Assessing the Injury

- Resuscitation
- Injury Surveys
  - Primary, secondary, tertiary, "quaternary"/continued/ongoing
- Emergent Intervention
  - Pelvic binder, antibiotics, traction, reductions, splints, etc.
- Surgical Intervention
  - External fixation, traction, etc.
- Definitive Intervention

Primary Orthopaedic Survey

- Hemodynamic Instability
- Deformity Or Open Wounds
- Vascular Compromise
- Neuro Deficit

Secondary Survey

- Check every bone/joint
- Make limb look like a limb
- Re-assess NV status
- Splint long bones & pelvis
  - Re-assess NV again

Dynamic & Integrated Process

- Resuscitation & Assessment not mutually exclusive
  - Resuscitation
  - Injury Surveys
  - Emergent Interventions
  - Surgical Interventions
  - Definitive Interventions

Tertiary Survey

- Re-eval all:
  - tenderness,
  - Crepitus
  - Ecchymosis
- XR any suspected injury
  - Never wrong to x-ray
  - 11-18% fxes missed on initial surveys
Adequate imaging

- XR: CXR, Pelvis
  - 2 views extremities if possible

- CT
  - Fine cut pelvis -> fem neck
  - C-spine
  - "pan-scan"
  - Reduce joint first
  - Exfix first

Pelvic Fracture

- High energy to disrupt pelvis
- Potentially Life-Threatening Injury
- Aggressive Eval & Mngt
  - Team / Multiple Disciplinary Approach
  - ATLS Protocols

Prioritizing treatment

- Life (things that will kill Pt)
- Limb (things that will maim Pt)
- Pain/Function

Associated Injuries

- Pelvic Fractures
  - Shock – 25 - 67%
  - Neurologic – 27 - 60%
  - ARDS – 6 - 19%
  - Thoracic – 19 – 43%
  - Urologic – 0 - 16%
  - Mortality – 14 - 37%

Things that can kill you

- Unstable pelvis
- Unstable C-spine
- Multiple long bone fxs

Managing the Hemodynamically Unstable Pelvic Fracture

- Identify Patient At Risk
  - Hypotension
  - Pelvic Exam
  - Radiographic Evaluation
  - ATLS Resuscitation

- Determine Orthopaedic Intervention (If Any)
  - Pelvic Immobilization
  - Binder or sheet
  - External Fixation
  - Angiography?

- Is the patient unstable?
- Is the pelvis unstable?
Emergent Pelvic Immobilization
- \(\psi\) pelvic volume
- \(\psi\) further hemorrhage
  - Sheet
  - Binder
  - Exfix

Risks to limb
- Amputations
- Dysvascular Limb
- Crush Injuries
- Compartment Syndrome

Spinal Cord Injury
- Aggressive Resuscitation
- Temp Immobilization
  - Cranial Tong Traction
  - Halo Vest
- Urgent or Emergent Decompression / Stabilization
- Early Mobility / Ambulation

Amputations
- Can Be Life Threatening
  - Control Hemorrhage
  - Tourniquet Or BP Cuff
  - Hemostats/ties
  - Reduce Infection Risk
  - Prophylactic ABx
  - Sterile Wound Dressing
  - Tetanus Update
  - Surgical Debridement
- NEVER PRIMARY CLOSURE!

Multiple Long Bone Fx's
- Bilateral Femur Fractures = double mortality
- Aggressive Resuscitation
- Temporary Immobilization
- Urgent or Emergent Stabilization
- Early Mobility / Ambulation
- IMN v. exfix femur < 24h

Dysvascular Limb
Dysvascular Limb

- Limb at risk
  - Identify the injury
  - Reduce fx/dislocation
  - Involve Vascular Sx
    - CTA or true angiogram

- Ischemia Time?
  - 6 or 8 hrs?
  - Warm or cold?

Adequate Decompression

Crush Injury

- Check for compartment syndrome
- Debride devitalized tissue
- Stabilization bone
- Watch for rhabdo

Damage Control Orthopaedics

- Under-resuscitation + big surgery = ARDS
  - Espec w/ femoral IMN
- Ready for surgery? Use markers.
  - Urine output
  - Lactate
  - Base deficit
  - IL-6??
- Trend, not absolute #s
- Resuscitation continues in OR!

Compartment Syndrome

- A Clinical Diagnosis
  - Pain
    - Swelling
    - Paresthesia
    - Paralysis
  - Check pressure
    - Obtunded Patients
    - Confirm clinical suspicion
  - Δ P
    - Diastolic BP – Compartment P

- If patient "sick": DCO
  - Life & Limb only
  - Exfix, fasciotomy, debridement
- Temporize everything else
  - Wait for physiology to improve
  - Usu >5 days
**Summary**

- Team Approach
- Few Life-Threatening Ortho Injuries
- Protocols
  - Primary
  - Secondary
  - Tertiary
- Too sick?
  - DCD & fight another day