Pelvic Trauma

Jim Holliman, M.D. FACEP
Associate Professor of Surgery / Emergency Medicine
Director, Center for International Emergency Medicine
M.S. Hershey Medical Center
Penn State University
Hershey, Pennsylvania USA
Pelvic Trauma

- Pelvis: The most important area of the body
- Pelvic injuries often represent multi-system injuries
Traumatism pelvian
Ruptură de perete abdominal anterior
Pelvic Fractures

- Mortality 6 to 19%
- If hypotensive, mortality 40 to 50%
- 60% due to MVAs
- 30% due to falls
- 65% of deaths due to hemorrhage
Immediate Sequelae of Pelvic Trauma

- Massive hemorrhage
- Bony disruption of pelvis
- Vascular interruption (major and minor)
- Urologic injury
- Bowel and vaginal tears of perforations
- Neurologic injury
Hemipelviectomie dreapta posttraumatica
Massive Hemorrhage

- Major cause of death from pelvic fracture (60 to 80%)
- 50 to 60% of deaths due primarily to pelvic fracture occur within first nine hours of hospital admission
- Degree of hemorrhage dependent on fracture type; truly massive in large posterior fractures
- Retroperitoneum can accommodate large amount of blood and problem compounded with open fracture
- Operative treatment seldom if ever indicated unless major vascular injury uncontrolled after angiography
Pelvic Fracture: Initial Exam

- Local palpation – assess gross instability
- Both hips – associated hip fx common
- Blood at meatus (elicit by “milking” along the urethra first) – mandates urethrogram and cystogram – Do not pass foley first!
- Careful neuro exam
- Vaginal / rectal exam – if mucosa violated, patient must go to OR for diverting colostomy
- Early external fixator may be needed for unstable fx
Fixator extern
Fixator extern
Fixator extern Ganz
Centura de stabilizare
London
Centura de stabilizare

London aplicată
Centură de stabilizare
London aplicată
Pliere în vederea efectuării
laparotomiei
Banda de stabilizare

Geneva
Bandă de stabilizare
Geneva aplicată
Bandă de stabilizare *Dallas*
Radiografie în incidență AP
Înaintea aplicării benzii de de

Fractură de bazin
Radiografie în incidenţă AP
Înaintea aplicării benzii de
Radiografie în incidență AP
După aplicarea benzii de stabilizare
Pelvic Fractures: Radiology

- AP view shows most fxs
- Inlet view – shows inward fx displacement
- Outlet view
- Tangential view – good for sacral fx and sacroiliac (SI) separation
- Computed tomography (CT) – more accurate for posterior arch and acetabular fxs
Pelvic Fractures: Diagnostic Peritoneal Lavage (DPL)

- Usually required to quickly R/O intra-abdominal bleeding as cause for shock or hypotension
- False positive rate higher than for isolated intraperitoneal injury
- Should use supraumbilical open approach
M.A.S.T. (P.A.S.G.)

- Inflation may be helpful to control bleeding from pelvic fx (inflate abdominal compartment and leg compartments)
- If unable to stabilize patient within 2 hrs of application and suspected arterial bleeder present, then go to angiography
- If left on too long: risk of compartment syndrome in legs
Angiography

- Indicated when hypovolemic shock persists and other sources of bleeding ruled out.
- Consider early for posterior arch fractures (associated with greater bleeding).
- Allows Rx by vasopressin infusion or transcatheter embolization (wire coils or autologous clot) of bleeding vessel(s).
Classification of Pelvic Fractures

**STABLE**
Fracture of individual bones – no break in the pelvic ring
   Avulsion fractures
      anterior superior iliac spine
      anterior inferior iliac spine
      ischial tuberosity
   Fracture of the pubis or ischium (around the obturator foramen)
   Fracture of the wing of the ilium (Duverney’s fracture)
   Fracture of the sacrum
   Fracture of the coccyx

**Single break in the pelvic ring**
   Fracture of the two ipsilateral rami
   Fracture near or subluxation of symphysis pubis
   Fracture near or subluxation of sacroiliac joint
Fractură de spină antero-superioară prin avulsie
Fractură de râm pubian cu minimă deplasare - Stabilă.
Fractura transversă de sacru sau coccis
Stabilă
Fisură și fractură ipsilaterală de ram pubian
Classification of Pelvic Fractures (con’t.)

