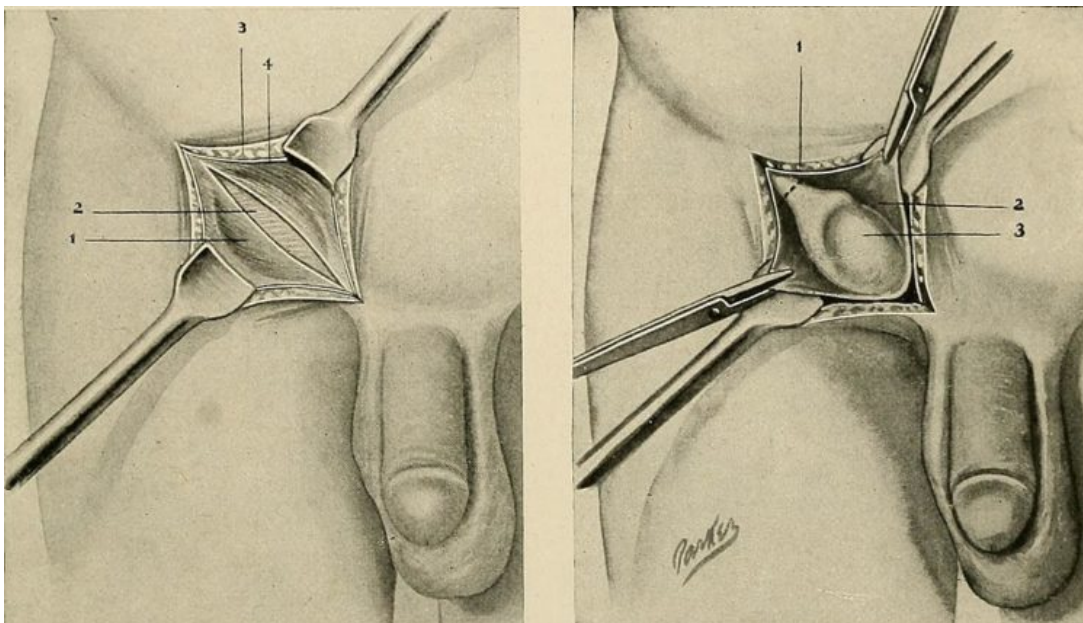


The Acute Scrotum in Adolescents: Testicular Torsion, Epididymitis, Hydroceles and More

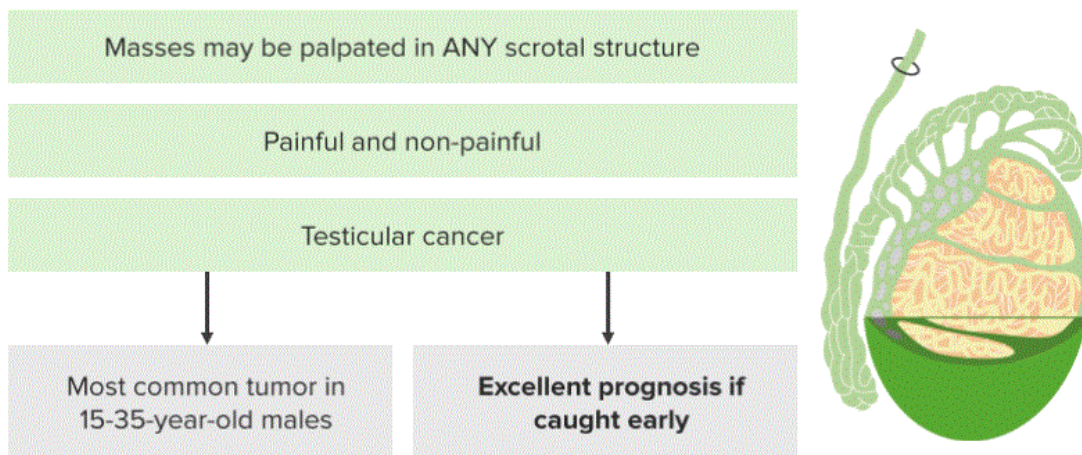
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The acute scrotum is an emergency condition that is characterized by scrotal pain, swelling, and redness which are of acute onset. The most important diagnosis to exclude is testicular torsion, as the testicular tissues cannot withstand ischemia for more than few hours.



Epidemiology of the Acute Scrotum in Adolescents

The acute scrotum per our previous definition can be quite common in adolescents. According to our definition, the term acute scrotum includes **testicular torsion, orchitis, and epididymitis, or non-testicular diseases** that can also present with acute painful swelling of the scrotum. The peak incidence of acute scrotum is seen in boys aged between 12 and 18 years.



“Scrotal Masses. General Characteristics” Image created by Lecturio

Testicular torsion is the most serious condition that presents with an acute scrotum. Up to 25 % of the cases of the acute scrotum are caused by testicular torsion. The estimated incidence of testicular torsion in adolescents is 1 per 4000, hence it is a common and serious condition. The main complication of untreated testicular torsion is infertility.

