TRAUMA - EVALUATION OF SUSPECTED URETHRAL INJURY IN TRAUMA

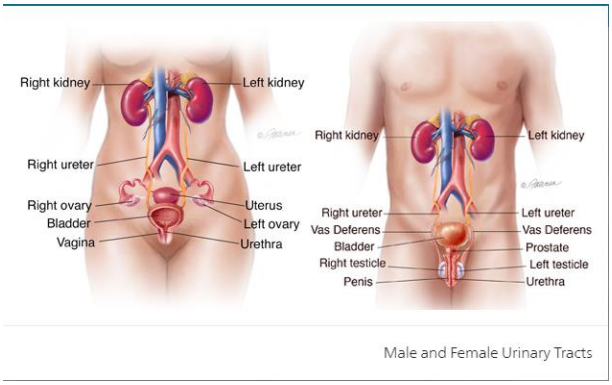
1. Purpose	Evidenced-based guidelines for the evaluation of potential urethral injury following pelvic or perineal trauma. This document is to be used following initial stabilisation of trauma patients when mechanisms of injury, symptoms or signs raise the suspicion of urethral injury. If undiagnosed it may lead to significant long-term morbidity. Injury of the urethra occurs in 3%–25% of patients with pelvic fractures.
2. Risk Rating	Medium
3. National Standards	1 – Clinical Governance 5 – Comprehensive Care 6 – Communicating for Safety 8 – Recognising and Responding to Acute Deterioration
4. Employees it Applies to	Trauma team Medical Officers, Emergency Department Medical Officers and Surgical Fellows/Registrars managing trauma patients

5. EVALUATION

5.1 INDEX OF SUSPICION

- Urethral disruption accompanies pelvic fracture in approximately 5 percent of cases in women and up to 25 percent in men and risk varies with the extent of the fracture.
- The male urethra is vulnerable because of its close relation to the pubic bones and fixity of the puboprostatic ligaments. (Fig 1) The external portion is also susceptible to direct trauma from bone fragments arising from the pubic rami. The distal membranous urethra is especially at risk, and its injury may disrupt the active continence mechanism.
- Injury of the female urethra is rarer because of shorter length, internal location, increased elasticity, and less rigid attachment of the urethra to the adjacent pubic bones. (Fig 1)

Fig 1: Female and male urinary tracts



Urethral injury should be suspected in patients with pelvic fracture, straddle injury or penetrating injuries adjacent to the urethra. The type of pelvic fracture has been shown to predict the likelihood of urethral trauma.

5.2 THE RISK OF URETHRAL INJURY VARIES WITH PELVIC FRACTURE TYPE. (FIG 2)

5.2.1 High risk:

- fractures of all four pubic rami
- fractures of both ipsilateral rami with massive posterior disruption through the sacrum, sacroiliac joint, or ilium, or with accompanying diastasis of the symphysis pubis

5.2.2 Low risk:

- Single ramus fractures and ipsilateral rami fractures without posterior ring disruption.

5.2.3 Zero (almost) risk:

- Isolated fractures of the acetabulum, ilium, and sacrum.

5.3 GENDER

5.3.1 Males:

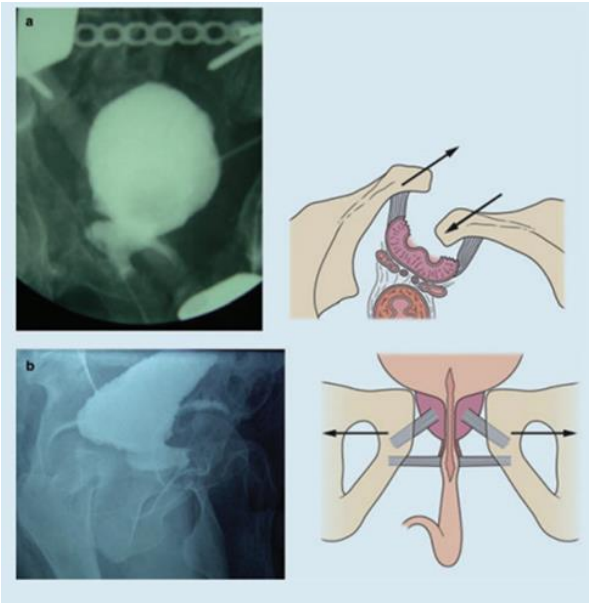
Posterior urethral disruption occurs in males when a significant pelvic fracture causes upward displacement of the bladder and prostate. Avulsion of the puboprostatic ligament followed by stretching of the membranous urethra results in a partial or complete disruption at the anatomic weak point, the bulbomembranous junction.

