Damage Control Orthopedics
Five Tricks for Lower Extremity Injury

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History

- “Damage control” originally coined by US Navy
  - reference to keeping afloat a badly damaged ship
  - limit flooding, stabilize the vessel, isolate fires and explosions, and avoid their spreading
- In abdominal surgery, refers to maneuvers designed to ensure patient survival
  - staged strategy for treatment of severe bleeding injury
- Damage control orthopedics (DCO) applied to the management of multi-injured patients with long bone and pelvic fractures

4 Phases

1 - acute phase - life-saving procedures performed
2 - second phase
  - minimizing the degree of surgical insult to the patient
  - control of hemorrhage
  - temporary stabilization of major skeletal fractures
  - management of soft tissue injuries
3 – monitoring period in ICU
4 – definitive fracture fixation
How did we get here??

Reamed Femur and Chest Injury

Why the discrepancies?

- Uncontrolled reason for surgical delays
- Surgical fixation weighted against systemic instabilities
- Surgical ICU admission
  - Coagulation
  - Core temp
  - Hyoxia
  - Base deficit

Corrected
Now 2 Camps Formed

- DCO (Damage Control Orthopedics)
- Acute Fixation

What Do (we think) We Know

- It’s the severity of injuries and not the timing to fracture fixation
- Incidence of pulmonary complications parallels frequency of initial thoracic injury
- Clinical judgment remains most important determinant
- ISS > 18 “probably ok” with early surgery
- ISS < 18 “preferable to wait”
- Other newer methods better at detecting resuscitation
  - Lactate levels
  - Mediators of the inflammatory response, such as IL-6, IL-8, IL-10, HLA-DR class-II molecules

Goals

- Sufficient stabilization of fractures to prevent further tissue damage
- Potential compartment syndrome
- Allows patient to be mobilized for tests
- Allows for improved pulmonary care
External Fixation

- DCO workhorse
- Rapid application
- Reduced blood loss
- Minimally invasive

Other Options

- Fracture below knee
  - Simple splint

Other Options

- Femur Fracture
  - Splint alone generally not helpful to immobilize hip
  - Skeletal traction = to external fixation in terms of:
    - acute respiratory distress syndrome (ARDS)
    - multiple organ dysfunction syndrome (MODS)
    - Pneumonia
    - deep venous thromboembolism (DVT)
    - pulmonary embolism (PE)
    - ICU stay
    - death rate
Compartment Syndrome

- Quick, easy
- Life/Limb Saving
- Can be done at bedside
  - ER/ICU

Amputation

- Rare to do on admission
- If patient in extremis can be life saving
- Weigh risks and benefits of saving in short term
  - If likely going to amputate in future may be better to do immediately