Testicular Torsion

Definition of Testicular Torsion

Testicular torsion is the **sudden rotation of one of the testes around its axis**. Strictly speaking, it refers to the twisting of the spermatic cord structures either in the inguinal canal or below.

This acute rotation results in compromised blood flow to and from the testis. Because of the blocked venous return and the reduced arterial perfusion of the testis, hemorrhagic infarction of the testicular parenchyma occurs. For these pathologic changes to happen, the involved testis needs to **rotate at least 360 degrees around its axis**.

Delayed treatment of testicular torsion has been linked to impaired spermatogenesis. The main cause of testicular torsion is the abnormal degree of mobility of the testis. When the testis is hypermobile, physical exercise, trauma or the activation of the cremasteric reflex can result in testicular torsion.

Classification

Extravaginal torsion: This type manifests in the neonatal period and most commonly develops **prenatally** in the spermatic cord, proximal to the attachments of the tunica vaginalis.

Intravaginal torsion: This type occurs within the tunica vaginalis, usually in older children.

Etiology and risk factors

- Certain anatomical variations such as the failure to anchor the gubernaculum, testis, and epididymis “*the bell-clapper anomaly*” may predispose to testicular torsion. Intravaginal torsion is the most common form of testicular torsion in

adolescents.

- A large mesentery between the epididymis and the testis
- History of trauma is seen in 20% of patients with testicular torsion.
- 1/3 have had prior episodic testicular pain which may denote the previous torsion that rotated and resolved hence acts as a risk factor for recurrence.
- Contraction of cremasteric muscle or dartos muscles shortens the spermatic cord and may initiate testicular torsion may play a role and is stimulated by trauma, exercise, cold, sexual stimulate.
- Cryptorchidism
- Testicular atrophy-post infectious or traumatic.

Clinical Presentation of Testicular Torsion

In the newborn, it presents as a hard-scrotal mass that doesn't transilluminate.

In older patients, they usually complain of **acute and severe pain** that can be associated with nausea and vomiting. Younger adolescents can present with shock-like symptoms. The **involved testis is fixed in position**, near the body and can be vertical or oblique. The cremasteric reflex is lost in patients with testicular torsion.

Similar symptoms of epididymitis may be experienced by the patient, however, the testis discoloration and swelling that is dominant in epididymitis may not be present. Additionally, testicular infraction can cause a low-grade fever.

Prehn's sign may be helpful in differentiating between torsion and epididymitis: If pain is reduced when the scrotum is lifted over the symphysis pubica, the pain is due to epididymitis; if pain increases, the cause is probably torsion.

Diagnostic Workup for Testicular Torsion

The main diagnostic tool for the evaluation of a suspected case of testicular torsion is history and physical examination. If the diagnosis is not straightforward, then ultrasonography and Doppler ultrasonography is indicated.

The ultrasonographic findings of testicular torsion of ultrasonography **depend on the degree of testicular ischemia**. In the initial stage, ultrasonography reveals a progressive increase in testicular volume and diffuse hypoechoogenicity. Inhomogeneities are found in delayed cases where irreversible testicular damage has happened.

Doppler ultrasonography is used to assess blood flow to and from the testis. The unambiguous demonstration of central arterial and venous flow from the testis is enough to exclude testicular torsion. In case of complete testicular torsion, central perfusion is absent.

Treatment of Testicular Torsion

Emergency surgical exploration of the tests is indicated in all cases of suspected or confirmed testicular torsion. The first step in the surgery is the detorsion of the testicular vessels to restore testicular perfusion. After that, the testicular parenchyma should be inspected to assess the degree of testicular damage. If the testis is clearly necrotic, primary orchiectomy is indicated. When the testis is not necrotic, it should be anchored to the scrotum with two sutures to prevent future recurrences of torsion. Contralateral orchiopexy is indicated in all cases of testicular torsion.

When the testis is not removed, follow-up ultrasonography is indicated to assess for subsequent testicular damage and adequate perfusion.

Complications of testicular torsion

- Delayed surgery reduces the salvage rate by more than 50%
- Retention of an injured testis can induce pathologic changes to the contralateral testis.
- Recurrence if orchidopexy not done
- Infertility

Epididymitis and Orchitis

Definition of Epididymitis and Orchitis

Epididymitis and orchitis are two conditions that are **characterized by the acute inflammation of the epididymis or the testis due to viral or bacterial infections**. Viral orchitis is more common in prepubertal boys and young adolescents, whereas bacterial infections are more commonly seen in older adolescents.

Clinical Presentation of Epididymitis and Orchitis

The main goal of the history taking and physical examination of the patient with any of these two conditions is to **exclude the true surgical emergency “testicular torsion”**. The main differences between these two conditions and testicular torsion are the slower onset, the absence of testicular fixation, and the normal position of the testis. Additionally, the cremasteric reflex is usually preserved. Patients might also complain of dysuria, urinary frequency, and urgency.



