidectomy was a result of delayed presentation in 1 patient and missed diagnosis in the other who presented 24 h after onset of pain and on Doppler was reported to have a good flow. Of the 4 patients with torsion of testicular appendage, the diagnosis was established clinically in 1, and by surgery in 3. The patient with idiopathic scrotal edema was 10 years old, and presented with a 1-day history of right scrotal pain and swelling. Laboratory studies were normal, and ultrasonography showed normal Doppler flow but an anteriorly placed epididymis. In view of the suspicious clinical and sonography findings exploration was done, and the diagnosis established.

Hospital stay was slightly longer in patients with epididymitis (4.3 days) compared to patients with torsion (3.1 days) (table 2). Follow-up was available in 32 patients ranging from 1 month to 6 months (average 3.1 months). In this period the patients were asymptomatic, and there was no significant testicular atrophy.

Discussion

The main objective in patients with acute scrotum is to diagnose testicular torsion without delay, towards which clinical evaluation seems to be very useful. Age of the patient is an important factor. Peak incidence of torsion of testicular appendage is in the prepubertal age group (9–10 years), and that of testicular torsion is in the pubertal age group (12–17 years) [1, 2]. Epididymitis occurs at a later age [3], and Cranston and Moisey [4] suggested that it is unsafe to make a diagnosis of epididymitis below 25 years of age. Our observations were similar, as only 2 (8.3%) patients with epididymitis were below 16 years of age whereas 13 (86.7%) patients with torsion were below the same age. Furthermore, 3 (75%) patients with torsion of testicular appendage were below the age of 10 years whereas only 1 (9.1 %) patient with testicular torsion was below the same age.

Nature of onset and duration of pain is another important factor. In epididymitis the pain is usually insidious in onset with a longer duration of pain at presentation, in comparison to testicular torsion where the pain is of sudden onset with a short duration of pain at presentation [2, 5]. Torsion of testicular appendage may be distinguished from testicular torsion by its more insidious onset and slightly longer duration of pain at presentation, presumably because this condition is less painful [2, 6]. History of scrotal trauma (reported in 4–22% of patients with torsion) may be misleading [1, 7, 8]. Fever and dysuria are more common in epididymitis with reported incidences of 75 and 33%, respectively [9], however, a small proportion of patients with testicular torsion may also have these symptoms [7].

Though there is considerable overlap in the clinical signs, there are a few differentiating features. Erythema

of the scrotum is more common in epididymitis [9] and thickening and tenderness of the cord more common in cases of testicular torsion [7]. The cremasteric reflex has been reported to be absent in patients with testicular torsion and retained in others [2, 5, 10]; but in our experience we found it difficult to elicit the sign in the presence of severe pain. The transverse elevated lie of the testis described in testicular torsion [5] was observed in only 4 (36.4%) patients in our study, and in 46% by Kadish and Bolte [11]. Early cases of torsion of testicular appendage may be distinguished by the localized polar tenderness and by the blue dot sign which have been reported in around 40% of patients [2, 5, 6]; this sign contributed to the diagnosis in 1 of our patients. However when the presentation is beyond 24 h, there is often generalized swelling and tenderness making the condition difficult to diagnose clinically [6].

Leukocytosis and pyuria have been reported to occur in around two thirds of patients with epididymitis [9], but is occasionally observed in some patients with testicular torsion [2, 11]. Our experience has been similar, and hence testicular torsion must be considered even in these patients if the clinical presentation is suspicious.

