Bladder and Urethral Rupture in Pelvic Ring Fractures

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Pelvic Fractures - Anatomy

- The pelvis is made up of three bones – two innominate bones (each made up of ilium, ischium and pubis) and a sacrum
- Stability is provided by the sacroiliac joints and the sacrotuberous and sacrospinous ligaments
- The pubic symphysis serves as a strut to prevent collapse (rather than for weight-bearing or stabilisation)
Young-Burgess Classification

- Most commonly used system for classification of pelvic fractures
- Classifies pelvic fractures by vector of force – antero posterior compression (APC), lateral compression (LC), and vertical shear (VS) types
- APC and LC fractures are further divided into types I, II and III with increasing degrees of severity
Young-Burgess A
Young-Burgess A

- LC-I

- Horizontal or oblique fractures through ipsilateral pubic rami

- Crush fracture of the sacrum

- ‘Stable’ as posterior elements intact
Young-Burgess A

- LC-II
- Pubic rami and sacral crush fractures
- Iliac wing fracture and/or SIJ separation
- Unstable – internal rotation/displacement of anterior hemi pelvis
Young-Burgess A

- LC-III
- As per type I or II with contra lateral external rotation
- Bilateral posterior instability
- Typically due to severe crush/roll-over injuries (e.g. by heavy vehicle)
Young-Burgess B
Young-Burgess B

- APC-I

- Diastasis of the pubic symphysis

- Vertical pubic rami fractures may occur

- Stable – no posterior disruption
Young-Burgess B

- APC-II
- 3.5cm diastasis of the symphysis and vertical rami fractures
- Disrupted sacrospinous, sacrotuberous and anterior sacroiliac ligaments
- External rotation of hemi pelvis “open book”
Young-Burgess B

- APC-III
- Complete disruption of symphysis, sacroiliac joint and posterior ligaments
- “Open book”
Young-Burgess C
Young-Burgess C

- Completely unstable
- Vertical displacement of major fragments
Bladder Rupture

- Bladder ruptures occur in 9-16% of all pelvic fractures, diagnosed by cystogram ± CT
  - Extra peritoneal rupture is usually due to shearing forces or laceration by bony spicules anteriorly
  - Intraperitoneal rupture results from severe pressure to a distended/full bladder
  - Mixed rupture occurs in up to 12% of cases

- Signs – suprapubic tenderness, low urine output, gross haematuria (%)

- Treatment varies – intraperitoneal generally requires formal repair; extraperitoneal may use IDC for 10/7-1/12 (but ? risk of infection)
Extra Peritoneal Rupture - Bladder
Intraperitoneal Rupture - Bladder
Urethral Rupture

- Urethral rupture occurs in 4-14% of pelvic fractures, diagnosed by retrograde urethrography
  - May be complete or partial
  - Important to consider as attempted catheterisation may convert a partial to a complete injury
- Signs – meatal bleeding (98%), gross haematuria, perineal haematoma, vaginal laceration
- Treatment – depends on location and severity but includes suprapubic or aligning urinary catheter, primary repair or delayed urethroplasty/otony.
Conclusion

- Higher incidence of lower urinary tract injuries with more severe fractures.
- Increased risk of bladder rupture with anterior arch fractures.
- Higher incidence in APC fracture, but no statistical difference between APC-I, -II and -III.
- Consider the mechanism of trauma and X-ray findings alongside clinical findings to help determine risk of injury.
- Investigate and treat suspicious cases as appropriate.