

# 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.

**Date reviewed: April 2018**

**Date of next review: April 2021**

**Published: June 2018**

## 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.

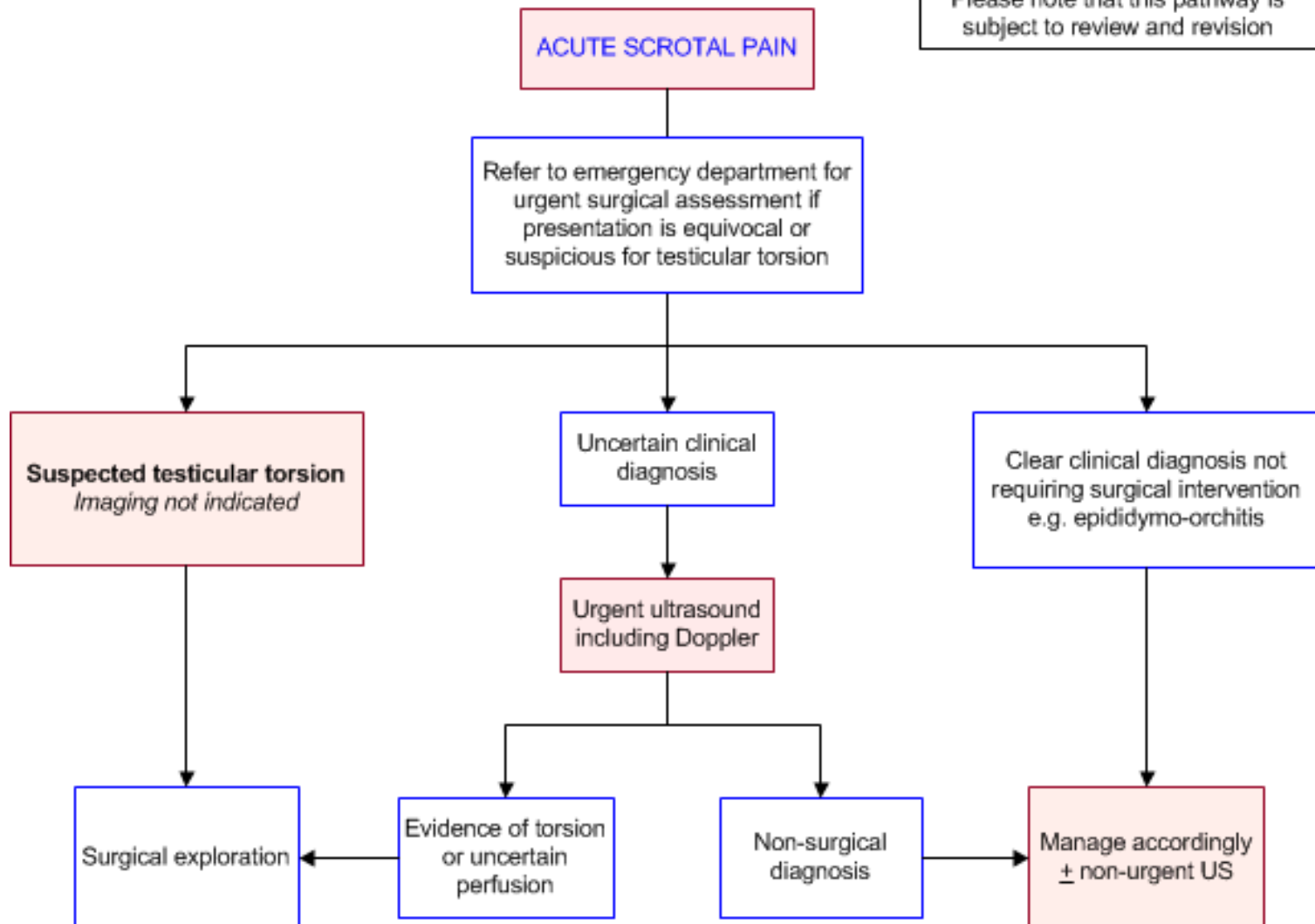
Clicking on the **PINK** text box will bring up the full text.

The relative radiation level (RRL) of each imaging investigation is displayed in the pop up box.

SYMBOL	RRL	EFFECTIVE DOSE RANGE
	None	0
	Minimal	< 1 millisieverts
	Low	1-5 mSv
	Medium	5-10 mSv
	High	>10 mSv

## Pathway Diagram

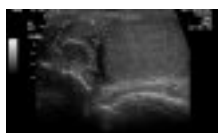
Date reviewed: May 2018  
Please note that this pathway is subject to review and revision



## Image Gallery

*Note: These images open in a new page*

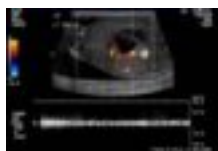
1



### 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 torsted 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 torsted 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

a false negative rate [10, 13](#)

## Ultrasound

- Scrotal ultrasound (US) examination should include grayscale and Doppler studies, either colour Doppler and/or power Doppler. [9](#) 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% [14-16](#)
- Colour Doppler reliably assesses blood flow within the testis. In testicular torsion, blood flow is markedly reduced or absent. [14](#) Power Doppler has been shown to demonstrate flow where colour Doppler does not, with sensitivity 96-100% and specificity 84-95% [17](#)
- Clinical correlation with imaging findings is essential as a spontaneous detorsion of a torqued testis can appear ultrasonographically identical to epididymo-orchitis
- In suspected epididymo-orchitis, US allows [2](#)
  - 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 [2](#)
  - Epididymal enlargement
  - Hypoechoogenicity
  - Skin thickening
  - Increased blood flow (hypervascularity of epididymis and/or testicle has a sensitivity of 91-100% for epididymitis +/- orchitis) [18](#)
- Helps localise a scrotal swelling (testicular or extra-testicular); >98% sensitivity for testicular neoplasms (which may present with pain) [19](#)
- There is a reported false negative rate of 1%. [5](#) This may be due to: [14, 16, 20](#)
  - 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](#)

- [1.](#) Davenport M. **ABC of general surgery in children. Acute problems of the scrotum.** BMJ : British Medical Journal. 1996;312(7028):435-7. (Level II evidence). [View the reference](#)
- [2.](#) Dunne PJ, O'Loughlin BS. **Testicular torsion: time is the enemy.** Aust N Z J Surg.