5.3.2 Females:

Female urethral injury is usually seen in cases of severe pelvic trauma and may be associated with vaginal (75%) or rectal trauma (33%) or penetrating injury close to the urethral orifice. If on inspection injury adjacent to the urethral orifice is seen or suspected prompt evaluation by the on call Urologist is mandated prior to any attempt to pass a Foley catheter.

Fig 2: Mechanism of prostatic urethral and bladder neck injury in

a) lateral compression
b) A-P compression



5.4 SIGNS AND SYMPTOMS

- Blood at the urethral meatus
- Gross hematuria
- Inability to void
- Absent or abnormally positioned prostate on digital rectal examination
- Ecchymosis or haematoma involving the penis, scrotum, or perineum

These classic findings may be absent in up to 57% of urethral injuries or may occur later.

Digital rectal examination (DRE) has been historically used in male patients with a pelvic fracture and suspected urethral injury. DRE incudes evaluation for an absent or "high riding" prostate, suggesting a posterior urethral disruption. Not only is this an unreliable sign, but multiple studies suggest that DRE is not useful for detecting urethral injuries. Its accuracy may be limited when performed on a supine or obese patient.

One gentle attempt at urethral catheterisation is reasonable, even if blood is seen at the meatus:

- It is unlikely to convert a partial tear into a complete tear
- An IDC passes easily into the bladder in 50% of patients with partial injuries
- If the IDC does not pass with ease nor drain urine it should be removed immediately

5.4 INVESTIGATION - RETROGRADE URETHROGRAM

Urethral anatomy may be investigated by retrograde urethrogram. However, the procedure should be deferred if significant pelvic vascular injury is suspected necessitating pelvic angiography. The contrast used in the urethrogram may interfere with interpretation of angiogram or CTA.

Retrograde urethrography may be performed in the Resuscitation Bay

- With the patient supine a baseline abdominal radiograph (KUB) is performed visualizing the entire course of the urethra and bladder
- Advance a 16FR Foley IDC into the urethral meatus just far enough to admit the uninflated balloon (≈3-5cm). Stretch the penis obliquely over the thigh to promote unfolding and visualization of the entire urethra. Gradually inflate the balloon with 0.5 - 1.0ml of water. Do not over inflate - this will cause pain and may damage the urethral mucosa.
- Slowly inject 60ml of full-strength contrast through the catheter using a 50ml urologic syringe. Take 2 oblique x-rays of the lower pelvis during the final 20- and 10mls of contrast. If injury is excluded the balloon on the IDC is deflated and it can then be fully advanced.
- **Normal** - lack of urethral extravasation with contrast entering the bladder
- **Partial disruption** - urethral extravasation with contrast entering the bladder
- **Complete disruption** - urethral extravasation with no contrast entering the bladder
- If urethral injury is seen or suspected, the Urology registrar should be contacted to assess the patient. The patient may need a suprapubic catheter under US guidance.
- If there is no evidence of urethral injury, the catheter passes easily and frank haematuria is drained, the patient will require additional imaging in the form of CT pyelogram and cystogram to exclude renal parenchymal +/- bladder injury.