Sexual history



Urinary Symptoms



Pain and swelling of the testicle



Fever is rare

“Epididymitis” Image created by Lecturio

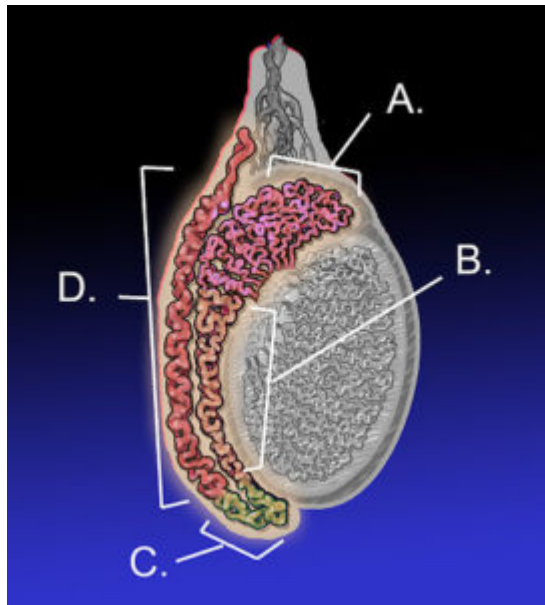
Causes of Epididymitis and Orchitis

Among sexual active teenagers gonorrhoea as well as chlamydia are the major cause of the Epididymitis and Orchitis conditions. In older males, the enteric bacteria are the common cause. The chlamydia trachomatis is responsible for almost two third of cases of urinary tract infections among sexually active men.

The various forms of epididymitis can be because of Genito urinary surgery, which includes prostatectomy as well as the urinary catheterization. Chemical epididymitis is as

a result of using drugs such as amiodarone

Diagnostic Workup for Epididymitis and Orchitis



Picture: "An illustration of an adult human testicle with the epididymis highlighted" by KDS444. Lizenz: [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

Ultrasonography is indicated to **establish one of these two diagnoses of the acute scrotum and to rule out testicular torsion**. The testis or the epididymis are usually enlarged on ultrasonography. Increased vascularization is typically seen in these two conditions.

A urinalysis is indicated in all cases of suspected epididymitis or orchitis. Urinalysis can help with establishing the diagnosis of urinary tract infection and can point towards the most likely causative organism.

Treatment of Epididymitis and Orchitis

Because most cases of orchitis are viral in etiology, symptomatic treatment is all that is needed. **Bed rest, local cooling, and nonsteroidal anti-inflammatory drugs** are the main treatments prescribed for orchitis. Antibiotic treatment of orchitis and epididymitis is indicated when the cause is suspected to be bacterial in origin. Cefuroxime 100 mg/kg/day is a reasonable antibiotic choice for epididymitis in adolescents.

Classification of epididymitis

Epididymitis can be grouped depending on the duration of the symptoms. It can be classified as acute, subacute as well as chronic. The chronic epididymitis is usually present for a duration of more than three months, and it is commonly associated with lower back pains.

Testicular Trauma

Testicular trauma can also cause acute scrotum. Hematocele or deme of the testis and scrotum are the main two findings seen after a blunt traumatic injury to the scrotum. Because testicular trauma can lead to testicular torsion, ultrasonography should be

performed to exclude this surgical emergency. If the testicular damage on ultrasonography is deemed as too extensive, surgical intervention is indicated. Otherwise, symptomatic treatment and ultrasonographic follow-up are all that is needed.

Hydroceles

Definition of Hydroceles

Hydroceles in adolescents are usually idiopathic and are not related to a patent processus vaginalis. The main pathology behind idiopathic hydroceles is the **imbalance between the secretion and absorption of fluid in the tunica vaginalis**. Because of either excessive fluid secretion or decreased absorption, scrotal swelling ensues.

Hydroceles are associated with some ipsilateral testicular changes which might be associated with decreased fertility in the future. Increased scrotal temperature and the absence of testicular diastolic flow are the main two abnormalities observed in the ipsilateral testis in an adolescent with a hydrocele.

Clinical Presentation of Hydroceles

The clinical presentation of hydroceles is characterized by the **swelling of one or both of the hemiscrota**. The swelling is usually not painful, unlike the other causes of acute scrotum we discussed so far. Symptomatic hydroceles are more likely to be caused by trauma or an infectious process rather than being idiopathic.

Diagnostic Workup for Hydroceles

Ultrasonography is indicated to establish the diagnosis of idiopathic hydroceles. Nowadays, fluid aspiration should not be attempted in a case of hydrocele as the risk of infection is increased. Ultrasonography is also indicated to exclude another cause of painless scrotal swelling, i.e. testicular tumors. Testicular tumors are more commonly seen in adolescent boys compared to adults and they can cause swelling of the scrotum by themselves or cause a reactive hydrocele.

Treatment of Hydroceles

The treatment of choice for idiopathic hydroceles in adolescents is **open hydrocelectomy**. A scrotal incision is usually sufficient in the repair process of idiopathic hydroceles. When a communicating hydrocele is suspected, an inguinal approach is preferred. Communicating hydroceles due to a patent processus vaginalis are rarely encountered in adolescents compared to younger children and infants.

References

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