

Clinics in Diagnostic Imaging (33)

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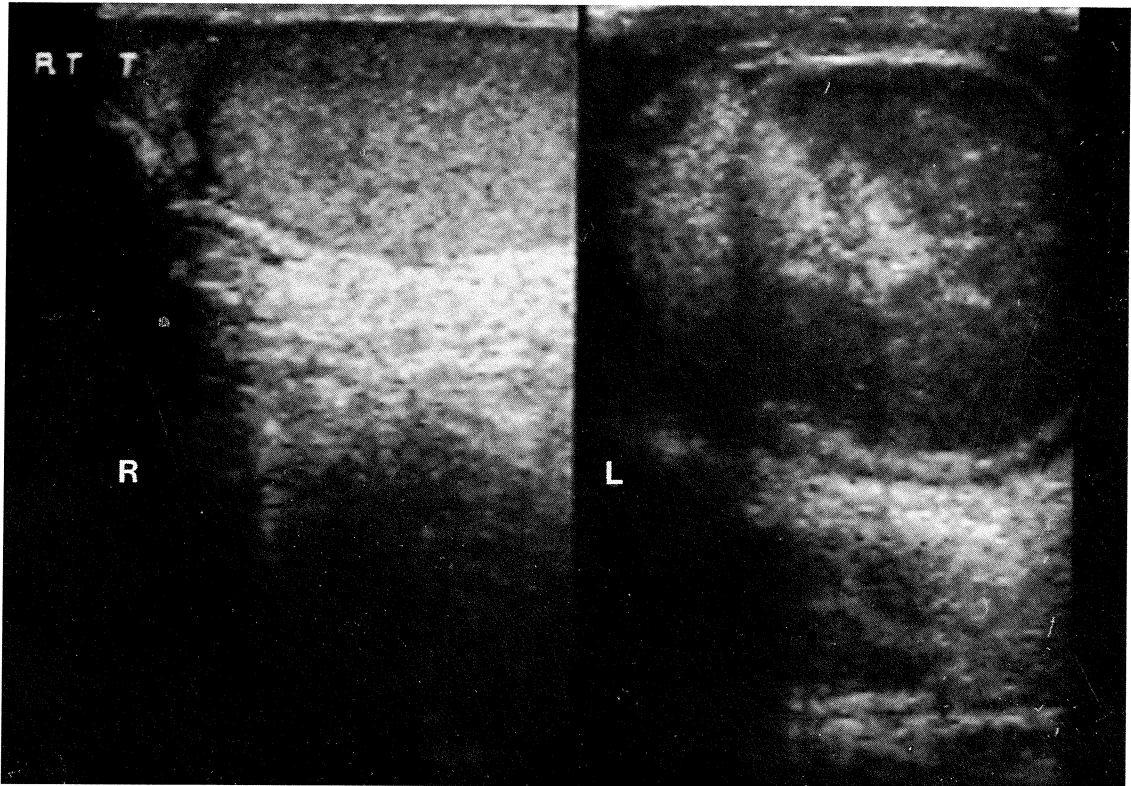


Fig 1 – Longitudinal US scans of both testes [R=right, L=left].



Fig 2 – Colour Doppler US scan of the left testis.

CASE PRESENTATION

A 13-year-old boy presented with painful swelling of the left scrotum for 7 days and a fever for 3 days. He denied history of sexual intercourse, trauma and mumps. On physical examination, he was found to be febrile. Redness of the scrotal skin, enlargement of the left scrotum and moderate tenderness of the left testis were noted. Urinalysis was normal. The white blood count was $20.2 \times 10^9/L$, with 79% polymorphonuclear leukocytes. Ultrasound (US) was performed with the provisional diagnosis of left testicular abscess. What do US scans of the scrotum show? (Figs 1 and 2). What is the diagnosis?

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IMAGE INTERPRETATION

Longitudinal US image of the scrotum revealed diffuse homogeneously-decreased echogenicity of the enlarged left testis with a highly echogenic mediastinum. The overlying left scrotal skin was thick compared to the normal right scrotum (Fig 1). Colour Doppler US showed absence of flow signal to the left testis but increased peritesticular blood flow was present (Fig 2).

DIAGNOSIS

Missed testicular torsion

CLINICAL COURSE

The patient underwent left orchidectomy and right orchidopexy, which confirmed the diagnosis. The post-operative course was uneventful, and he recovered well.

