

Outcomes of routine surgical exploration in children who admitted to the emergency service with acute scrotum

Serpil Sancar, Esra Ozcakil, Mete Kaya

Department of Pediatric Surgery, University of Health Sciences, Bursa Yuksek Ihtisas Training and Research Hospital, Bursa, Turkey

ABSTRACT

Objectives. The acute scrotum frequently presents a diagnostic and therapeutic challenge. In cases where the testicular torsion cannot be excluded, a surgical exploration is recommended. The aim of the study was to present the results of our management in the patients with acute scrotum. **Methods.** We reviewed the medical records of 33 patients suffering from acute scrotal pain underwent scrotal exploration between 2011 and 2016. Anamnestic data (age of patient, duration of anamnesis prior to admission and the side that was involved), scrotal color Doppler ultrasound (SCDUS) results, intraoperative findings, mode of operative treatment, and the clinical outcomes were analyzed. **Results.** Patients aged from several hours up to 17 years of age (average 11.9 years). The duration of symptoms prior to admission ranged from 3 h to 4 days, (average 32 h). Acute scrotum was found 18 in right side, 15 in left side. SCDUS was diagnostic for testicular pathologies in 19 (51%) of 30 patients. In patients who underwent scrotal exploration, 18 (54%) had a testicular torsion, 11 (33%) had a torsion of the appendix testis, and 4 (12%) had an orchio-epididymitis. Three patients who found testicular torsion required an orchidectomy immediately because of necrosis. The rest had detorsion and ipsilateral fixation of testis. Three patients underwent second look, and orchidectomy was performed in 2 of them. In 2 of detorsioned testes, two testicular atrophies developed on follow-up period. **Conclusions.** Regardless of the etiology, the management of the patients with acute scrotum by urgent surgical intervention allows the salvage of a possible testicular torsion.

Eur Res J 2017;3(2):152-156

Keywords: C-reactive protein, procalcitonin, correlation, kidney transplantation

Introduction

Acute scrotum or acute scrotal pain is a common clinical situation that present with pain, hyperemia and swelling of the hemiscrotum. The most common causes of acute scrotum include inflammation of the testicle and/or epididymis (acute orchio-epididymitis),

testicular torsion, torsion of the appendix testis. Among of them, the testicular torsion is of major concern because it requires urgent surgical intervention to avoid testicular loss [1]. Since decades, the patients with acute scrotum have underwent

Address for correspondence:

Mete Kaya, MD., Professor, University of Health Sciences, Bursa Yuksek Ihtisas Training and Research Hospital, Department of Pediatric Surgery, Bursa, Turkey
E-mail: kayamete@yahoo.com

Received: November 25, 2016; Accepted: February 04, 2017; Published Online: March 04 28, 2017

emergency surgery to treat all testicular torsions as soon as possible. On the other hand, an approach to the patient with acute scrotum might be more challenging in recent years, especially when available more different imaging facilities, such as color coded duplex sonography, scintigraphy, magnetic resonance, etc [2]. In this study, we aimed to determine the results of surgical management of children with acute scrotal pain suspicious for testicular torsion.

Methods

Between 2011 and 2016, we reviewed the medical records of 50 patients suffering from acute scrotal pain with/without swelling and redness. Seventeen patients who managed conservatively but were not operated were excluded from the study. Clinical features (age of patient, duration of symptoms prior to admission and the side of scrotum that was involved), physical examination findings, scrotal color Doppler ultrasound (SCDUS) results, duration between admission and operation, operative diagnosis, mode of surgical management, and the postoperative outcomes were noted.

The following summarizes our approach to initial investigation in a patient with acute scrotum. The onset, site, duration, character, severity, precipitating and relieving factors of symptoms have been noted. History of trauma and other accompanying symptoms and signs such as nausea, vomiting and fever have been questioned. On physical examination, redness or edema of the scrotum, location of testis, tenderness, trans-illumination and a “blue dot sign”, and result of Prehn’s sign were recorded. A white blood cell and urine analysis has routinely obtained prior to surgery. If available, a SCDUS has been requested in an emergency setting in all cases with acute scrotal pain to evaluate of suspected testicular torsion. Finally, the operative decision was made by evaluating the history, symptoms, laboratory tests and SCDUS together with the physical examination. Manual detorsion was not attempted when testicular torsion is suspected in the patients.

