

PELVIC FRACTURE (INCLUDING ASSOCIATED URETHRAL INJURY)

Significant pelvic fractures require prompt and comprehensive management to address (or prevent) associated injury, morbidity and prevent long term complications. Associated injury to the pelvic viscera, abdomen, spine, and thorax as well as the extremities can occur and treating teams should use a structured approach to the global management of these cases.

The British Orthopaedic Association, in collaboration with other specialist bodies set out audit standards for managing these injuries ([Boast Pelvic Injuries](#)) .

This document should be read alongside a separate guideline for the management of urological injuries with pelvic fracture ([BOAST Urological Injuries](#))

ASSESSMENT

Pelvic fracture should be suspected in any patient involved in a high-energy transfer injury. ATLS/ETC assessment is mandatory to ensure all causes of physiological instability are assessed and addressed. As part of the trauma team the orthopaedic and general surgical registrars should be present.

Primary Survey

Significant pelvic fractures can be associated with hypovolaemic shock. Prompt IV access, tranexamic acid administration and blood (initiate Major Haemorrhage Protocol when appropriate) should be instigated if the patient with a pelvic fracture is hypovolaemic. If a pelvic binder is not already in place as part of the pre-hospital care package it should be applied immediately.

Pelvic pain, lower abdominal bruising/wounds, leg length discrepancy and bruising/wounds in the perineum can all indicate significant pelvic injury. In the presence of significant leg length discrepancy in line skin traction should be applied as this may reduce bleeding. ***Do not examine the pelvis for mechanical instability - this may worsen bleeding/pain.***

Secondary survey

Careful examination of the abdomen (for bruising, tenderness, guarding), groin, buttock, perineum, vagina, and rectum is important to assess for wounds suggesting an open fracture. These examination findings must be documented and reviewed in light of any clinical change. As above, consideration must be given to ruling out other causes of hypotension in the trauma patient.

Investigations

CT Trauma scan is the primary imaging modality for the pelvic ring and acetabulum and often happens through 'convenience' as part of major trauma management.

It may be possible for an 'open book' fracture configuration to be well reduced by a pelvic binder and for a compromised pelvic ring to be missed. AP Pelvic XR should be considered

mandatory following a normal CT scan report, with ongoing haemodynamic monitoring. The binder is loosened once the x ray gantry is in position over the pelvis. This should not be attempted in the presence of haemodynamic instability.

All patients with blunt polytrauma undergoing damage control laparotomy should have imaging of the pelvis before surgery (XR or CT depending on level of haemodynamic instability). All patients should have a pelvic binder in situ during surgery and this should not be removed for a post binder XR until the patient is haemodynamically stable.

MANAGEMENT

If the patient remains haemodynamically unstable with an adequately applied binder and the cause appears to be from a pelvic fracture (i.e., there is not another more likely cause) then **selective** embolization of an **identified injured vessel** may be considered if arterial blush present on the CT scan. In discussion with the orthopaedic team, the on-call consultant interventional radiologist should be called to request angiography and embolization.

If despite good resuscitation (binder, TXA, MHP) and intervention from radiology the patient is still unstable, and the cause appears to be from pelvic bleeding then pre-peritoneal pelvic packing should be considered and carried out jointly by the on call general surgical and orthopaedic consultants. For patients *in extremis* transfer to theatres to enable pelvic packing should be undertaken prior to referral for IR. If the patient continues to remain unstable after this, interventional radiology may also need to be undertaken.

In the presence of an open pelvic fracture into the rectum or perineum referral should be made to on call general surgeon to consider an end colostomy to divert bowel content away from the fracture.

Orthopaedic management at MTC

- Once the patient is stable and has had appropriate imaging as above they can be referred to the orthopaedic team and transferred to the MTC ward if the pelvis is an isolated injury, and there are no other indications for admission to the ICU.
- The orthopaedic consultant on call at the MTC will take responsibility for management of the pelvic fracture. They will decide on the urgency of secondary referral to the pelvic surgery team.
- The pelvic binder should be released after a maximum of 24 hours to prevent pressure damage.
- An XR AP pelvis with binder undone is mandatory except for patients *in extremis* as CTs are done with the binder on and may not show open book injuries.

Exclusion: Older (>65yrs) patients with low energy/ fall from standing height mechanism and undisplaced insufficiency fractures should be cared for jointly between the orthopaedic and older people's medicine teams, regardless of admission location.

Referral from Trauma Units (TU)

- In most cases, where the patient can be stabilised, the on-call TU orthopaedic consultant will make a referral to the orthopaedic consultant at the MTC. Depending on MTC, dedicated referral forms may be available and if so will be present on the hospital intranet or on the NTN website(<https://traumanorth.org.uk/>).
- All cases where transfer is considered should ideally be under the direction of the TU orthopaedic consultant once they have reviewed the patient although flexibility exists depending on presentation time. Communication is strictly orthopaedic team to

orthopaedic team only. All imaging must be transferred on PACS and decision on need for transfer to be made ASAP but within 24 hours.

