The North West Children's
Major Trauma Network

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Always Children First

Pelvic Injury

Source Document:	North West Children's Major Trauma Operational Delivery Network (ODN) Clinical Guidelines
Version:	4
Ratifcation Date:	10/11/2023

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Pelvic Injury

Emergency Management of Severe Pelvic Fracture

The initial management aims to:

1. Splint the pelvis to provide tamponade and prevent movement.
2. Detect the presence of a pelvic fracture with an early CT.
3. Differentiate between pelvic and intra-abdominal bleeding.

The following is the Standard Operating Procedure

1. Low blood pressure and suspected pelvic injury: Apply pelvic binder.
2. Pelvic binder can be applied even if lateral compression injury is suspected.
3. The binder should be placed around the greater trochanters not the iliac crests.
4. Internally rotate both legs and bring both ankles together
5. Before placing the binder examine for:

- open wounds in the perineum, or over the area to be covered by the binder.
- presence of blood at external meatus
- signs of significant soft tissue injury around the pelvis

Examination to be done once by a senior member of the team to reduce the distress to the child.

If binder applied pre-hospital leave it, check position and obtain radiographs.

6. Hypotension: Activate massive transfusion protocol
7. Do NOT examine the pelvis for mechanical stability.
8. Do NOT logroll the patient until the pelvis is cleared or stabilised
9. Obtain an early pelvic radiograph (Appropriate AP view to start with, or immediate CT) to clear the pelvis
10. On the pelvic radiographs, particular attention should be made to the triradiate cartilage if present, as injuries can occur at this level and can be difficult to see.
11. In small children where a pelvic binder may not be available in the correct size, a sheet, towel or large BP cuff can be utilised.
12. Removing pelvic binder: For patients with suspected pelvic fractures and pelvic binders, remove the binder as soon as possible if:
    - There is no pelvic fracture
    - A pelvic fracture is identified radiologically as mechanically stable, or
    - There is no further bleeding or coagulation is normal.
    - Remove all pelvic binders within 24 hours of application

    Before removing the pelvic binder, agree with a pelvic surgeon how a mechanically unstable fracture should be managed.

If the radiograph is normal, the pelvis may still be fractured. An AP compression – open book – injury can be perfectly reduced by the binder so that the plain radiograph is normal.

A check radiograph after loosening of the binder will identify this problem. Only do this if there is haemodynamic stability. Unstable patients with suspected pelvic injuries should have CT pelvis.

If a pelvic fracture is present:

1. You can leave binder in place for up to 24 hours unless patient has severe neurological deficit (e.g. paraplegia).
2. Examine carefully for open wounds, especially in the perineum.
3. If there is an open wound, including vaginal lacerations, antibiotics must be administered. Unless contraindicated use co-amoxiclav, gentamicin and metronidazole.
4. Perform a log roll when the pelvis is stabilised. Even when stabilised with a binder, take extreme care
    a. If unilateral pelvic injury: log-roll to opposite side
    b. If bilateral pelvic injury: avoid log-roll if at all possible, use scoop stretcher.
5. Consider early catheterisation, but beware of urethral injury. Seek early consult from a Consultant Paediatric Urologist in the presence of possible urethral injury

Contrast Urethrogram/Cystogram

Discuss with Radiology Registrar / Consultant

These principles apply for children but always consult Consultant Paediatric Urologist prior to any investigation. It is rare this will be done in PED.

In the absence of any concerning features, in particular blood at the meatus, or any history of haematuria since accident, a single, gentle attempt at passing a urinary catheter may be undertaken. Sterile technique must be used and the procedure performed by an experienced surgeon: this is not the time to teach the technique.

- If clear urine drains, that is satisfactory
- If there is any element of blood staining in the fluid draining from the catheter then a contrast study (retrograde cystogram) is mandated.
- Retrograde cystogram: dilute 50mL of intravenous contrast medium with 50mL of sodium chloride 0.9% and administer into the catheter. Clamp catheter and then take AP pelvis x-ray (or CT if the patient is having one).

If there is any blood at the meatus prior to catheterisation, or any history of haematuria since accident, then a retrograde urethrogram is indicated before attempts at catheterisation.

Retrograde urethrogram: dilute 50mL of intravenous contrast medium with 50mL of sodium chloride 0.9% in a bladder syringe. Insert size 10 Foley catheter so that balloon is just past the meatus then gently inflate balloon with 5mL sodium chloride 0.9%. Hold in place whilst assistant injects contrast into catheter and take AP pelvis x-ray.

- 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.
- Retrograde urethrogram negative: Catheterise. If haematuria perform retrograde cystogram

ADDITIONAL DOCUMENTS Gänsslen A, Heidari N & Weinberg AM. Fractures of the pelvis in children: a review of the literature. Eur J Orthop Surg Traumatol. 2013; 23(8):847-61

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British Orthopaedic Association | OTS | Association of Surgeons of Great Britain and Ireland | The Association of Coloproctology of Great Britain and Ireland

BRITISH ORTHOPAEDIC ASSOCIATION AUDIT STANDARDS for TRAUMA JAN 2018

The Management of Patients with Pelvic Fractures

Background and justification
Pelvic fractures must be managed within a trauma system with defined referral pathways. They can be associated with significant haemorrhage, urological injury and other injuries. Specialist units, based at Major Trauma Centres, should have the ability to provide multidisciplinary care for these patients as well as specialist orthogeriatric care for those sustaining fragility fractures.

Inclusions:
Patients of all ages with fractures of the pelvic ring.

Exclusions:
Isolated acetabular fractures, isolated low energy pubic rami fractures and pathological fractures.

