

Trauma Service Guidelines

Title: Haemodynamically Unstable Pelvic Fracture Guideline
Developed by: K. Gumm, R. Judson, P. Page, M. Richardson & ACT
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Revised By: K. Gumm, R. Judson, A. Bucknill, A. Oppy, M. Walsh, D. Pascoe

Pelvic Fractures

Pelvic fractures account for only 3% of all skeletal injuries, making them relatively uncommon. Most result from high velocity mechanisms such as motor vehicles, pedestrians, motor bike, falls and crush injuries. They occur in 20% of multi-trauma cases and most commonly in 15 to 30 year olds and in the over 60's, with 75% of all injuries occurring in men. ¹⁻⁵ Pelvic fracture make up approx. 16% of all RMH skeletal injuries, the most come mechanism is Motor vehicle crashes (26%) followed by low falls (which make up 23%, then high fall (14%), pedestrians (14%), motorcycle and pedal cyclists (20%).⁶

Mortality in all of pelvic fractures is approximately 16% with haemorrhage being the major reversible factor in 42% of patients. ^{1, 4, 5, 7} Timely identification and control of pelvic bleeding is pivotal in decreasing pelvic fracture related mortality. RMH mortality rate with a pelvic fracture is 7%, most (55%) of these patients dying as a result of multiple injuries and only 9% due to haemorrhage with only 2% of cases needing a massive blood transfusion. With only 2% of all pelvic fracture patient required angiography and 33% required operative fixation.⁶

Bleeding in pelvic fractures is from 3 sources; **arterial, venous and/or from cancellous bones**. The majority of bleeding is venous; however 70% of unstable patients with a pelvic fracture have arterial bleeding. ^{8, 9}

Haemodynamically unstable patients with pelvic fractures are a major challenge. Management is best accomplished by a multi-disciplinary team. The most difficult decision is to either proceed to theatre for laparotomy or to radiology for angiography and embolisation. Effective management relies on rapid screening for the source of blood loss and prompt definitive management. Instability defined as ^{9, 10}

- BP \leq SBP 90mmHg, despite resuscitation
- Base Excess \leq -6 and / or 2L CSL and/ or Transfusion 4-6 units RBC's.

Assessment

Patient's assessment commences with a primary and secondary survey.

Initial inspection looking for signs of external blood loss and blood loss from long bone fractures.

A chest x-ray will rule out a large haemothorax. If a fracture is seen on pelvic x-ray there is a 32% probability of arterial bleeding in the pelvic retroperitoneum. ¹¹

Signs and symptoms of a significant pelvic fracture include: ^{3, 5, 9, 12-14}

- bruising &/or swelling over bony prominences, pubis, perineum, and/or scrotum
- leg length discrepancy or rotation deformity of a lower limb
- wounds over the pelvis or bleeding from rectum vagina or urethra
- neurological abnormality.

If examination is suggestive of a pelvic injury and the patient is hypotensive the pelvis should not be sprung as this is an unreliable test in detecting major pelvic disruption and is dangerous as it may dislodge a clot promoting further bleeding in the unstable patient. ^{3, 13, 14}

Disruption of the pelvic ring requires a high energy decelerative force of approximately 50 km/hr. These forces cause other organ injuries in 90% of patients with an unstable pelvic fracture have other associates injuries and 50% have sources of haemorrhage other than the pelvic fracture. ^{4, 9, 13-17}

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Therefore it is crucial to exclude other causes of shock including tension pneumothorax, pericardial tamponade and neurogenic shock. Whilst continuing with fluid resuscitation a rapid systematic evaluation of the whole body is needed to manage patients with pelvic fractures.

Management of Haemodynamically Unstable Patient with a Pelvic Fracture

Patients with a suspected pelvic fracture require a trauma team activation, either call for haemodynamic instability or trauma alert for suspected pelvis fracture.

Pelvic Binder. ^{3, 18}

The pelvic binder is a circumferential compression device. It is easy to apply and readily available in the trauma bays in emergency department. When applied to the greater trochanters will cause the legs to internally rotate, assist in decreasing pelvic volume, improve mechanical stability and prevent disruption of haemostatic clots. A pelvic binder should be considered as early as possible in patients with suspected pelvic fractures, it should not be removed until the patient is haemodynamically stable, normothermic and not coagulopathic.¹⁹ (see [TRM 06.02 Pelvic Binder Guideline](#))

Massive Blood Transfusion

Resuscitation should begin on arrival and if the patient has a BP < 90 mmHg, a BE < -6 or meets the Massive Transfusion Trigger (see ABC Tool in [TRM08.01 Massive Blood Transfusion](#)), the massive transfusion guideline should be activated and resuscitation from the massive exsanguination pack commenced. Resuscitation should be ongoing in an attempt to correct and / or prevent coagulopathy, acidosis and hypothermia. ^{3, 5, 14, 17, 20}

X-ray

All patients should have an AP pelvis x-ray on arrival. A plain x-ray is sufficient to identify virtually all clinically important fracture dislocations. However there is no significant correlation between the need for embolisation and pelvic fracture pattern. ^{5, 9, 14, 21}

FAST

FAST is an effective tool for identifying patients with intra-abdominal injuries with a specificity of 87-100%.^{8, 22} This should be completed on arrival. The FAST can be repeated if the patients remain unstable and the initial scan was negative. The presence of a pelvic fracture does reduce the specificity of FAST to 75% therefore patients may require a CT scan to more accurately diagnose there injuries. ^{3, 5, 14, 22}

CT scan

CT scanning is a valuable asset and has a 98% sensitivity in identifying the need for angiography²³, it is useful for gauging the location and the amount of bleeding. Contrast blush on CT is very specific for arterial bleeding. Evidence of extravasation of contrast or blush on CT requires angiography in the haemodynamically unstable patient. ^{22, 24}

If the patient is in extremis and it will take > 45 minutes for angiography to become available, a CT scan is recommended to expedite embolisation by accurate identification of bleeding sites.

