

Diagnostic Imaging Pathways - Lower Urinary Tract Trauma

Population Covered By The Guidance

This pathway provides guidance for imaging adult trauma patients with suspected injuries to their lower urinary tract.

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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.

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: August 2013
 Please note that this pathway is subject to review and revision.

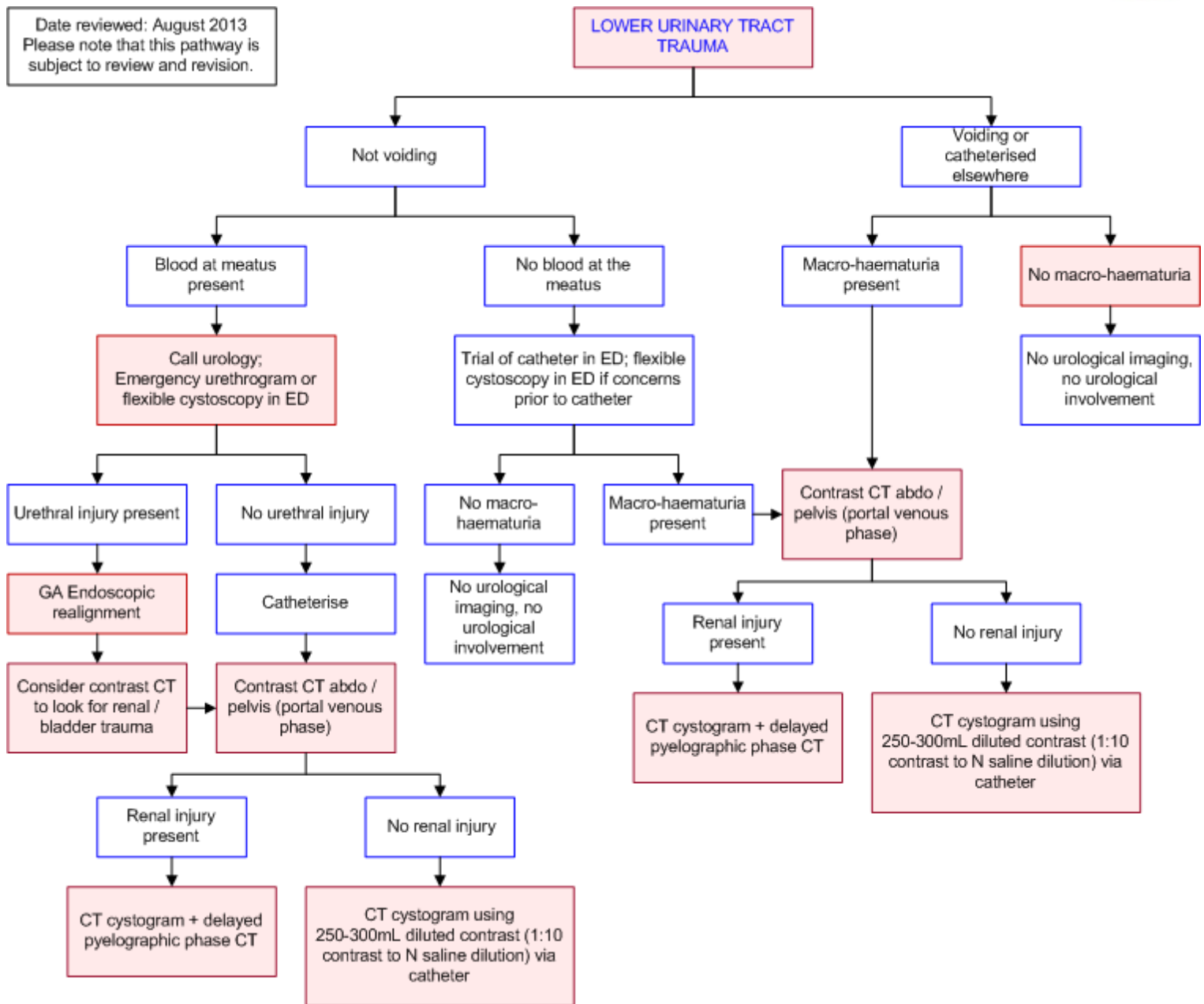


Image Gallery

Note: Images coming soon

Teaching Points

- In patients with lower urinary trauma, imaging is only indicated where the patient demonstrates gross haematuria
- When performing a CT cystogram study, the bladder should be adequately filled with 250-300mL of diluted contrast, administered via catheter. The dilution ratio should be 1:10 (eg. 50 ml of Omnipaque 300 (300mg iodine/mL) mixed with 500ml normal saline)