UNSTABLE – DOUBLE BREAKS IN THE PELVIC RING
Double vertical fracture or dislocation of the pubis (straddle fx)
Double vertical fracture or dislocation of the pelvis (Malgaigne’s fx)
Severe multiple fractures (including sacral fracture)

FRACTURES OF THE ACETABULUM
Undisplaced
Displaced
Pelvic Avulsion Fractures

- Anterior superior iliac spine avulsion – sartorius
- Anterior inferior iliac spine avulsion – rectus femoris
- Ischial tuberosity avulsion – hamstrings
- Rx: analgesics, rest, may need temporary use of crutches; ORIF rarely only for professional athletes
Coccygeal Fractures

- Usually caused by fall in sitting position
- May be caused by childbirth
- No need to reduce transrectally since reduction usually not maintained due to muscle pull
- Rx: analgesics, stool softeners, sacral dough-nut; consider coccygectomy if severe persistent pain (usually if > 1 month)
Sacral Fractures

- Isolated sacral fx often transverse (vertical fx usually associated with Malgaigne fx)
- Do not do bimanual reduction via rectum (may cause enlargement of presacral hematoma or conversion to contaminated open fx)
- If neurologic Sx, Rx by surgery
- If no neuro Sx, bed rest, analgesics, sacral corset
stângă
Disjuncție sacro-iliacă stângă
Compresie laterală
Fractură de ăripă iliacă stângă
Disjuncție sacro-iliacă stângă
Aspect CT
Fracturi pelviene multiple
Compresie bilaterală
Fracturi pelvine multiple
Compresie bilaterală
Aspect CT
Fracturi pelvine multiple
Compresie bilaterală
Aspect CT
Disjuncție sacro-iliacă stângă
Compresie antero-posterioară
Contur neregulat al veziciei urinare
Hematom pelvian
Fracturi ale ambelor ramuri pubiene
Disjuncție sacro-iliacă dreaptă
Disjunctie de simfiza pubiană
Disjunctie sacro-iliacă stângă
Disjuncție de simfiza pubiană
Disjuncție sacro-iliacă stângă
Aspect CT
Straddle Fracture

- Fractures of both pubic rami on both sides or fx of both rami on one side and a symphysis separation
- 1/3 have lower GU tract injury
- 1/3 have abdominal visceral injury
Fractura Straddle
Type II Fractures

- Single break in Pelvic Ring
- Rx: analgesics, initial bed rest, gradual ambulation advanced as tolerated
Type III Fractures

- Double breaks in Pelvic Ring
- Unstable
- Almost all require surgery
- Are one of criteria for referral to a trauma center
Malgaigne Fracture

- Anterior and posterior pelvic ring fracture
  - Anterior: both pubic rami
  - Posterior: fx ilium, Sl joint separation or sacral fx (vertical)
Malgaigne Fracture

- 50% have intra-abdominal injury
- 50% have GU tract injury
- > 25% have head injury
- > 25% have chest injury
Acetabular Fractures

- Posterior lip fx
  - Most common
  - Associated with posterior hip dislocation
- Central or transverse fx
- Fracture of anterior (iliopubic) column
- Fracture of posterior (ilioischial) column (Walther fx)
Pelvic Fractures - Summary

- Assess pelvis as part of secondary survey
- Treat associated injuries
- Consider sequence of fluid support – angiography – M.A.S.T. inflation – surgery (laparotomy or external fixator ± plating) for continued bleeding from pelvic fractures
- Assess for associated injuries to GU tract, rectum, and femurs