Joint Trauma System

Pelvic Fracture Management

Joint Trauma System Battlefield Trauma Educational Program
A 21M AD soldier is involved in a vehicle rollover. He complains of left hip and left leg pain. The left leg appears shortened and externally rotated. His initial vital signs are BP 130/60, HR 120, RR 24 with an O2 saturation of 98% on room air.

1. What types of injuries would you suspect?

2. What are the steps in management of this patient?
EWS Pelvic Fracture

Objectives

- Identify patients at risk for pelvic fractures.
- Learn initial pelvic fracture management.
- Identify need for aggressive resuscitation and use of blood products.
- Identify early need for multi-disciplinary approach involving trauma and orthopedic surgery.
Prevalence of improvised explosive device (IED) attacks have seen an increased incidence of blunt trauma pelvic injuries.

Blunt injuries may be associated with major hemorrhage and early mortality. Death within the first 24 hours of injury most often due to hemorrhage.

Civilian mortality rates have ranged from 6-35% with higher mortality rates associated with open fractures.
Initial questions to ask:
- Is the patient hemodynamically stable?
- Is the pelvic fracture mechanically stable?

Fractures can be identified with clinical signs such as leg-length discrepancy, scrotal or labial swelling/echymosis.

Assess pelvic stability by applying a posteriorly-directed force to the iliac crest.
- This should only be done once by the most experienced provider.
- Further manipulation can exacerbate hemorrhage.
Hemodynamically unstable patients should be thoroughly and rapidly investigated for sources of hemorrhage.

- Evaluate chest, abdomen, and extremities for other potential sources of uncontrolled bleeding.
- Bleeding from pelvic fractures may be concurrent with or independent of other sources.

Evaluate perineum for concurrent rectal or genitourinary/gynecologic injuries.

- AP Pelvic XR used as an adjunct to primary survey.
- Early multidisciplinary consultation with orthopedic surgery is crucial.
Joint Trauma System
Pelvic Fracture Clinical Pathway

**Hemodynamically Unstable Patient with Pelvic Fracture**

1. Initiate aggressive resuscitation with fluid and blood products
2. Rule out thoracic source of hemorrhage (i.e. ATLS and chest x-ray).
3. Wrap pelvis with sheet or apply pelvic binder.

**Ultrasound Abdomen**

**CPG OPERATIVE PATHWAY**
- Laparotomy, consider extraperitoneal pelvic packing.
- On table angiography if available.
- Sheet/Binder, external fixation where/when applicable.

**Resuscitation for Hemorrhage**

**Hemodynamically Stable?**

**YES**

**ICU (CT if available)**

**FURTHER OPERATIVE OPTIONS**
1. Consider angiography if fluoroscopy available.
2. Consider external fixation if fluoroscopy available.
3. Unilateral iliac artery ligation on side of more severe fractures.

**NEG**

**ICU (CT if available)**

**ALTERNATIVE OPERATIVE PATHWAY**
Consider REBOA in hemodynamically unstable patients.

**If pelvis likely primary source of bleeding:**
1. Extraperitoneal packing.
2. Exploratory laparotomy if pelvic packing fails or to control other injuries.

**If abdomen likely primary source of bleeding:**
1. Exploratory laparotomy
   - Try to limit initial incision to supraumbilical fascia.
2. Extraperitoneal packing if pelvis appears to be primary source.
3. Extend exploratory laparotomy as needed.
In the austere/combat setting, all types should be treated the same initially until expert consultation with orthopedic surgery can be obtained.

Placement of a pelvic binder is first step in reducing pelvic volume.

- Complete by any means necessary (wrapped sheet, bean bags, commercial pelvic binder, or external fixation).
- Center binder around greater trochanters.
- Tape ankles and knees together to minimize external rotation.
- Best for control of venous bleeding (70% of all pelvic bleeding).

Pelvic external fixation is another option if surgical expertise present.
30% of pelvic bleeding is arterial.
- May need massive resuscitation with blood products.
- Temporary aortic occlusion can be useful.

Embolization is an excellent option for control but is only available at Role 3 or above.

Retroperitoneal packing via suprapubic packing (without violating the peritoneum) is the best surgical option.
- Attempts at opening a retroperitoneal pelvic hematoma from inside the abdomen should be resisted and only attempted as a last resort, although it may be necessary due to other injuries requiring a laparotomy.
If an open pelvic fracture continues to bleed despite packing, ligation of bilateral internal iliac arteries should be considered.

Once hemorrhage controlled, diversion of the fecal stream in the presence of wounds at risk for fecal soilage should be considered.

Definitive internal pelvic stabilization is done outside of the combat zone.

Exploratory laparotomy, if required, should follow closure of the lower anterior rectus sheath to allow for continued tamponade of the vessels of the retroperitoneum.
Pelvic Packing

- 8 cm vertical midline incision from the symphysis pubis to umbilicus.
- Divide the fascia of the rectus abdominus with care to avoid injuring the bladder.
- Retract the bladder to one side and identify the pelvic brim.
- Up to 3 lap sponges usually fit on one side.
- Place the first lap sponge below the level of the pelvic brim at the level of the sacroiliac joint (likely with aid of a sponge stick).
- The second sponge is then placed at the mid portion beneath the pelvic brim, and the third below the bladder.
- Repeat for the opposite hemipelvis.
- Close the rectus fascia.
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References

- Joint Trauma System, Pelvic Fracture Care Clinical Practice Guideline, 15 Mar 2017

The Office of The Surgeon General, Borden Institute

*Photos are part of the JTS image library unless otherwise noted.*