- 2000;70(6):441-2. (Level II evidence). [View the reference](#)
3. Makela E, Lahdes-Vasama T, Rajakorpi H, Wikstrom S. **A 19-year review of paediatric patients with acute scrotum.** Scand J Surg. 2007;96(1):62-6. (Level II evidence). [View the reference](#)
  4. Tekgül S, Dogan HS, R. Kocvara, Nijman JM, Radmayr C, Stein R, et al. **EAU guideline on paediatric urology.** European Association of Urology. 2017 (Guideline). [View the reference](#)
  5. Baker LA, Sigman D, Mathews RI, Benson J, Docimo SG. **An analysis of clinical outcomes using color doppler testicular ultrasound for testicular torsion.** Pediatrics. 2000;105(3 Pt 1):604-7. (Level II evidence). [View the reference](#)
  6. Bowlin PR, Gatti JM, Murphy JP. **Pediatric testicular torsion.** Surg Clin North Am. 2017;97(1):161-72. (Review article). [View the reference](#)
  7. Al Shakarchi J, Bowley D, Hendrickse C. **Guidelines for the management of acute scrotal pain in children.** Heart of England NHS Foundation Trust. 2011 [View the reference](#)
  8. Kaplan G. **Testicular torsion** BMJ Best Practice; 2018. (Review article). [View the reference](#)
  9. Hartman MS, Leyendecker JR, Friedman B, Fulgham PF, Heller MT, Hosseinzadeh K, et al. **Acute onset of scrotal pain - without trauma, without antecedent mass.** American College of Radiology ACR Appropriateness Criteria. 2014 (Guideline). [View the reference](#)
  10. National Institute for Health and Care Excellence. **Management of paediatric torsion.** 2015. (Guideline). [View the reference](#)
  11. Murphy FL, Fletcher L, Pease P. **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). [View the reference](#)
  12. Lopez RN, Beasley SW. **Testicular torsion: potential pitfalls in its diagnosis and management.** J Paediatr Child Health. 2012;48(2):E30-2. (Review article). [View the reference](#)
  13. Sharp VJ, Kieran K, Arlen AM. **Testicular torsion: diagnosis, evaluation, and management.** Am Fam Physician. 2013;88(12):835-40. (Review article). [View the reference](#)
  14. Wilbert DM, Schaerfe CW, Stern WD, Strohmaier WL, Bichler KH. **Evaluation of the acute scrotum by color-coded Doppler ultrasonography.** J Urol. 1993;149(6):1475-7. (Level II evidence). [View the reference](#)
  15. Suzer O, Ozcan H, Kupeli S, Gheiler EL. **Color Doppler imaging in the diagnosis of the acute scrotum.** Eur Urol. 1997;32(4):457-61. (Level II evidence). [View the reference](#)
  16. Burks DD, Markey BJ, Burkhard TK, Balsara ZN, Haluszka MM, Canning DA. **Suspected testicular torsion and ischemia: evaluation with color Doppler sonography.** Radiology. 1990;175(3):815-21. (Level III evidence). [View the reference](#)
  17. Altinkilic B, Pilatz A, Weidner W. **Detection of normal intratesticular perfusion using color coded duplex sonography obviates need for scrotal exploration in patients with suspected testicular torsion.** J Urol. 2013;189(5):1853-8. (Level II evidence). [View the reference](#)
  18. Horstman WG, Middleton WD, Melson GL. **Scrotal inflammatory disease: color Doppler US findings.** Radiology. 1991;179(1):55-9. (Level II-III evidence). [View the reference](#)
  19. Guthrie JA, Fowler RC. **Ultrasound diagnosis of testicular tumours presenting as epididymal disease.** Clin Radiol. 1992;46(6):397-400. (Level II evidence). [View the reference](#)
  20. Allen TD, Elder JS. **Shortcomings of color Doppler sonography in the diagnosis of testicular torsion.** J Urol. 1995;154(4):1508-10. (Level IV evidence). [View the reference](#)

## Information for Consumers

Information from this website	Information from the Royal Australian and New Zealand College of Radiologists' website
-------------------------------	--



<p><a href="#">Consent to Procedure or Treatment</a></p> <p><a href="#">Radiation Risks of X-rays and Scans</a></p> <p><a href="#">Ultrasound</a></p> <p><a href="#">Ultrasound (Doppler)</a></p>	<p><a href="#">Radiation Risk of Medical Imaging for Adults and Children</a></p> <p><a href="#">Ultrasound</a></p> <p><a href="#">Nuclear Medicine</a></p>
---	--

**Copyright**

© Copyright 2018, Department of Health Western Australia. All Rights Reserved. This web site and its content has been prepared by The Department of Health, Western Australia. The information contained on this web site is protected by copyright.

**Legal Notice**

Please remember that this leaflet is intended as general information only. It is not definitive and The Department of Health, Western Australia can not accept any legal liability arising from its use. The information is kept as up to date and accurate as possible, but please be warned that it is always subject to change

**File Formats**

Some documents for download on this website are in a Portable Document Format (PDF). To read these files you might need to download Adobe Acrobat Reader.



[Legal Matters](#)