

## Overview of the Acute Scrotum in Adolescence

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### Abstract

The acute scrotum is a very serious condition affecting males of all ages, commonly children and adolescents. For that, an extensive literature search of the Medline, Cochrane, and EMBASE databases was performed. Papers discussing acute scrotum in adolescence were screened for relevant information. There were no limits on date, language, age of participants or publication type. Identifying the etiologic origin of acute scrotum constitutes a major role in proper management of acute scrotum. Torsion of testicular appendages, testicular torsion and epididymo-orchitis were the common etiologies of acute scrotum. The proper evaluation of a patient with acute scrotum starts with a concise history and physical examination, followed by a Doppler ultrasonography. The subsequent management of the acute scrotum is mainly dependent on the etiology.

**Keywords:** Acute Scrotum; Etiology; Evaluation, Diagnosis

### Introduction

The acute scrotum is defined as a sudden inflammation and swelling of the scrotal tissue or its contents affecting males of all ages, commonly children and adolescents [1]. Emergency consultation with a variety of specialists (pediatric surgery, urologist and emergency doctors) is mandated to reach a prompt diagnosis. Time is of extreme importance in the management of acute scrotum. The golden time of management is considered at 6h after the disease development, and after 24h negative consequences such as testicular loss or spermatogonia, mortality resulted from testicular ischemia [2]. The latter commonly occurs especially if the etiology of the acute scrotum was testicular torsion [2,3].

Patients identified with acute scrotum usually presented with moderate to severe degrees of pain, nausea, and fever; however, some patients may be presented with abdominal pain and associated trauma [4]. Moreover, laboratory data implies a good diagnostic approach for acute scrotum. Leukocytosis affects around half of the patients with acute scrotum which originates from testicular torsion and epididymo-orchitis [5]. Furthermore, nearly a quarter of epididymo-orchitis patients presented with pyuria [5].

Seasonal variation in acute scrotum has been reported in many studies [6-8]. Low temperature and humidity imply a key role in developing hyper-active cremasteric reflex which resulted in acute scrotum affection [6,8]. In this paper, we aim to provide an overview of the etiologies, diagnosis and treatment of acute scrotum.

**Methods**

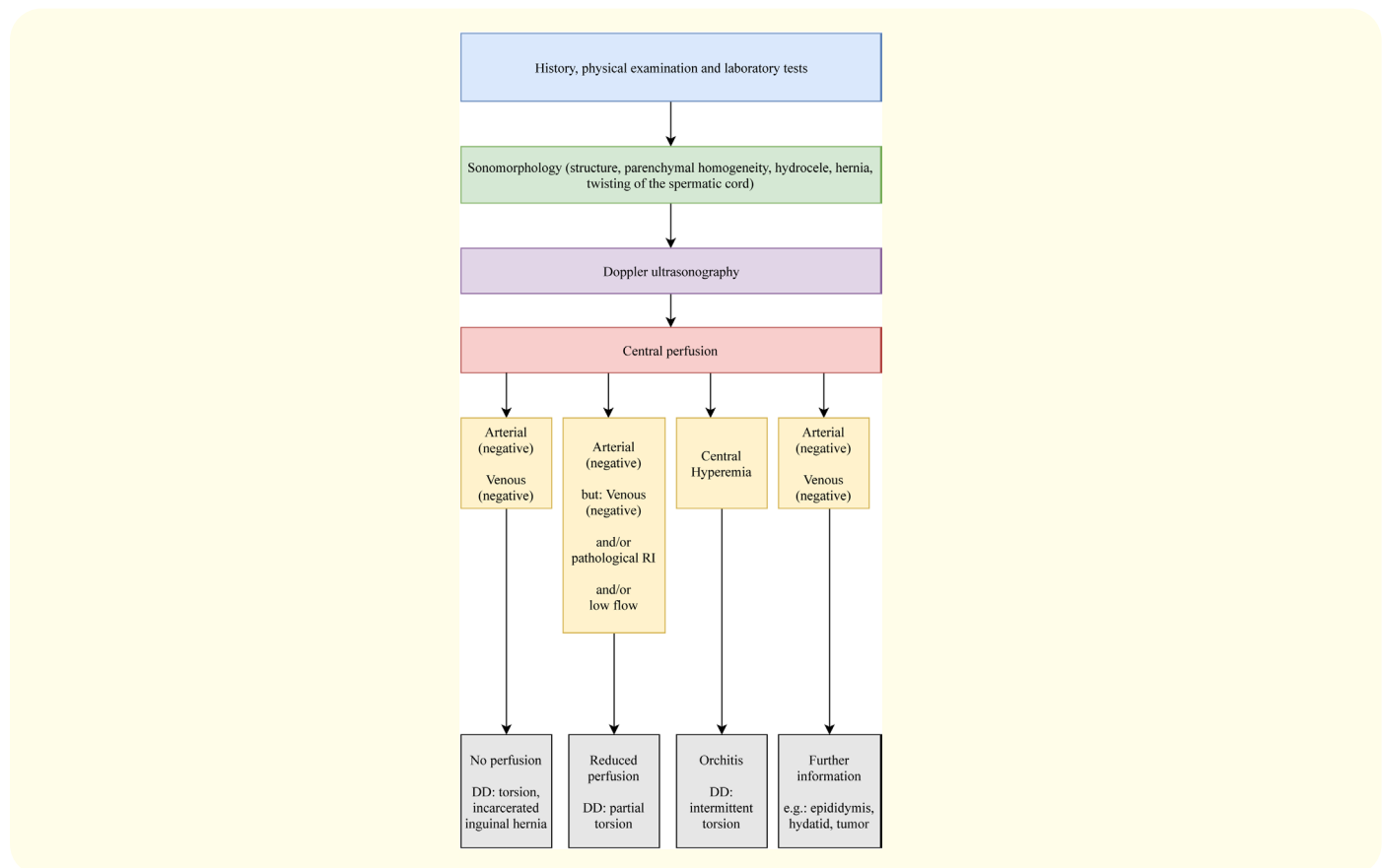
We performed an extensive literature search of the Medline, Cochrane, and EMBASE databases on 13 December 2019 using the medical subject headings (MeSH) terms. Papers discussing acute scrotum in adolescence were screened for relevant information. There were no limits on date, language, age of participants or publication type.