Ultrasonography and Doppler study have been regarded to be highly reliable and beneficial in avoiding an unnecessary exploration [12]. However, the role of sonography has been under debate with respect to accuracy, availability, cost, delay in treatment, and as the procedure is operator-dependent [1, 13, 14]. In our experience, sonography was accurate in only 72.7% of patients with testicular torsion, where it was most critical to make the correct diagnosis. Sonography, however, was accurate in patients with epididymitis. Melekos et al. [2] similarly reported accuracy of 50% in testicular torsion and 80% in other scrotal conditions. In the 8 patients lost to follow-up in our series there may have been some instances of missed testicular torsion. Reports in the literature have suggested that ultrasonography for testicular torsion has a specificity of almost 100%, but the sensitivity varies from 50 to 100% [2, 11, 15, 16]. We therefore suggest that sonographic interpretation must be in conjunction with the clinical diagnosis, and patients in whom torsion testis is strongly suspected clinically should be subjected to exploration even if the Doppler flow is good. The value of ultrasonography is mainly in patients in whom the diagnosis of testicular torsion seems unlikely, in order to confirm the presence of blood flow. It may also be used to confirm the diagnosis when the duration of symptoms in testicular torsion indicate a dead testis [14, 15], and in patients with epididymitis in order to diagnose complica-

tions, such as abscess formation, which require surgical drainage.

Radionuclide scan has been reported to be more accurate in diagnosing testicular torsion [17]. However, we used it sparingly as the method is not available to us on a 24-hour basis and also due to the delay involved in doing the study. The technique is not without its drawbacks; Melekos et al. [2] reported that decreased perfusion in edematous testicles in 2 cases of epididymitis mimicked testicular torsion and resulted in surgical exploration. Also, 5% of patients with testicular torsion can appear to have satisfactory flow because of persistent testicular arterial perfusion if the degree of torsion is only 180–360° [18]. The role of radionuclide scan is probably for establishing the diagnosis in cases of missed testicular torsion.

Finally, the experience of the clinician seems to be a very important factor in accurate diagnosis. Corbett and Simpson [19] reported that in their series the correct diagnosis of testicular torsion was made in 39% of patients by casualty doctors, in 53% by urology registrars and in 76% by specialists. The majority of instances of wrong diagnosis were due to an overdiagnosis of testicular torsion.

Our salvageability rate in testicular torsion was 81.8%, and the previously reported rates range between 26 and 90% [1, 8]. Salvageability largely depends on the duration of pain at presentation [1], and in our series the average duration was 2.6 h when the testis was salvaged and 48 h when the testis had to be removed. Some degree of testicular atrophy is inevitable when pain is present for more than 8–12 h [20] and when pain is present for more than 24 h, testicular salvageability is very low [21]. Therefore, even in equivocal cases, early exploration is necessary to prevent testicular loss, and negative explorations are acceptable [14]. An aggressive approach is especially indicated in the younger patient, and when the duration of pain is short [1, 5]. Education of the community is another important measure to reduce delayed presentation [8, 14]. Salvageability also depends on the degree of twist and whether torsion is continuous or intermittent [1]. Previously fixed patients must be treated just like a fresh case, as testicular torsion can even occur after fixation [22] as was seen in 1 of our patients.

Torsion of testicular appendage is a frequently misdiagnosed intrascrotal condition. When found on exploration, excision of the twisted vestige is all that is necessary. When established clinically, conservative management may be carried out [6, 23], though some believe that surgical excision is preferable as it rapidly relieves the symptoms [2]. In the differential diagnosis, idiopathic scrotal edema must be considered. It is a localized type of angio-

neurotic edema, where there is edema of the scrotum primarily and out of proportion to the degree of tenderness found. The condition usually resolves in 2–3 days [2].

Epididymitis was the commonest cause of acute scrotum in our series. The condition is often idiopathic with infective, chemical (vasal reflux of urine), reactive and systemic diseases being the other causes [24]. The majority of cases settle with conservative management. Complications include abscess formation and testicular ischemia due to inflammatory involvement of cord and extrinsic compression of the testicular blood supply by the edematous epididymis [9]. The reported incidence of complications ranges from 3 to 39% depending on the severity of the infection [9].

Conclusion

Our results show that a good history and physical examination by an experienced clinician can provide the correct diagnosis in the majority of patients with acute scrotum rather than ultrasonography. An aggressive approach is especially indicated in those who are younger than 16 years of age and whose duration of pain is less than 24 h so that testicular loss may be minimized. Severe epididymitis usually resolves with broad spectrum antibiotic with minimal complications.

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