Refresher Course

Testicular Scanning

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Testicular scanning

Torsion of the testis has been recognized as a surgical emergency because it leads to death in the scrotum by ischemia and infarct within a short time after occurrence. It is important to distinguish testicular torsion from epididymitis because torsion is treated by surgery and epididymitis is treated medically. The diagnosis of epididymitis or torsion of testis based on only history and physical examination is very frequently unreliable. Without a reliable way to exclude the possibility of testicular torsion in a patient with hemiscrotal tenderness and relatively acute symptoms, immediate surgical exploration has been recommended. This approach maximizes testicular salvage but, retrospectively leads to many unnecessary operations. The peak incidence of testicular torsion is around puberty. The pain of testicular torsion is describe as abrupt and often causes nausea and vomiting. Upon physical examination, the hemiscrotum will be edematous and the testis will be swollen and high in the scrotum. The epididymis will be normal in size but posterior in position. Urinalysis will be normal or show fewer than 5 white blood cells/ high power field, and a urine culture will be sterile. Epididymitis has been considered a disease of young adult males. The symptoms of epididymitis are usually gradual in onset and moderate in intensity. Dysuria and burning with urination are common, as is moderate to high fever. Physical examination will demonstrate swelling and erythema of the involved hemiscrotum, swelling of the epididymis and testis, and normal position of both testes. Urinalysis will show more than 10 white blood cells/ high power field. Prehn's sign, relief of symptoms with elevation of the scrotumt also indicates epididymitis. In patients with testicular torsion, however, elevation of the scrotum leads to exacerbation of symptom. Other causes of scrotal pain are idiopathic scrotal edema, acute hydrocoele, acute or incarcerated inguinal hernia, acute fat necrosis and scrotal deep vein thrombosis.

Testicular scanning : Scintigraphic technique

Patient position

The patient is positioned supine with the scrotum in a tape sling suspended between the thighs. The penis is taped cephalad on the lower abdominal wall so its activity will not interfere with scrotal images. The legs are abducted to diminish soft tissue thigh activity.

Radioactivity and imaging protocol

A 99m Tc pertechnetate (99m TcO4) 15-20 mCi is bolus injected during dynamic imaging at three-second intervals over the first minute. Static image of anterior view is taken with marker placed at the median raphe of the scrotum.

Normal findings

Well-defined flow in the testicular artery is usually not visualized because of the low level of perfusion. Static images reveal a symmetrical and homogeneous faint distribution of activity. Activity presented in the penis generally appears as a hot linear or ovoid collection of activity located above the scrotum. The urinary bladder is cold on the initial images, but as time progresses, 99m TcO4 is excreted into the urine.

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Intrascrotal pathology and its scintigraphic appearance

Torsion of the testicle

Extravaginal torsion seen in neonates is an obvious clinical indication of torsion and it is invariably accompanied by testicular necrosis. Therefore there is no need to study these patients by scintigraphy.[1] Intravaginal torsion is appropriately studied by scintigraphy.

Chen et al divided testicular scan into three phases.[2] The early phase extends from the onset of symptoms to approximately 5-7 hours later. Static blood-pool images display a unilateral decrease in activity on the affected side. When the testicle has undergone spontaneous detorsion prior to imaging, the study may be normal or a diffuse hyperemia of the involved side may be present. In the mid-phase of torsion between 7-24 hours, perfusion via the spermatic cord remains absent with increasing inflammation and reactive hyperemia of the dartos, supplied by pudendal vessels, resulting in a symmetrical rim of progressively increasing activity surrounding the photopenic testicle[3] (Figure1). This finding has been termed a " bull's eye", "halo", or "rim" sign and is usually associated with irreversible loss of testicular function, however if the rim is only mild to moderate in intensity the testis may still be salvageable[4]. The late phase of torsion begins 24 hours after the initial onset and extends for several weeks. The late phase of torsion is associated with testicular infarction and pronounced scrotal hyperemia. A prominent rim sign is noted.

Epididymo-orchitis

The scintigraphic findings in epididymo-orchitis are opposite those seen in testicular torsion. There is hyperemia of the involved tissue with increased flow on dynamic images via the spermatic cord (Figure 2).



Figure 1. A thirteen years old boy with a history of pain at right testis started 1 week ago. The physical examination revealed swelling of right testis and mild tenderness. The scan showed decreased uptake at the central of right testis with increased activity at the periphery. These scan results along with clinical symptom of right scrotal pain for a week, is compatible with a missed torsion. The patient received supportive treatment and at a 1-month follow up visit, the pain in the right scrotum is subsidence with the solid mass.

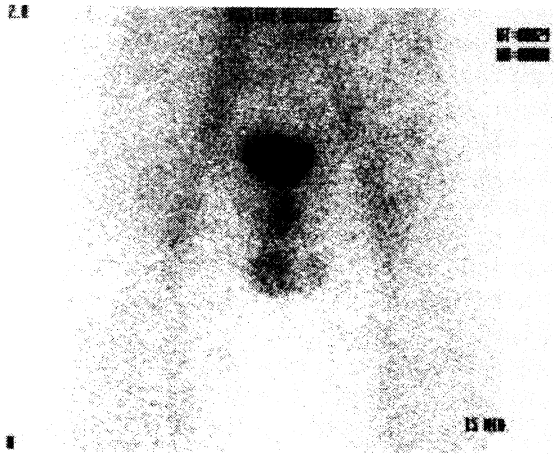


Figure 2. A ten years old boy had tenderness and swelling at the right testis for 5 days. The testicular scan revealed diffuse increased tracer uptake at the right testis. The left testis shows a normal distribution of the tracer. The finding is compatible with orchitis at the right testis. The patient was treated with cetriaxone and clinical symptoms improved.

Torsion of the testicular appendices

Radionuclide appearance is usually normal, although mild hyperemia and focal photopenic defects may be noted.

Abscess

An abscess generally results in a diffusely increased flow in both the spermatic cord and pudendal vessels. On static images, there is diffusely increased activity with a cooler central area. The differential diagnosis between intrascrotal abscess from missed torsion is difficult, and both conditions require surgical intervention.

Other conditions

A faint halo may also be seen surrounding an area of hematoma, non-infected hydrocele, spermatocele or hernia.

Accuracy of scrotal scintigraphy

Meta-analysis of approximately 1,200 patients in several large series prior to 1990[5] showed that the sensitivity of the examination is 96% and an even higher sensitivity has been confirmed in more recent studies.[6]

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