Scrotal exploration was made via an incision in midline raphe of scrotum, and inguinal incision under 1 year old babies. When a testicular torsion was detected during surgery, if it is live, the testis was made detorsion and ipsilateral fixation also. If it was found that the testis had undergone torsion and was gangrenous, it was applied heat by warm saline soaked

sponges for at least for five minutes. Then, if there was no improvement in the testis color, the testis capsule was incised. If there was a hope that the testis can recover, it was left in place and a second-look operation performed a 24-48 hours later. If no bright bleeding was seen during surgery, or if it is still dark at second-look surgery, the affected testis was removed, and the contralateral testicle was fixed to the dartos fascia in three points. If exploration is revealed torsion of the appendix testis, the appendage was simply excised and no orchidopexy was done. The broad spectrum antibiotic therapy was started in the patients who diagnosed epididymo-orchitis at surgery, and operative debridement was done, if needed.

Statistical Analysis

Statistical data are presented as the mean \pm the standard deviation of the mean or number (percent) when necessary.

Results

Thirty-three patients with acute scrotal pain underwent scrotal exploration for a high clinical suspicion of testicular torsion and were included in the study. The postoperative diagnoses were confirmed as orchio-epididymitis (n=4, 12%), torsion of the appendix testis (n=11, 33%), or testicular torsion (n=18, 54%). Demographic and clinical features of the patients are summarized in Table 1. Pain and tenderness of the hemiscrotum were the most common findings in all patients. Positive Prehn's test was diagnostic in adolescents with testicular torsion. Hyperemia was frequently detected in orchio-epididymitis patients. “A blue dot sign” was visible in only in 2 cases with torsion of the appendix testis.

The mean age in the patients with testicular torsion was high, although the extent of the age gap varies widely. While testicular torsion occurred predominantly on the left side, other causes were mostly on right. Although, some of the patients with testicular torsion have applied late period to emergency service, a shorter onset of symptoms in the most of patients was identified. A SCDUS was applied in 16 (87%) of cases, and 13 (81%) of those with testicular torsion facilitated the preoperative diagnosis; however torsion of the appendix testis diagnosed in only one case, and orchio-epididymitis in one case. Of the 14 cases with SCDUS reports compatible with normal vascularization, all of them underwent surgical

Table 1. Demographic and clinical features of the patients with acute scrotum according to the postoperative diagnoses summarized.

	TT	TAT	OE	Total
Number	18	11	4	33
Age (Mean, Average)	13.2 (3 mo-16 y)	11.8 (8-15 y)	9.6 (6 mo-17 y)	11.9 (3 mo- 17 y)
Affected side	8 R, 10 L	8 R, 3 L	2 R, 2 L	18 R, 15 L
Duration of symptoms (h)	18 h (3-72 h)	53 h (12-96h)	36 h (24-72 h)	32 h (3-96 h)
SCDUS (accuracy)	16 (81%)	9 (9%)	4 (25%)	29 (51%)

OE=orchio-epididymitis, SCDUS=scrotal color Doppler ultrasound, TAT=torsion of the appendix testis, TT=testicular torsion

exploration due to a strong testicular torsion suspicion on physical examination and the testicular torsion was diagnosed in 2 cases, torsion of the appendix in 8 and orchio-epididymitis in 3. When the torsion of the appendix testis is also considered a surgical disease, the negative exploration rate was 12% in our series. On scrotal exploration, three patients who found testicular torsion required an orchidectomy because of necrosis. The time between onset of symptoms and admission to the hospital was 6 hours or more in these patients. It had been done detorsion and ipsilateral fixation of testis in the remaining patients. Three patients underwent second look, and orchidectomy was performed in 2 of them. In two of detorsioned testes, a testicular atrophy developed on follow-up period. Results of surgical management in children with acute scrotal pain suspicious for testicular torsion are depicted in Figure 1.