Angiography

Pelvic angiography is 85-97% effective in controlling bleeding, 10% of patient with a pelvic fracture require embolisation. ⁹

Decision Making

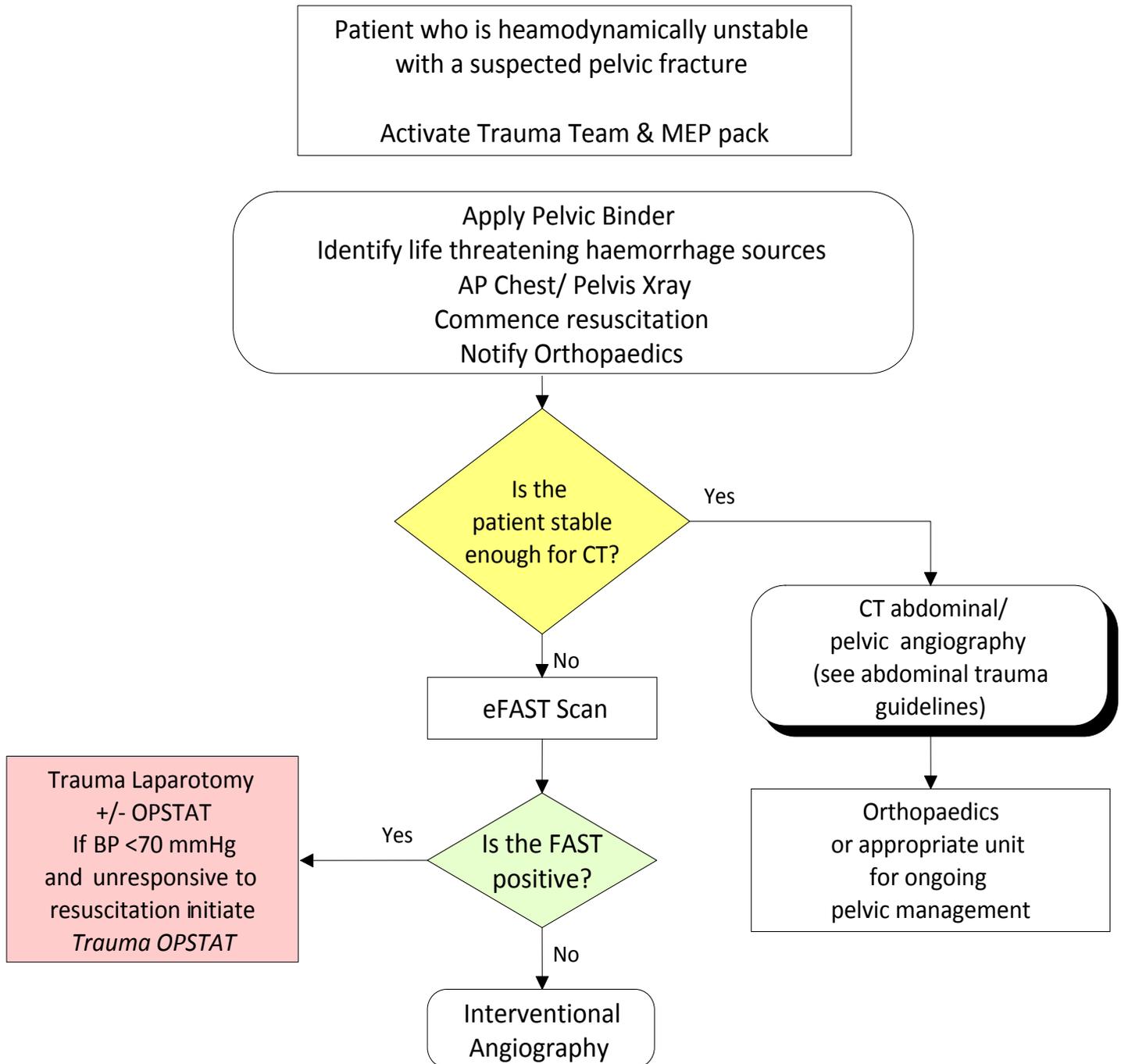
It is suggested that for every 3 minutes of haemodynamic instability without haemorrhage control in a severe blunt trauma patient in the emergency department mortality increases by 1%. ^{3, 9, 14}

Haemodynamically unstable patient should leave the resuscitation room within 45 mins.

1. Pelvic haemorrhage without intraperitoneal bleeding requires immediate angiography and embolisation
2. Intraperitoneal bleeding requires immediate laparotomy and concomitant external pelvic stabilisation in the operating theatre
3. Non- invasive external stabilization in the resuscitation room aids to control small venous and cancellous bone bleeding.

The Exsanguinating Patient

Exsanguination on arrival with BP <70 mmHg immediate operation is the best lifesaving option.



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