6. Cross References	SGH CLINxxx *Pelvic Fracture Management*
7. Keywords	Urethral injury, Trauma
8. Document Location	Trauma Page, U
9. External References	1. Blunt Genito-urinary trauma – initial evaluation and management. Runyon, M UpToDate 2018 https://www.uptodate.com.acs.hcn.com.au/contents/blunt-genitourinary-trauma-initial-evaluation-and-management 2. Urethral trauma. Part I: introduction, history, anatomy, pathology, assessment and emergency management: Mundy, A; Andrich, D BJU international, 08/2011, 108:3 3. Shlamovitz GZ, Mower WR, Bergman J, et al. Poor test characteristics for the digital rectal examination in trauma patients. Ann Emerg Med 2007; 50:25. 4. Esposito TJ, Ingraham A, Luchette FA, et al. Reasons to omit digital rectal exam in trauma patients: no fingers, no rectum, no useful additional information. J Trauma 2005; 59:1314. 5. Ball CG, Jafri SM, Kirkpatrick AW, et al. Traumatic urethral injuries: does the digital rectal examination really help us? Injury 2009; 40:984. 6. Johnson MH, Chang A, Brandes SB. The value of digital rectal examination in assessing for pelvic fracture-associated urethral injury: what defines a high-riding or nonpalpable prostate? J Trauma Acute Care Surg 2013; 75:913. 7. Pelvic fracture urethral injury in males—mechanisms of injury, management options and outcomes. Barratt R, Bernard, J et al. Trans Androl Urol 2008 Mar; 7(Suppl 1):S29 – S62 8. Urethral Injuries after Pelvic Trauma: Evaluation with Urethrography. Ingram M, Watson SG, Skippage P, Patel U RadioGraphics 2008; 28:1631–1643
10. Consumer Advisory Group (CAG) approval	Not applicable
11. Implementation and Evaluation Plan	**Implementation:** The document will be published on the SGH-TSH business rule webpage and distributed via the monthly SGH-TSH CGD report. **Evaluation:** Incident monitoring, compliance monitoring by SGH Trauma Service
12. Knowledge Evaluation	**Q1: In which patients should urethral injury be suspected?** A1: Urethral injury should be suspected in patients with pelvic fracture, straddle injury or penetrating injuries adjacent to the urethra. **Q2**: **When should retrograde urethrogram be performed?** A: In pelvic fracture with high risk or clinical evidence of urethral injury, retrograde urethrography should be performed. It should be delayed if the patient requires contrast imaging of the pelvis such as CT angiogram or Interventional Angiography.

	Q3: What are the signs of urethral injury in males? *A3:* blood at the urethral meatus, ecchymosis or haematoma involving the penis, scrotum, or perineum
13. Who is Responsible	All clinicians involved in the care of trauma patients where urethral injury may be a consequence of the injury.

Approval for: TRAUMA - EVALUATION OF SUSPECTED URETHRAL INJURY IN TRAUMA	
Specialty/Department Committee	Committee: Network Trauma Committee Meeting Chairperson: Sarah O'Hare, SESLHD CNC Trauma & P.A.R.T.Y. Date: 03.11.2021
Nurse Manager (SGH)	Andrew Bridgeman, Nurse Manager Surgery Date: 03.11.2021
Medical Head of Department (SGH)	Dr Mary Langcake, Director of Trauma Date: 03.11.2021
Executive Sponsor	Andrewina Piazza-Davies, A/ Operations Manager Surgery, Critical care & Women's & Children's Health Date: 03.11.2021
Contributors to ClBR	**Contribution**: Dr David Malouf, Urology HOD

Revision and Approval History

Revision Date	Revision number	Reason	Coordinator/Author (Position)	Revision Due
Dec 2011	1	New	Kate Curtis Trauma CNC	Dec 2015
Nov 2021	2	Review, major	Mary Langcake Director of Trauma	Nov 2024

General Manager's Ratification
Name: Paul Darcy (SGH) Date: 26.11.2021