

Guidelines for the evaluation of urethral and bladder injury.

Approximately 10% of trauma patients sustain injury to the genitourinary system. This guideline describes the indications and technique for imaging the urethra and bladder after blunt or penetrating trauma.

Indications for retrograde urethrography and cystography:

1. Blood at urethral meatus or gross hematuria
2. Difficulty/inability to void
3. “Butterfly pattern” of perineal bruising, scrotal or penile hematoma
4. High-riding or freely mobile prostate on digital rectal exam
5. Displaced fractures of the pubic rami
6. Pelvic hematoma

Retrograde urethrogram (RUG) technique:

This procedure can be performed in the Trauma Bay or Radiology Department as clinically indicated. RUG is performed in male patients. Female patients suspected of having urethral trauma should have urologic consultation.

1. A scout film of the pelvis is obtained prior to contrast injection.
2. Place patient in 25-30 degree oblique position.
3. Sterilely insert Foley catheter 2-3 cm into meatus and inflate balloon with 2-3 ml water, stretch the penis to straighten the urethra, hold catheter in place.
4. A second person injects 20-30 ml of undiluted sterile water-soluble contrast with X-ray images taken during the injection at 10 ml intervals. Alternatively, video fluoroscopy can be performed in the Radiology Department. Care is taken to avoid spilling contrast which may result in a false positive or equivocal test.
5. If the RUG shows an intact urethra, the Foley balloon is deflated, the Foley is advanced into the bladder and the balloon inflated with 10 ml water. Cystography is performed next as described below.
6. Abnormal findings indicative of potential urethral injury include:
 - a. Extravasation of contrast
 - b. Urethral occlusion (failure of dye to enter the bladder)
7. If the RUG shows urethral injury or is equivocal, or if on attempt of advancement of the Foley resistance is met or severe pain produced, the Foley is NOT advanced and urologic consultation is obtained.

Cystography technique:

Once urethral integrity is confirmed by RUG and a Foley catheter is in the bladder, two options exist for evaluation of bladder integrity. Accuracy is comparable between the techniques.

1. **Plain film (conventional) cystography.**

- a. This is done in the Trauma Bay or Radiology Department after RUG and placement of Foley catheter.
 - b. A scout film is done prior to contrast injection (the initial pelvis X-ray obtained above is sufficient).
 - c. Fill bladder with 250-300 mL of 50% dilute water soluble contrast under gravity pressure. Clamp the Foley.
 - d. Obtain filled bladder AP X-ray.
 - e. After confirming adequacy of this X-ray, drain the bladder completely and obtain a post-void AP X-Ray.
2. **CT cystography.**
- a. Alternative to conventional cystography in stable patients.
 - b. After completion of standard trauma CT of the chest/abdomen/pelvis and TL spine.
 - c. Instill dilute contrast (mixture of 50 mL of Optiray or other iodinated contrast material and 500 mL of sterile saline). 250-300 mL of this dilute contrast is instilled under gravity, and then Foley is clamped.
 - d. CT of the pelvis is performed.
 - e. Note: CT scans performed during the excretion phase of IV contrast and without direct instillation of dilute contrast into the bladder are NOT sufficient to rule-out bladder injury.
3. The finding of intraperitoneal bladder injury by conventional or CT cystography (extravasation of contrast into the peritoneal cavity) requires laparotomy and bladder repair.
4. Extraperitoneal bladder injury in hemodynamically stable patient should be managed selectively with bladder decompression and urologic consultation.
- a. Contraindications to non-operative management of extraperitoneal bladder injuries include:
 - i. Patient undergoing laparotomy for other indications
 - ii. Active urinary tract infection
 - iii. Inadequate bladder drainage with Foley or suprapubic tube
 - iv. Presence of bone fragments in the bladder
 - v. Patients undergoing internal fixation of pelvic fractures in continuity with the bladder injury

References:

1. Schwab CW. Genitourinary injuries. In Peitzman AB, Rhodes M, Schwab CW, et al (ed) The Trauma Manual. 3rd ed. Chapter 30. pp 297-306, 2008.
2. Chapple C, Barbagli G, Jordan G, et al. Consensus statement on urethral trauma. BJU Int 93(9): 1195-1202, 2004.

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