DISCUSSION

Acute scrotal pain is a surgical emergency that requires prompt diagnosis and treatment. Clinical symptoms and physical examination are variable and nonspecific, particularly when there are severe pain and swelling, which makes accurate palpation of the scrotal contents difficult. Causes of acute scrotal pain include torsion of the spermatic cord, inflammation, trauma and tumour⁽¹⁻³⁾. It is essential to differentiate, as early as possible, conditions requiring immediate surgery (eg. testicular torsion or rupture) from those that can be adequately treated by medication alone (eg. epididymitis). US is the imaging modality of choice for defining scrotal abnormalities, hence enabling the proper management⁽¹⁻⁶⁾.

Testicular torsion

Testicular torsion results from an abnormal mobility of the testis and usually occurs in adolescent males aged between 12 and 18 years. This problem is usually bilateral and requires treatment by orchidopexy. The diagnosis of testicular torsion must be rapidly confirmed since the salvage rate of the testes is 80% to 100% if the surgery is performed within 5 hours after onset of pain. If surgery is performed within 6 to 12 hours after torsion, the salvage rate is 70% and only 20% are salvageable if surgery is delayed more than 12 hours after the onset of pain. The patients usually seek treatment early because of the severity of pain⁽¹⁻³⁾. The US appearances of testicular torsion are non-specific, being dependent on the duration of torsion. Appearances are determined by accompanying morphological changes such as oedema, necrosis and haemorrhage. The oedematous testis is enlarged and hypoechoic. Haemorrhage gives the testis a heterogeneously-echogenic appearance. Variable degrees of scrotal wall thickening and reactive hydrocoele may be present.

These US features of testicular torsion may however be confused with those of epididymo-orchitis. Colour Doppler US or testicular perfusion scintigraphy are useful procedures for the assessment of testicular perfusion⁽⁴⁻⁶⁾. Reduced or absent vascular perfusion indicates torsion, whereas increased

perfusion suggests an inflammatory condition. In the acute phase of testicular torsion, there is diminished or absent flow to the testis with normal peritesticular flow. In the late phase, there is persistent decreased flow to the testis but increased peritesticular flow. The increased peritesticular flow produces the so-called "rim sign" or "doughnut sign" on testicular scintigraphy⁽⁵⁻⁷⁾ (Fig 3).

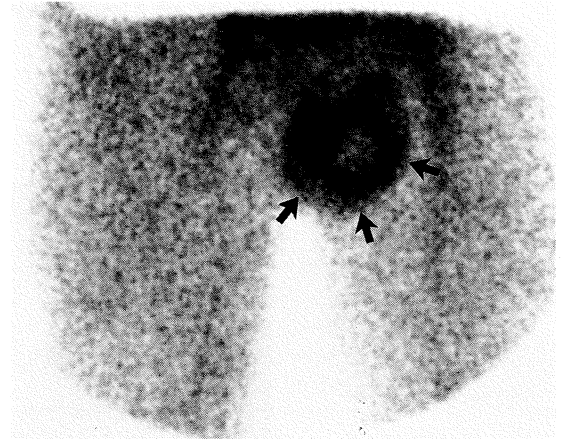


Fig 3 – Testicular scintigraphy, static image, shows the normal right testis and a cold area in the left testis with surrounding increased uptake producing the "rim sign" or "doughnut sign" (arrows).

Testicular inflammation

Epididymitis is the most common cause of acute scrotal pain in the post-pubertal age group. Most cases of epididymitis are caused by retrograde spread of infection from the bladder or urethra. Associated orchitis generally results from an extension of epididymitis and is called epididymo-orchitis. Orchitis without epididymitis may be present in viral infections such as mumps⁽¹⁻³⁾. US findings consist of a variable combination of enlargement of the epididymis and/or testis, with focal or diffuse hypoechoicities. Associated scrotal skin thickening and reactive hydrocoele are also common (Fig 4). Colour Doppler US and testicular perfusion scintigraphy show increased testicular flow⁽⁵⁻⁷⁾ (Fig 5). A circumscribed, markedly hypo- or anechoic lesion within the affected testicular parenchyma suggests the presence of an abscess^(1,4-6) (Fig 6).

