Diagnostic Imaging Pathways - Scrotal Pain (Acute)

Population Covered By The Guidance

This pathway provides guidance for the imaging investigation of male patients with acute scrotal pain.

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Quick User Guide

Move the mouse cursor over the PINK text boxes inside the flow chart to bring up a pop up box with salient points. Clicking on the PINK text box will bring up the full text. The relative radiation level (RRL) of each imaging investigation is displayed in the pop up box.

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>RRL</th>
<th>EFFECTIVE DOSE RANGE</th>
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<td>Minimal</td>
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<td>![Symbol]</td>
<td>High</td>
<td>&gt;10 mSv</td>
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Pathway Diagram
ACUTE SCROTAL PAIN

Refer to emergency department for urgent surgical assessment if presentation is equivocal or suspicious for testicular torsion

Suspected testicular torsion
Imaging not indicated

Uncertain clinical diagnosis

Clear clinical diagnosis not requiring surgical intervention e.g. epididymo-orchitis

Urgent ultrasound including Doppler

Surgical exploration

Evidence of torsion or uncertain perfusion

Non-surgical diagnosis

Manage accordingly ± non-urgent US

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Image Gallery

Note: These images open in a new page

1. **Epididymo-Orchitis**

   Image 1 (Ultrasound): Swelling of the right epididymis with associated mild orchitis. Doppler images (not shown here) demonstrate increased vascularity.

2. **Testicular Tumour**

   Image 2 (Ultrasound): Solid and cystic lesion with thick walls and marked vascularity in some areas. The appearances are consistent with a tumour.
3a

Testicular Tumour

Image 3a: Orchidectomy specimen showing complete replacement of the normal testicular parenchyma with the classical “cut-potato” appearance of a seminoma. The tunica albuginea is intact.

3b

Image 3b (H&E, x2.5): Histological section of a seminoma showing groups of malignant cells with large nuclei and prominent nucleoli. There are also intervening fibrous bands with an infiltrate of lymphocytes and plasma cells.

4a

Testicular Tumour

Image 4a (H&E, x2.5): Orchidectomy specimen showing a teratoma with areas of cyst formation and haemorrhage.

4b

Image 4b (H&E, x2.5): Histological section of a teratoma (non-seminomatous germ cell tumour) showing hyaline cartilage and islands of columnar epithelium.

Teaching Points

- There are many causes of acute scrotal pain. Torsion of the testis, epididymo-orchitis and torsion of the testicular appendage are the most common.
- If torsion is suspected following history and physical examination, imaging should not delay urgent surgical exploration.
  - The viability of a torted testicle declines significantly with time, up to 100% salvageable within 6 hours, but almost none are salvageable at 24 hours.
  - Negative surgical exploration is preferable to a missed diagnosis because all imaging studies have a false negative rate.
- Epididymo-orchitis is the most common cause of scrotal pain in adolescents and adults and is diagnosed clinically. Ultrasound is indicated if there is concern about a scrotal abscess or after failure to respond to treatment.
- Doppler ultrasound is only indicated in equivocal cases or where there is a low suspicion for torsion on clinical evaluation. Other causes for scrotal pain can also be demonstrated on ultrasound.

Testicular Torsion

- Torsion is a urological emergency.
- The viability of a torted testicle declines significantly with time, up to 100% salvageable within 6 hours, but almost none are salvageable at 24 hours 1-3.
- When history and physical examination are consistent with torsion, patients should proceed to surgical exploration; imaging only delays definitive treatment 4-12.
- Negative surgical exploration is preferable to a missed diagnosis because all imaging studies have
Ultrasound

- Scrotal ultrasound (US) examination should include grayscale and Doppler studies, either colour Doppler and/or power Doppler. This can help to rule out torsion in clinically equivocal cases, and to identify other causes for pain that require treatment such as epididymitis or inguinal hernia.
- "Gold standard" in the diagnostic imaging of testicular torsion with sensitivity 82-90% and specificity approaching 100%.
- Colour Doppler reliably assesses blood flow within the testis. In testicular torsion, blood flow is markedly reduced or absent. Power Doppler has been shown to demonstrate flow where colour Doppler does not, with sensitivity 96-100% and specificity 84-95%.
- Clinical correlation with imaging findings is essential as a spontaneous detorsion of a torted testis can appear ultrasonographically identical to epididymo-orchitis.
- In suspected epididymo-orchitis, US allows:
  - Confirmation of the diagnosis
  - Excludes testicular torsion
  - Scrotal assessment if there is difficulty in palpating the epididymis separately from the other intrascrotal structures
  - Monitor complications such as infarction or abscess, which may require surgical intervention
- US features of epididymitis include:
  - Epididymal enlargement
  - Hypoechoogenicity
  - Skin thickening
  - Increased blood flow (hypervascularity of epididymis and/or testicle has a sensitivity of 91-100% for epididymitis +/- orchitis)
  - Helps localise a scrotal swelling (testicular or extra-testicular); >98% sensitivity for testicular neoplasms (which may present with pain)
- There is a reported false negative rate of 1%. This may be due to:
  - False negatives in incomplete torsion and in spontaneous de-torsion
  - Occasional inability to demonstrate flow in a normal testis
  - Discordant epididymal and scrotal flow in spermatic cord torsion
  - Flow in patients with testicular necrosis
- Testicular isotope scan or MRI have been suggested as second-line imaging tests to assess perfusion following an equivocal ultrasound, however they are not always readily available and can take a long time so are not generally appropriate in the acute setting where urgent surgical intervention may be warranted.

References

Date of literature search: March 2018

References are graded from Level I to V according to the Oxford Centre for Evidence-Based Medicine, Levels of Evidence. Download the document


EAU guideline on paediatric urology. European Association of Urology. 2017 (Guideline).


Testicular torsion BMJ Best Practice; 2018. (Review article).


Management of paediatric torsion. 2015. (Guideline).

Early scrotal exploration in all cases is the investigation and intervention of choice in the acute paediatric scrotum. Pediatr Surg Int. 2006;22(5):413-6. (Level II evidence).


Consent to Procedure or Treatment

Radiation Risks of X-rays and Scans

Ultrasound

Ultrasound (Doppler)

Radiation Risk of Medical Imaging for Adults and Children

Ultrasound

Nuclear Medicine