**Etiologies**

Identifying the etiologic origin of acute scrotum constitutes a major role in the proper management of acute scrotum. Torsion of testicular appendages (60%), testicular torsion (25%) and epididymo-orchitis (10%) were the common etiologies of the acute scrotum [9]. Lyronis., *et al.* reported that the epididymo-orchitis followed by torsion of appendages, spermatic cord torsion and trauma were the common etiologies of acute scrotum in 140 Greece boys [6]. Melekos., *et al.* demonstrated the age distribution of different causes of acute scrotum; torsion of testicular appendages was the common cause in patients ranges from 9 - 11 years; however, torsion of the testis was the common cause in patients ranges from 12 - 15 years [10]. Moreover, Tabari., *et al.* revealed that torsion of testis followed by incarcerated inguinal hernia and torsion of testicular appendage were the common diagnoses for driving acute scrotum in Iranian patients [11]. Furthermore, after performing the exploration surgery of French patients, the common etiologies were torsion of testicular appendages and testis torsion [12]. Physicians must consider rare causes of acute scrotum such as idiopathic scrotal edema, rheumatoid purpura, viral orchiditis, epididymal cyst, scrotal lipoma, calcification of the epididymis, epididymal hematoma, testicular tumor and Varicocele [12].

**Diagnostic evaluation**

The evaluation of a patient with acute scrotum starts with a concise history and physical examination. Whenever spermatic cord torsion is suspected, an immediate surgical consultation is required [13]. If surgical consultation is not indicated, further diagnostic investigations are required including a full blood examination, urine analysis and culture along with urethral swabs [14]. In patients with systematic diseases or sepsis, blood culture is required along with inflammatory biomarkers and pelvic imaging studies [14]. An overview of the evaluation of an acute scrotum patient is provided in figure 1 [15].



**History and physical examination**

A focused history taking is the first step to be performed for the proper assessment of patients with acute scrotum [14,16]. The patients should be inquired for the onset and duration of symptoms along with pain characteristics including; site, kind and onset along with nature (intermittent or continuous) [14,16]. The other main items in history taking include age, past medical history, general symptoms, first local symptom (pain or swelling), history of trauma, prior surgery, nausea or vomiting, fever, dysuria, petechiae, and changes in skin color [15]. The sexual history should be also reviewed, in sexually active adolescents, including; sexual partner information (gender and number), using condoms, and history of sexually transmitted diseases [14].

The physical examination of the acute scrotum should start with a careful inspection of the exposed abdomen and pelvis areas [13-16]. Any abnormal skin discoloration, rashes, ulcers, abnormal scrotal asymmetry (it is normal for the left hemiscrotum to hang slightly lower) or horizontal position of a testicle. This should be followed by the palpation of the groin, scrotum, thighs, and perineum for any present crepitation or subcutaneous emphysema [13-16]. The involved testis should be examined for size, position, and tenderness; in comparison to the contralateral one [13-16]. Moreover, the inguinal canal and the lower abdomen should be palpated with testing the cremasteric reflex [13-16]. The main items of physical examination are listed in table 1 [15].

Physical examination of the acute scrotum
Position and orientation of the testes (Brunzel sign = secondary high position of a testis)
Size of the testes
Cremasteric reflexes
Site of maximal tenderness
Color of the scrotum
“Blue dot sign”
Inguinal and abdominal examination

**Table 1:** Main items for the physical examination of the acute scrotum.

**Doppler ultrasonography**

The ultrasonographic examination of the acute scrotum is to done to assess testicular perfusion (both arterial and venous) [17,18]. The vessels of testicular parenchyma should be assessed along with the peripheral ones [19]. The reason for that is some conditions may show preserved perfusion in the peripheral vessels and the outer covering in spite of testicular torsion [19]. The resistance index (RI) of the testicular vessels should be determined as well [15,20-24]. An RI above 0.7 (mean: 0.43 - 0.75 [21]) with reversal of diastolic flow may indicate partial torsion [15,21,22,25]. This cutoff value is appropriate from puberty onward [21,26]; for pre-pubertal children, RI values up to 1.0 are considered normal (mean: 0.39 - 1.0) [15,21].

**Treatment**

Treatment modality differs according to etiology. In the case of testicular torsion, an emergency surgical exploration and detorsion is indicated [27-29]. An orchiopexy is usually the subsequent procedure to prevent recurrence [27-29]. A bedside trial of manual detorsion could be attempted with a success rate of 25% to 80%. The manual detorsion should be done from a medial to a lateral direction with up to 180 to 720 degrees [27-29]. In case of persistent pain or suspected torsion for more than six hours, manual detorsion should never be attempted [27-29]. Noteworthy, surgical exploration is always indicated even with a successful manual detorsion [27-29]. For the epididymitis, the treatment should be directed towards the causative organism using the appropriate antimicrobial treatment [30,31].

### Conclusion

The acute scrotum in adolescents has many causes with torsion of testicular appendages, testicular torsion, and epididymo-orchitis are the most common causes. The appropriate history taking, physical examination, and doppler ultrasonography are the main components of the proper diagnostic evaluation.

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### Conflicts of Interest

No conflicts related to this work.

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