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PELVIC FRACTURE WITH UROGENITAL TRAUMA

KEY RECOMMENDATIONS

1. During the **initial exploratory survey / secondary survey**:
 - a. The external urethral meatus and the transurethral bladder catheter (if it is already inserted) should be examined for blood.
 - b. The flanks, abdomen, perineum and the external genitals should be inspected for hematomas, ecchymosis and external injuries.
 - c. All patients with haematuria, blood discharge from the urethral meatus, dysuria, inability to pass a catheter or suspicious features in the history (local hematoma, concomitant injuries, mechanism of injury) have an increased risk of genitourinary injuries and should be given a **focused diagnostic work-up** of the kidneys and the efferent urinary tract.
2. A single gentle attempt of passing a standard **transurethral bladder catheter** can be attempted by an experienced doctor, even if the clinical or CT findings suggest a urethral injury. A **16F soft silicone catheter** and sterile technique should be used (the size should be adjusted appropriately for children).
 - i. If the catheter passes and *clear urine* comes through, then inflate the balloon.
 - ii. If the catheter passes but *blood stained urine* comes through, then again inflate the balloon and perform a **catheter cystogram**.
 - iii. If the catheter passes and *frank blood* is drained then DO NOT inflate the balloon, withdraw the catheter and perform a **retrograde urethrogram**.
 - iv. If the insertion attempt fails, a **retrograde urethrogram** and the insertion of a **suprapubic catheter (SPC)** should follow
3. In case of **circulatory instability** that does not permit initial continuing diagnostic tests and if it is impossible to insert a transurethral bladder catheter, a **suprapubic urinary diversion** should be performed percutaneously (with ultrasound guidance if necessary) or by laparotomy (with simultaneous exploration). See below for further guidance on **SPC**.
4. **Further imaging diagnostic tests** should be carried out on the efferent urinary tract if one or more of the following criteria apply:
 - haematuria
 - bleeding from the urethral meatus or vagina
 - dysuria
 - local hematoma
5. **Computed tomography with contrast agent** should be performed in the case of suspected kidney injury. This is covered by the trauma CT scan.
6. When there is a *pelvic fracture OR haematuria*, and the patient is hemodynamically stable, a **CT cystogram** should be performed at the time of the initial trauma CT scan. If the patient is NOT hemodynamically stable, a **delayed cystogram** (either fluoroscopic or CT guided) should be performed.

7. If you suspect an **Urethral lesion**, and the patient is stable, a **Retrograde Urethrogram AND Cystogram** should be performed.
8. If you suspect a **Bladder injury**, and the patient is stable, a **Retrograde Cystogram** should be performed.
9. If there is an identified Bladder or Urethral injury, contact the **on-call Urologist**.
10. **Extra-peritoneal BLADDER ruptures** without involvement of the neck of the bladder can usually be conservatively treated through urethral urinary diversion (insertion of transurethral catheter), providing that there is no concurrent urethral injury.
Intra-peritoneal BLADDER ruptures should be surgically explored AND are an emergency.
11. **Complete ruptures of the URETHRA** should be treated in the emergency surgery phase by suprapubic urinary diversion with a view to undertaking delayed urethral reconstruction.

RETROGRADE URETHROGRAM - CYSTOGRAM

1. Discuss with **Radiology Consultant / Registrar**
2. These principles apply for children but always consult **Consultant Paediatric Urologist** prior to investigation. It is rare that this will be done in this population.
3. Sterile technique must be used and the procedure performed by an experienced clinician.
4. If clear urine drains following catheterisation no further imaging is required. If there is any element of blood staining in the fluid draining from the catheter then a contrast study (**retrograde cystogram**) is mandated.

Retrograde Urethrogram:

- Usually in the Resuscitation room, Radiology suite, or in Theatres
 - An x-ray plate is needed under the pelvis
 - Use 20-50ml diluted (50% saline, 50% contrast) IV contrast medium in a bladder syringe
 - Insert a size 10F Foley catheter so that balloon is just past the meatus then gently inflate balloon with 5mls saline
 - Hold in place whilst assistant injects contrast into catheter and take AP pelvis x-ray - if possible get an additional lateral film
- A. **Urethrogram positive**: call **Consultant Urologist**. Decisions are now very difficult. If a suprapubic catheter is needed, suggest discussion with the pelvic and acetabular surgeons, as this will have major implications for any internal fixation.
 - B. **Retrograde urethrogram negative**: Catheterise. If haematuria perform **retrograde cystogram**.