Standards for Practice

1. When there is a suspected active bleeding from a pelvic fracture, apply a pelvic binder in the correct position. Thisshould be applied pre-hospital.
2. Patients with suspected pelvic fractures with signs of haemodynamic instability should be transported directly to aMajor Trauma Centre in accordance with network guidelines. If received into a trauma unit then resuscitation shouldbe commenced followed by immediate transfer to the Major Trauma Centre for definitive treatment of active bleeding.
3. All patients require IV Tranexamic Acid as soon as possible and ideally within an hour of injury. In the presence ofhaemodynamic instability, patients should be urgently resuscitated using blood products according to MassiveTransfusion Protocols.
4. Patients with suspected pelvic fractures from high-energy trauma should have a CT scan with IV contrast including head,chest, abdomen and pelvis on admission. This should include a head to toe scanogram.
5. All patients with blunt polytrauma undergoing damage control laparotomy should have imaging of the pelvis beforesurgery (X-ray or CT). All patients should have a pelvic binder in-situ during surgery and this should not be removed fora post binder pelvic X-ray until the patient is haemodynamically stable.
6. Active bleeding from the pelvis in patients who do not respond to resuscitation can be managed by surgical packing ofthe pelvis or interventional radiology with selective embolization of active arterial bleeding vessels. Major TraumaCentres must have a clear protocol in place for managing this situation.
7. All polytraumatised patients require a post-binder X-ray after resuscitation, even in the presence of a 'negative' CT scanbecause a well-applied pelvic binder can mask a catastrophic pelvic ring injury.
8. Each trauma network must have a clear protocol for binder removal but, ideally, it should be removed within 24-hoursof injury.
9. External fixation should be considered for temporary mechanical stabilisation when early definitive surgery cannot beperformed.
10. In displaced vertical shear fractures, traction should be considered when early definitive surgery cannot be performed.
11. Potential injury to the bladder or urethra should be suspected, diagnosed and managed according to The Managementof Urological Trauma Associated with Pelvic Fractures BOAST.
12. Open pelvic fractures associated with wounds to the lower abdomen, groin, buttocks, perineum, anus (includingsphincters) and rectum require urgent assessment by a consultant general or colorectal surgeon and wounddebridement as per the Open Fractures BOAST. Clinically and/or radiologically proven or suspected injuries to the anusand/or rectum may initially require construction of a defunctioning stoma. Nursing care of wounds to the perineum orbuttocks may also require a defunctioning stoma, although this is unlikely to be necessary for open pelvic fracturesassociated with wounds to the groin or lower abdomen alone. Please see over for further guidance.
13. Patients who are admitted to Trauma Units and require surgical stabilisation should be referred and safely transferredto a specialist centre within 24 hours.
14. Reconstruction of the pelvic ring should occur within 72 hours of the stabilisation of the patient's physiological state ifassociated injuries allow.
15. Patients who suffer displaced low energy fragility fractures of the pelvic ring, who are unable to mobilise due to pain,should be discussed with the specialist centre for consideration of surgical stabilisation.
16. Specialised units should have written local policies for thromboprophylaxis for patients with pelvic fractures, whichshould be followed and documented in the medical records.
17. Each network should submit appropriate data to the TARN, monitor performance against national standards and auditttheir outcomes.
18. Patient follow-up should occur in a specialist pelvic trauma unit or rehabilitation clinic, to ensure full advice is availablefor the pain, physical, psychological, and urological disabilities, which are common adverse outcomes.
19. All patients who may be sexually active should receive written advice on sexual dysfunction in accordance to theguidelines from the British Association of Urological Surgeons.Each hospital should submit data to national databases (NHFD, FLS-DB and TARN) to monitor its performance against national benchmarks and quality standards.

Evidence base:
Professional Consensus. NICE Complex Trauma Guidelines: www.nice.org.uk/guidance/ng37; The Management of Urological Trauma Associated With Pelvic Fractures BOAST

Guidance for stoma formation with open pelvic fractures from the Association of Coloproctology of Great Britain and Ireland and the Association of Surgeons of Great Britain and Ireland:

- Each case should be considered carefully on its merits with regard to both the need for a stoma and optimum timing, as stoma formation is not without morbidity.
- Whenever possible, arrangements should be made to obtain and document informed consent beforehand. Stoma formation is usually not appropriate at initial damage control laparotomy.
- When a defunctioning colostomy is required simply for diversion after distal injury, the stoma may be created laparoscopically, depending upon available surgical expertise.
- A double barrelled, or a loop stoma with the distal end stapled off (to minimise overspill) is acceptable. In either case, the gastrointestinal tract distal to the stoma should be irrigated thoroughly, in order to reduce the risk of contamination resulting from retained stool.
- The position of the stoma should be determined, whenever possible, in conjunction with the orthopaedic surgical team. It should usually be sited in the upper abdomen, to ensure that it is sufficiently remote from the site of potential definitive pelvic surgical fixation.
- Injuries to the colon or rectum associated with open pelvic fractures should be treated, where possible, by resection or repair, defunctioning, irrigation of the distal bowel segment and pelvic drainage.

Retrograde Urethrogram:

- Usually in Resuscitation room.
- X-ray plate under pelvis.
- 20 ml dilute IV contrast medium (10 ml contrast + 10 ml saline).
- Balloon of small Foley catheter into penile meatus and gently inflated.
- Hold catheter in place and inject contrast.
- AP Pelvis x-ray taken. Additional lateral if possible.

Catheter Cystogram:

- Usually in Resuscitation room.
- X-ray plate under pelvis.
- 300ml dilute IV contrast medium (150 ml contrast + 150 ml saline).
- Push catheter in a further 2-3 cm so balloon not blocking bladder neck.
- Inject contrast down catheter with bladder syringe and clamp catheter.
- AP Pelvis x-ray taken. Additional lateral if possible.
- Evacuate contrast and repeat AP Pelvis x-ray.