- In patients with haemodynamic instability related to pelvic fracture attempts should be made to stabilise the patient before transfer. Application of pelvic binder, tranexamic acid administration and transfusion of blood products will stabilise the majority of patients and very few will need emergency transfer for primary management of the pelvic fracture.
- If the patient cannot be stabilised due to bleeding from the pelvic fracture despite application of pelvic binder and transfusion of blood products then a rapid risk-benefit appraisal of continued attempts at stabilization (e.g. with pelvic packing) vs transfer to the MTC should be undertaken. This should also encompass consideration of other injuries and involve discussion between the trauma team leaders at the TU and at the MTC and the orthopaedic team.
- In the unstable patient, arrangements may be made to perform an immediate ED to ED transfer to ensure that the patient arrives in an environment where resuscitation can be performed. The MTC ED team should inform the orthopaedic and relevant teams about the patient.
- Where pelvic fracture occurs in the context of multisystem trauma the secondary transfer pathway may also be used where significant injuries requiring MTC care have occurred in two or more body compartments. Again, transfer between emergency departments will occur after discussion between the trauma team leaders and orthopaedic teams at the TU and MTC.

URETHRAL INJURY

A single, gentle attempt at catheterization, by an experienced doctor is permissible even if the clinical examination or CT findings suggest urethral injury. In adults a 16F soft silicone catheter should be used. The procedure and the presence of clear or blood stained urine should be recorded in the notes. Do not inflate the balloon if no evidence of urine. The on-call urologist should be contacted for all cases of confirmed or suspected urethral injury. A full description and auditable standards can be found at : [BOAST Urological Injuries](#)

REHABILITATION AFTER PELVIC INJURY

Pelvic fractures are high impact trauma and assessment of the longer-term effects on all pelvic organs is essential after initial acute management.

Principles

1. Ensure adequate analgesia :
 - Paracetamol
 - NSAIDs if tolerated
 - Regular and as required short-acting opiate with laxatives.
 - Assess for presence of neuropathic pain and commence neuropathic pain relief early.
2. Fully assess impact of **lumbosacral plexus injury** and explain to patients the cause, impact and expected recovery patterns of any abnormalities found.

Lower limbs – assess for sensory loss and motor disturbance

- Document American Spinal Injuries Association (ASIA) score to clarify if neurological damage sustained
- If use of splints or orthotics required inform patients about potential for skin/pressure damage and need for ongoing regular checking if sensory loss is present. Also beware of impact of loss of temperature sensing eg. check water temperature prior to bathing, ill-fitting footwear and need for podiatry review.
- Maintain range of movement and limb function (passive and active range of movement)
- Consider nerve conduction studies or referral for specialist peripheral nerve opinion to guide prognosis and future therapy, especially if there are concurrent lower limb injuries complicating the clinical picture, recovery is not as expected, or there is no recovery 6 weeks post-injury
- If needed make early referral to local wheelchair and orthotic services

Bladder (in addition to impact of direct bladder trauma – clarify if urethrogram required prior to trial without catheter TWOC).

- Ask about symptoms of lower urinary tract dysfunction proactively after catheter removal and consider nerve damage if normal function with an empty bladder does not happen immediately after TWOC. Patients may not be fully aware of such symptoms until later after discharge, especially in the context of multiple injuries, so continue to ask at follow up appointments.
- Perform pre and post void bladder scans after catheter removal to reassure satisfactory emptying. Repeat and contact urology for advice if any ongoing symptoms. Consider possibility of urethral stricture in males with retention of urine.
- If residual urine with some voiding, refer to Urology for further investigations - Urodynamic studies are recommended to inform ongoing bladder management.
- Manage actively and as soon as possible after injury according to Spinal Injuries Centre spinal cord injury protocol
- Patients may require Intermittent self-catheterisation (ISC) or re-insertion of indwelling catheter to maintain upper tract protection whilst awaiting urological assessment.

Bowel (in addition impact of direct bowel trauma managed by surgical teams)

- Establish with patients as early as possible whether bowel function feels normal after injury (bearing in mind impact of opiate and trauma-induced constipation).
- Perform PR and assess sacral root function as part of ASIA assessment and if abnormalities present refer to spinal cord injury/cauda equina specialist service
- Manage actively and as soon as possible after injury according to Spinal Injuries Centre spinal cord injury (cauda equina/flaccid bowel) protocol
- Proactively ask about bowel function at follow-up appointments and refer to spinal cord injury/cauda equina/gastro-intestinal specialist teams if there is ongoing dysfunction.

Sexual function (in addition to impact of genital trauma – gain advice from urology)

- In the acute recovery phase if there is evidence of neurogenic bladder or bowel dysfunction explain to patients that it is possible that sexual function may also be affected as the nerve supply damaged is the same and this is expected with this type of injury pattern
- Proactively ask about sexual function at follow-up appointments and refer to spinal cord injury/cauda equina/gastro-intestinal specialist teams if there is ongoing dysfunction

3. Plan discharge and follow up considering ongoing level of disability

- Complete full functional assessment ahead of discharge and supply aids and care package as needed to support return to washing, dressing, grooming, household tasks and consideration of return to work
- Refer early to community physiotherapy and occupational therapy to maintain range of movement and function as able
- Continue to communicate with orthopaedic teams and increase mobility as soon as possible after changes in weight-bearing status
- Continue to review need for pain management, aiming to withdraw opiate and gabapentinoids as soon as possible whilst balancing needs for simple analgesia as mobility improves
- If bladder dysfunction persists maintain ongoing urological follow up to protect upper tract function.

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