Retrograde Catheter Cystogram:

- Usually in the Resuscitation room, Radiology suite, or in Theatres
- An x-ray plate is needed under the pelvis
- Push catheter in 2-3 cm so balloon is not blocking bladder neck
- Inject 100-300ml diluted (50% saline, 50% contrast) IV contrast medium into the catheter
- Clamp catheter
- Take an AP pelvis x-ray (of CT if the patient is having one, or an additional Lateral x-ray of feasible).
- Evacuate the contrast and repeat imagining

Suprapubic Catheter

- If a **urethral catheter** cannot be passed, a **suprapubic catheter** is required. This can be inserted during emergency laparotomy but otherwise percutaneous suprapubic catheter should be placed.
- The suprapubic catheter should be placed using a Seldinger technique under ultrasound control by a **doctor experienced in the use of USS guided SPC techniques**:
 - The skin insertion point **MUST** be in the midline (through the linea alba) and should be as high as is safely possible (without causing bowel damage) to prevent getting in the way of future surgery
 - A 14-16F silicone catheter should be used. This is large enough to allow blood clots to pass and avoid clot retention
- If the bladder cannot be identified on USS and so a **percutaneous suprapubic catheter** cannot be placed, this is a very difficult situation. Consultant decision makers in Urology and General Surgery must be involved and open placement of the catheter +/- laparotomy should be considered.
- Urine becomes contaminated with bacteria within 5 hours of passage of a urinary catheter.
- If there is a urine leak from the bladder or urethra, the pelvic fracture should be treated like an open long-bone fracture with antibiotics (**Co-Amoxiclav + Gentamicin** for 72 hours - seek microbiological advice if penicillin allergy) an early fracture fixation if the patient's physiology allows.
- Suprapubic catheters can be repositioned and tunnelled at the time of pelvic fracture fixation but it is essential that they remain in the midline and at least 4-6cm above the symphysis as this allows the urologist access for the delayed urethral reconstruction.

Bladder Injury

- **Intraoperative Bladder Rupture** requires emergency laparotomy and direct repair. Thus, immediate referral to on-call Urology team and discussion between on-call consultants - MTC and Urology should follow such a diagnosis

- **Extraperitoneal Bladder Rupture** may be treated by catheter drainage alone. However, in the presence of a pelvic fracture that requires fixation, fracture reduction and fixation along with primary repair of the bladder is recommended
- Bladder injuries identified during pelvic fracture surgery should be repaired at the same time and bladder drainage (via urethral or suprapubic catheter, as appropriate) ensured. The Urology on-call team should be involved, so that appropriate treatment and follow up can be arranged
- If the Bladder is repaired and the surgeon elects to insert a drain, this should not be a suction drain and it should probably be removed the next day
- The prophylactic antibiotics commonly used for fracture surgery will also cover bacteria that commonly cause UTI. Prolonged or additional antibiotic cover would not usually be required
- Earlier fracture surgery, when a suprapubic catheter is in place, is likely to reduce infection rates

Urethral Repair

- The indications for **Primary Urethral Repair** (within 48 hours) are:
 - Bladder neck injury with extravasation
 - Associated ano-rectal injury
 - Perineal degloving
 - Massive bladder displacement
 - Penetrating trauma to the anterior urethra
- **Delayed Primary Urethral Repair** (between 2 and 14 days) is indicated in some females and children.
- All urethral injuries in **females and children** must be discussed at a very early stage with the appropriate supra-regional specialist in urology. These patients may need to be transferred between Leeds General Infirmary and St James' University Hospital to allow definitive surgery. In some situations, the urology specialist may need to travel to the Major Trauma Centre to undertake definitive surgery.
- The recommended definitive treatment for urethral rupture is **Delayed Repair** at 3 months post injury by an Urologist with experience in this complex procedure.