AAST Acute Care Surgery Didactic Curriculum

Pelvic Fractures

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Highlights:

- External stabilization is the first intervention in the patient who is suspected to have a pelvic fracture on exam and is hemodynamically unstable. Options include the placement of a pelvic binder or pelvic sheeting.
    - The pelvic binder should be centered over the greater trochanters. Sequential steps of binder placement include 1) cutting the free end of a binder using trauma shears to leave a 6-inch gap, 2) position the Velcro fasteners, 3) pull to tighten the shoelace mechanism, and 4) close the fastener.
    - For pelvic sheeting, prior to patient arrival, place a folded bed sheet on the hospital gurney.. Similar to the pelvic binder, the sheet must be centered over the greater trochanters. Sequential steps include 1) positioning, 2) crossing the ends of the sheet anteriorly over top of the patient, 3) pulling snugly without over compressing, 4) anchor the sheet with penetrating towel clips through the crossed section.
    - If a REBOA is needed, holes can be cut in binder or the sheet can be pulled cephalad over the common femoral artery.
    - If the patient remains unstable despite red cell transfusion, one must address pelvic-fracture related hemorrhage. Options include preperitoneal pelvic packing (PPP) or angioembolization (AE). When PPP is performed, external fixation of the pelvis is done and replaces the pelvic binder or sheet. When AE is performed, the pelvic binder or sheet remains in place. Pelvic fixation in the operating room can be done subsequently but should not delay hemorrhage control.
- Pelvic preperitoneal packing (PPP) is very useful in the treatment of exsanguinating pelvic hemorrhage. It may be definitive management depending on the source of bleeding. It has a faster time to intervention than AE and is thus particularly useful in the exsanguinating patient. Optimally, external fixation of the pelvis occurs just prior to PPP to ensure a stable pelvic frame into which packs are placed.
    - PPP is performed through a 6-8cm midline incision from the pubis cephalad. Upon entry into the preperitoneal space, the hematoma has often dissected the potential space of packing. Packing of this space is conceptually done as an inverted U shape around the bladder. The first pack is placed around the bladder onto the presacral space, using a ring forceps to achieve this deep posterior position. The next pack is placed on top of the first, typically lateral to the bladder

and the final ipsilateral pack is place slightly anterolateral to the bladder. Typically, 6 packs are used, but up to 8 may be needed. A running 0-PDS is used to close the fascia over packs. Skin may be closed with staples.
    - Drainage of the bladder must occur by the end of the initial operation; if a Foley catheter cannot be placed due to a urethral injury, a suprapubic catheter should be placed during PPP (through a separate incision to keep hematoma contained).
    - If the patient remains hemodynamically unstable following PPP and appropriate concurrent resuscitation, one should consider the possibility of abdominal hemorrhage (repeat FAST exam in the OR) or abdominal compartment syndrome if massive transfusion has occurred.
    - If a concurrent laparotomy is performed, the midline incision should be done above the umbilicus to limit decompression of the preperitoneal hematoma.
    - If transfusion requirements persist after correction of coagulopathy (>4u red cells in 12 hours) and are attributed to a pelvic bleed, diagnostic angiography should be performed.
    - Removal of packs occurs at 24-48 hours, after stabilization of the patient and correction of coagulopathy. Re-packing should not be done due to infectious morbidity.
- Angioembolization is very effective for arterial bleeding in pelvic hemorrhage control. Significant complications of AE are access complications, gluteal claudication, and perineal necrosis.
- REBOA may be used as an adjunct for severely hypotensive patients as a temporizing measure.. Risks include damage to the common femoral artery, balloon malposition causing visceral or pelvic injury, and limb ischemia.
    - Optimally an initial CXR excluding aortic injury is performed prior to REBOA placement. For pelvic fracture related bleeding, a REBOA is placed in Zone 3, just above the aortic bifurcation.
    - The ER-REBOA (compared to Coda Balloon catheter) is a smaller catheter, placed through a 7F introducer sheath, and does not utilize a wire for introduction. The ER-REBOA catheter has radio-opaque centimeter markings and placement can be verified before, during, and after inflation by bedside abdominal plan radiograph. The balloon should be inflated slowly while watching for hemodynamic improvement.