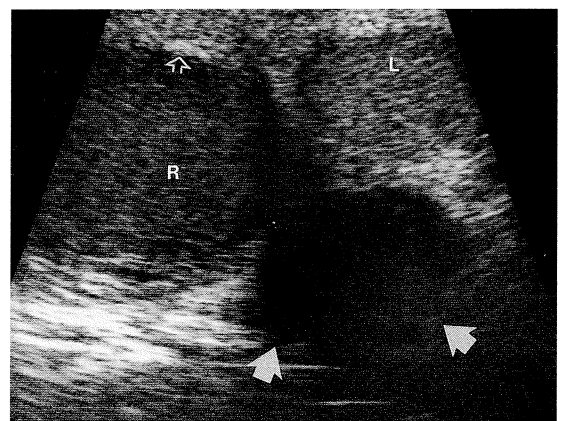


Fig 4 – Right epididymo-orchitis. Transverse US scans of both testes show diffuse homogeneously-decreased echogenicity of the enlarged right testis [R] with thickened right scrotal skin (open arrowhead). The hydrocoele is arrowed (solid arrows). Left testis [L] is normal.

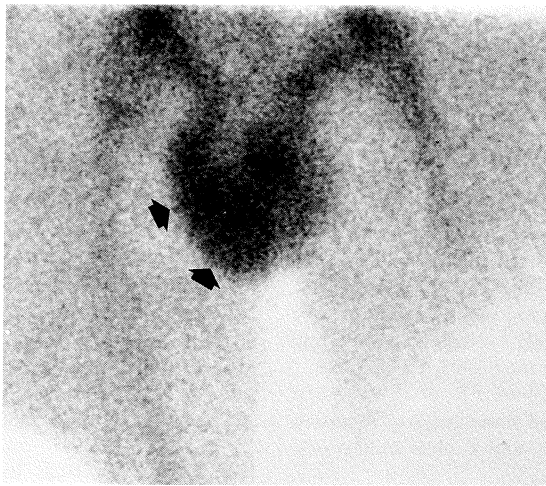


Fig 5 – Epididymo-orchitis. Testicular scintigraphy, static image, shows diffuse increased uptake in the right testis (arrows).



Fig 6 – Testicular abscess. Longitudinal US scan shows an enlarged testis and multiple anechoic areas (arrows) representing abscesses.

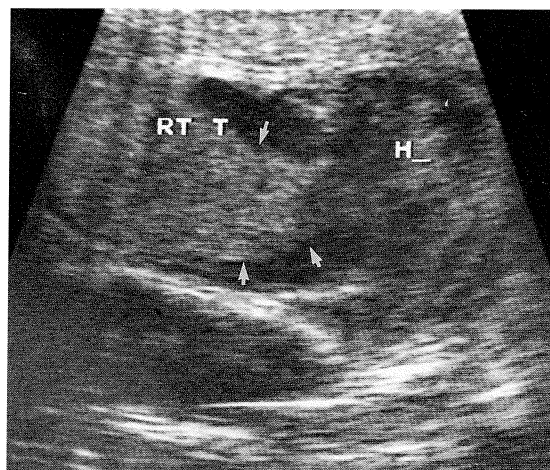


Fig 7 – Blunt trauma. Longitudinal US scan of the right testis demonstrates an irregular testicular contour (arrowheads) and scrotal haematoma [H].

Trauma

US plays a significant role in patients presenting with blunt trauma to the scrotum. It is used for confirming or excluding testicular rupture and is very helpful in guiding the proper management. Identification of testicular rupture in the first 72 hours enables early surgical exploration and optimum salvage rates⁽⁸⁾. Traumatic injuries of the testis are easy to identify by US. A haematocoele is seen as a hypoechoic area surrounding the testis. Testicular fracture is present in 50% of patients with traumatic haematocoeles. Irregularity of the testicular contour, loss of the linear structures of the tunica albuginea, and associated haematoma are US signs indicative of a fracture of the testis (Fig 7).

Testicular tumours

Ten percent of testicular tumours have an acute clinical presentation and may simulate an acute intrascrotal inflammatory process⁽³⁾. The occurrence of haemorrhage and necrosis in tumours may explain the acute symptoms. Ninety to 95% of malignant testicular tumours are of germ cell origin. Among these lesions, seminomas are the most common, accounting for 40% – 50% of cases. Small tumours are seen on US images as focal lesions, while larger tumours may destroy and replace the entire testicular parenchyma^(2,4,9). The tumour borders may either be smooth or irregular. Most testicular tumours are hypoechoic, although some may also be depicted as lesions of hyper- or mixed echogenicity (Fig 8). The diagnosis of testicular tumour cannot be made solely on the basis of the US appearances. A number of benign intra-testicular processes, including infarct, haematoma, abscess and orchitis, also may appear as focal intra-testicular lesions. The combination of an enlarged epididymis together with scrotal wall thickening is the most reliable finding suggestive of a benign inflammatory process⁽⁶⁾.