Discussion

In addition to testicular torsion, torsion of the appendix testis and orchio-epididymitis, other conditions include idiopathic scrotal edema, trauma, hernia, hydrocele, varicocele and Schonlein-Henoch purpura, however, most of them do not usually require immediate surgical intervention [1]. The incidence of testicular torsion among the patients with acute scrotum ranges from 18% to 45% depending on the age of subjects, type of clinical institution and the diagnostic method [3]. Testicular torsion is the most important because if it is diagnosed within a short time, testis can be salvaged. If testicular torsion occurred in less than 6 hours, testicular salvage rates of 90%, if detorsion occurred in after 24 hours testicular salvage less than 10% [4]. Therefore, the surgeon must move quickly to identify or exclude this

condition in any patient who presents with an acute scrotum. In our clinic, testicular torsion incidence was identified in 36% of all acute scrotum, and this rate was 54% in the operated patients.

The appendages of testis and epididymis are normal remnants of embryonic tissue and are usually located at the superior testicle. Torsion of the appendix testis is benign situation that necrotic appendix testis usually resorbs without any problem. The classic presentation of torsion of the appendix testis is “blue dot sign”, where the inflamed and ischemic appendage can be visualized from scrotal skin in the upper pole [1, 3]. In a series of 119 males with acute scrotum, more than one-half had torsion of the appendix [5]. Actually, in cases due to torsion of the appendix testis, emergency operation is not necessary, scrotal pain resolve spontaneously within a few days and do not require any intervention. It has been putted forward that nonsurgical approach to torsion of the appendix testis have admitted that 22% of cases need emergency surgery for differential diagnosis and 14% of conservatively treated patients develop persistent pain [6]. The overlap in clinical findings between testicular torsion and torsion of the appendix testis was so great that we could not reliably make this differentiation; and urgent scrotal exploration performed for these cases.

Although some are viral origin, but the most of orchio-epididymitis occur for bacterial reasons. Most cases, when clinically not diagnosed before, are therefore diagnosed after surgical exploration [1]. Nevertheless, clinical findings can suggest a diagnosis of orchio-epididymitis, once again, it must be taken together with physical examination and diagnostic testing to guide conservative management. In our study, four patients were carried out an emergency scrotal exploration because of there is a strong clinical suspicion of testicular torsion. As our mention is that