Computed Tomography (CT) Cystogram

- Conventional CT of the abdomen / pelvis has a poor sensitivity of 50-60% for detecting blunt bladder injuries. [11,12](#) Its role in this setting is to identify other abdominal injuries
- The accuracy of CT for detecting and categorising bladder injuries can be greatly improved with a CT cystogram
- Indications for this study include gross haematuria, pelvic fractures or high clinical suspicion of bladder injury [13](#)
- Recent studies support the use of retrograde filling of the bladder with dilute iodinated contrast. [19](#) Using this technique, the reported sensitivity for detecting bladder rupture ranges from 95% to 100% and the specificity is 100%. [13-16](#) These figures are comparable to conventional retrograde cystography [13](#)
- For categorising the type of bladder injury, the accuracy of a CT cystogram for identifying extraperitoneal injury is similar to conventional cystography. However, the sensitivity is slightly lower for intraperitoneal injury (94% versus 100%) [13](#)
- Multidetector CT with multiplanar reformation may help better localise the site of bladder rupture [16](#)
- In order to minimise exposure to radiation, time and costs, CT cystograms can be performed as part of the screening abdomino-pelvic CT without the need for post-void images [1,5,13](#)

Computed Tomography (CT) Abdomen / Pelvis

- CT is more sensitive and specific in the diagnosis of renal trauma. It is the diagnostic modality of choice in imaging patients with suspected blunt renal trauma [1](#)
- CT not only provides precise anatomic and functional information but also detects other coexisting intra-and extraperitoneal injuries at the same time [1](#)
- MRI equals CT in correctly grading blunt renal injuries and detecting the presence and size of perirenal hematomas [1](#)

Bladder Trauma

- There is no sufficient Class I data supporting standards regarding evaluation of bladder and urethral trauma. Around 10% to 15% of patients with pelvic fractures sustain bladder injuries whereas more than 70% of bladder injuries are associated with pelvic fractures [1](#)
- Bladder rupture is significantly associated with pubic symphysis diastasis, sacroiliac diastasis, and sacral, iliac and pubic rami fractures but not with isolated acetabular fractures [2,3](#)
- The clinical indicators for bladder injury are
 - Suprapubic pain or tenderness
 - Inability to void, low urine output, clots in urine
 - Signs of major perineal trauma: swelling or hematoma, blood at the urethral meatus
 - Unresponsiveness, intoxication, altered sensation
 - Free intraperitoneal fluid on CT scan or ultrasound
 - Pre-existing bladder outlet obstruction, bladder surgery, or bladder abnormality
 - Abdominal distention, hypoactive bowel sounds
 - Increased serum BUN and/or creatinine
- When should bladder imaging be considered a priority in blunt trauma patient?
 - Current literature suggests that immediate imaging is essential only in the event of gross hematuria with pelvic fracture [4](#)

- In atypical patients without the classic combination of pelvic fracture and gross hematuria, the presence of clinical indicators should guide one to screen for bladder injury
- In the absence of the clinical predictors, immediate bladder imaging is not warranted [4](#)

Microhaematuria in Bladder Trauma

- While grossly clear urine in a trauma patient without a pelvic fracture virtually eliminates the possibility of a bladder rupture, between 2-10% of patients with bladder rupture may demonstrate microhaematuria or have no haematuria at all [5,6](#)
 - Cass et al. describes a large series of patients with bladder injuries, in which 80% of the patients with rupture had gross hematuria. However, six patients with <30 red blood cells/high power field (RBC/HPF) had bladder ruptures, and 16 patients without any haematuria also had bladder ruptures [6](#)
 - However, other studies by Morgan et al. and Avey et al. found no bladder ruptures in patients with <25 RBC/HPF and <30 RBC/HPF, respectively [2,7](#)
- A recent prospective study of blunt trauma patients showed that bladder imaging is required for gross hematuria, even when no pelvic fracture is suspected, but is unnecessary for microscopic hematuria [8](#)

Emergency Retrograde Urethrogram

- The presence of blood at the urethral meatus should preclude any attempts at urethral instrumentation until the entire urethra is adequately imaged. Often a suprapubic catheter is inserted and a retrograde urethrogram is performed when appropriate [5](#)
- Radiologic evaluation with a cystogram and post-wash out film and a retrograde urethrogram allow immediate diagnosis of bladder and urethral injury [17](#)
- Retrograde urethrogram should be performed in all patients with fracture of sacroiliac joint and pubic ramus in addition to perirectal or scrotal hematoma, blood at the meatus, and/or high riding prostate. Patients with urethral injuries examined less than 1 hour after injury may not show physical findings [18](#)

References

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

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