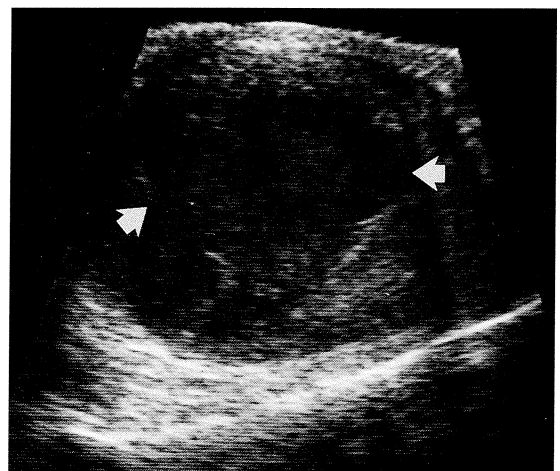


Fig 8 – Seminoma. The tumour is seen as an ill-defined hypoechoic mass (arrows) in an enlarged testis.

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ABSTRACT

A 13-year-old boy presented with a painful scrotal swelling. On examination, the left testis was enlarged and tender. Ultrasound scan showed diffuse hypoechoogenicity, with absent intra-testicular but increased peri-testicular blood flow. The diagnosis of missed testicular torsion was confirmed at surgery. The role of imaging in differentiating among other causes of painful scrotal swelling, such as infection, trauma and tumour, are discussed.

Keywords: scrotal lesion, testicular torsion, testicular tumour, testicular inflammation, ultrasound



8TH MINISTRY OF HEALTH – MAYO CLINIC FOUNDATION UPDATE



Theme : Cardiothoracic Disease
27 – 28 February 1999
Auditorium, College of Medicine Building

Saturday, 27 February 1999

11.00 am : Opening Address

Session I – Recent Advances

Chairmen : A/Prof Eugene Sim and Dr Philip Eng

11.10 am : Cardiac Surgery

11.50 am : Pulmonary Medicine

12.30 pm : Discussion

12.45 pm : Lunch

Prof Thomas Orszulak
Prof Udaya Prakash

Session II – Coronary Artery Disease

Chairman : Dr Charles Toh

2.00 pm : Medical Management

2.20 pm : Surgical Management

2.40 pm : Interventional Cardiology

3.00 pm : Discussion

3.30 pm : Tea Break

Prof Chia Boon Lock
Prof Thomas Orszulak
Prof Lim Yean Leng

Session III – Lung Cancer

Chairman : Dr Philip Eng

3.50 pm : Surgery for Lung Cancer

4.10 pm : Imaging in Lung Cancer

4.30 pm : Interventional Bronchology for Lung Cancer

4.50 pm : Discussion

5.20 pm : End of Programme

Dr T Agasthian
Dr Cheah Foong Koon
Prof Udaya Prakash

Sunday, 28 February 1999

Session IV – Pulmonary Infections

Chairman : Dr Wang Yee Tang

2.00 pm : Pulmonary Infections in HIV

2.20 pm : Use of New Fluoroquinolones in Pulmonary Infections

2.40 pm : TB in North America

3.00 pm : Discussion

3.20 pm : Tea Break

Prof Udaya Prakash
Dr Wong Sin Yew
Prof Udaya Prakash

Session V – Heart Failure

Chairman : Dr Chua Yeow Leng

3.40 pm : Medical Management

4.10 pm : New Surgical Option for Treatment of Heart Failure

4.40 pm : Discussion

5.00 pm : End of Programme

Dr Lau Kean Wah
Prof Thomas Orszulak
Prof Udaya Prakash

Mayo Clinic Foundation Faculty:

Udaya B S Prakash, MD

Edward W and Betty Knight Scripps Professor of Medicine, Mayo Medical School and Mayo Graduate School of Medicine, Consultant in Pulmonary, Critical Care and Internal Medicine, Director of Bronchoscopy, Mayo Clinic and Mayo Medical Centre

Thomas A Orszulak, MD

Consultant in Thoracic and Cardiovascular Surgery, Mayo Clinic, Professor of Surgery, Mayo Medical School

Admission : Free

CME : 3 points for Saturday, 27 February 1999
2 points for Sunday, 28 February 1999
On-site registration for each session