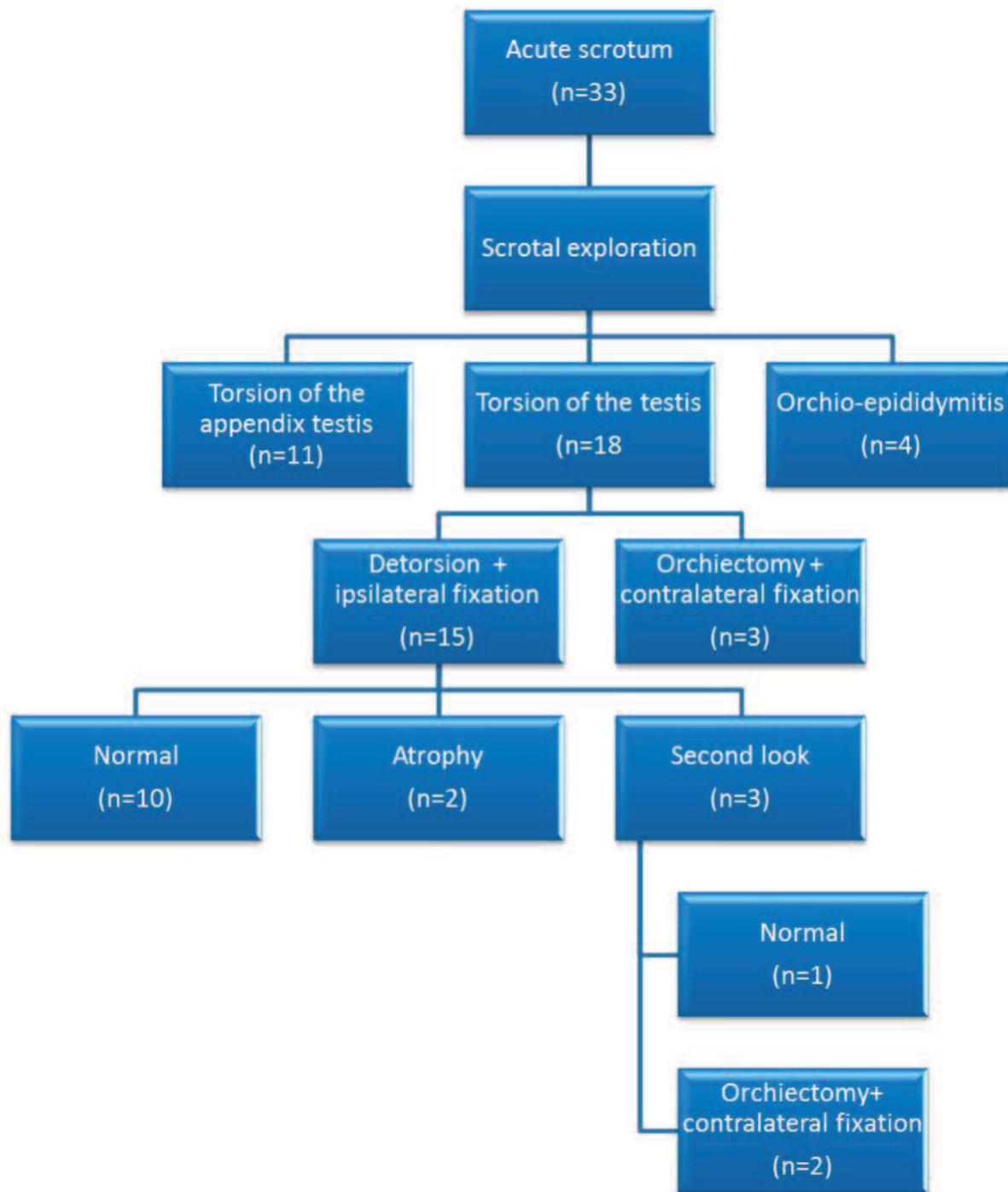


Figure 1. Flow chart of present study.

since over most of the patients with acute scrotum will have either testicular torsion or torsion of the appendix testis that would be treated at the time of scrotal exploration, we believed that scrotal exploration was the most reliable diagnostic approach.

Imaging studies are unlikely as a result, since the sensitivity or specificity of a single test in diagnosing testicular torsion is not high. However, imaging studies (eg, SCDUS, nuclear scans) may be useful

when testicular torsion is a low suspicion. SCDUS is often used to complete physical examination findings and clinical history in acute scrotum. Recently, a prospective study of the accuracy of SCDUS in testicular torsion suspected or referred patients found sensitivity, specificity, positive predictive value, and negative predictive value of 100%, 75.2%, 80.4% and 100%, respectively [2]. Even though US is a valuable diagnostic tool, correct diagnosis could not be ensured

in every case and the method is highly dependent on the expertise and technique of the investigator. If a mismatch exists between the clinical suspicion of testicular torsion and the US findings, the patient should undergo surgical exploration [7]. Our study has shown that the SCDUS is not a good diagnostic tool to detect testicular torsion in the patients with acute scrotum due to its low diagnostic accuracy. Nuclear scans, or other tests, may have a role in the management of the acute scrotum today; additionally, complete blood count and urinalysis may be helpful to evaluate other reasons of acute scrotum, but waiting for these outcomes should not postpone scrotal exploration. The management of the patients with acute scrotum in that study was based mainly on clinical findings and all of them had been operated. In our series, successful testicular salvage was succeeded in 11 cases with testicular torsion, and we had only 4 negative explorations as considering that torsion of the appendix testis is surgical problem. Orchiectomy was required in 5 patients because of necrosis. Results in an orchiectomy rate are ranging from 39% to 71% in most series in boys undergoing surgery for testicular torsion [6, 8]. Our low rate of orchiectomy (15%) suggests that we are not selective in approach to the patient with acute scrotum suspicious of testicular torsion.

Conclusions

In conclusion, patients with symptoms suggestive of testicular torsion, who admitted to the emergency due to acute scrotum, should be evaluated for prompt surgical intervention regardless of the onset of symptoms or the result of SCDUS, unless there are definite findings suggesting epididymitis or other reasons of acute scrotum. Although we identified non-testicular torsion diseases on scrotal exploration, we salvaged a large number of the torsioned testis with our approach method to the acute scrotum.

Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

Financing

The authors disclosed that they did not receive any grant during conduction or writing of this study.

Acknowledgement

The article was presented previously as poster presentation at the 34th Congress of Turkish Pediatric Surgeons, October 26-30, 2016, Kyrenia, TRNC (Turkish Republic of North Cyprus)

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