Division of Acute Care Surgery Clinical Practice Policies, Guidelines, and Algorithms:
Management of Hemodynamically Significant Pelvic Fractures
Clinical Practice Policy

Original Date: 12/2013
Purpose: To develop a protocol to ensure rapid identification and treatment of hemodynamically significant pelvic fractures.

Background: Patients in hemorrhagic shock due to pelvic fractures present complex clinical problems. Common errors in the treatment of these patients include:
- Failure to wrap apply a pelvic binder to an open book pelvis
- Failure to identify and correct coagulopathy
- Failure to rapidly triage patient to the operating room or angiography
- Patients stay in the Emergency Department too long

Indications for AP Pelvis Films during Trauma Resuscitation:
- Hemodynamic instability
- Pelvic pain or tenderness
- Instability of pelvis on physical exam
- Suspicion of femur fractures
- Suspicion of hip dislocation
- Perineal trauma
- Intubated patients (s/p high mechanism trauma)

Indications for Pelvic Binder Placement during Trauma Resuscitation:
- Any open book pelvic fracture (APC-I, APC-II, APC-III) despite hemodynamic status
- A patient with a suspected pelvic fracture and hemodynamic instability where pelvic films are not available
• Pelvic binder should be centered over greater trochanters.

• If access to groins is necessary, move the binder to mid thigh or knees and tape feet together.

Contraindications to pelvic binder: None
Maximum duration of pelvic binder: goal ≤ 24 hours

Hemostatic Resuscitation:
• Permissive hypotension (keep systolic blood pressure ≥90 mmHg or MAP > 50 mmHg) – don’t “pop the clot”
• Minimize crystalloid and colloid administration
• Resuscitate with 1:1:1 ratio of RBCs:FFP:platelets – give FFP and platelets early
• Maintain normothermia
• Rapidly identify source of bleeding and definitively control the hemorrhage.
• Obtain intravenous access in upper extremity, chest, or neck.
Identify Source of Bleeding:
- Chest radiograph to evaluate for hemothorax/tension pneumothorax
- Pelvic radiograph to evaluate for and identify type of pelvic fracture.
  - Place binder in patient is found to have an open book pelvis
- FAST exam:
  - If negative and patient non-responder: perform diagnostic peritoneal aspiration (DPA)
  - If positive and patient non-responder: proceed to operating room for laparotomy
- If patient has a sustained response to initial resuscitation, proceed to CT or operating room if indicated by clinical picture (e.g. traumatic diaphragm injury, intra-abdominal bleeding, or evisceration).
- If the patient is thought to have a hemodynamically significant pelvic fracture, contact orthopedic surgery resident immediately (4-BONE).

If Patient is a Transient or Non-Responder and Major Pelvic Hemorrhage is Suspected:
- Apply pelvic binder if patient has an open book pelvic fracture.
- Contact Interventional Radiology for angiography. IR is almost never immediately available.
- As IR is mobilizing, consider the following:
  - Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA):
    - See Aortic Balloon Occlusion guideline for more information
    - For hemorrhage due to pelvic fractures, place REBOA in Zone III. Adequate placement at aortic bifurcation can be ensured by the loss of the contralateral femoral pulse.
    - Once REBOA is secured, proceed to Interventional Radiology for pelvic angiography.

![Aortic Zones Diagram](https://example.com/aortic_zones.png)
Pre peritoneal pelvic packing:

- Take patient emergently to operating room.
- Vertical midline incision (~8cm) just above pubic tubercle.
- In a large pelvic hematoma, the preperitoneal space should already be developed for you. Additional blunt dissection may be necessary. Pack the pelvis with three laparotomy pads on each side of the bladder.
- If the preperitoneal dissection is difficult, the patient probably does not have a large pelvic hematoma and another source of hemorrhage should be sought.

If Patient is a Transient or Non-Responder and the Source of Hemorrhage is from Multiple Sources:

- Truncal hemorrhage:
  - Proceed to operating room for control of truncal hemorrhage via laparotomy or thoracotomy; consider REBOA if pelvic bleeding found to be significant.
  - If patient continues to be hemodynamically unstable despite control of truncal hemorrhage, perform damage control surgery and proceed to IR for pelvic angiography.
  - If patient hemodynamic status stabilizes after IR, return to operating room for definitive closure after correction of coagulopathy and physiologic optimization.

- Extremity hemorrhage:
  - If hemorrhage can be controlled with tourniquets and hemostatic packing, continue to IR and then proceed to the operating room after to definitively address the extremity hemorrhage.
  - If hemorrhage cannot be controlled with tourniquets and hemostatic packing, proceed to operating room to address extremity hemorrhage.
  - If patient continues to be hemodynamically unstable despite control of extremity hemorrhage, perform damage control surgery (e.g. packing, temporary arterial shunts) and proceed to IR for pelvic angiography.
  - Consider a return to the operating room for definitive extremity operation after correction of coagulopathy and physiologic optimization.

Indications to Consider Emergent External Fixation:

- The pelvic binder provides adequate reduction of the pelvic ring in most cases.
- If access to the groin, abdomen, genitalia, or perineum is necessary and closure of the pelvic ring by wrapping the feet and/or moving the pelvic binder lower is unsuccessful, then consult orthopedic surgery for emergent external fixation.
Indications for Pelvic Angiography in Stable Patients and/or Responders to Resuscitation:

- If CT of the abdomen/pelvis shows arterial extravasation, proceed to IR for pelvic angiography.
- If patient has not required blood products and has been hemodynamically normal throughout the trauma evaluation, you may consider not performing pelvic angiography for CT identified arterial extravasation.

References: