Challenges of Geriatric Fractures
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Objectives
- Identify challenges of osteoporotic bone
- Describe some of the techniques to improve fracture fixation in geriatric patients
- Understand the choice of implant in particular geriatric injuries

Overview
- What is the evidence
- Osteoporosis/Age related changes
- Goals of surgery
- Technique considerations
- Implant considerations
- Perioperative goals

Faith Trial
- Over 1,000 pts
- Worldwide
- Screw fixation vs CHS

No difference in re-operation rate
Greater risk of AVN/ON in CHS
Displaced fx, smokers, basicervical associated c fewer reoperations c CHS

Evidence
- Poor level of evidence
- Despite large number of patients, little indication in literature driving treatment
Osteoporotic fractures

Fracture patterns

Osteoporosis

- Bone mineralization
- Bone strength
- Bone geometry
- Bone healing

Age related geometry changes

Effect on bone healing

- Prolonged
- Decreased healing capacity
- Mineralization/cellular differences
- Nonunion/malunion
Considerations

• Define the injury
• Discuss risks/benefits of fixation vs nonop
• Goals of surgery
• Perioperative optimization
• Minimize morbidity
• Maximize outcome

Risks/benefits

• Realistic discussion w patient/family
• Functional results
• Ability to use limb/ambulate
• Return to ADL
• Return to home

Goals of surgery

• Promote bone healing
• Restoration of function
• Consideration for arthroplasty
• Length, rotation, alignment
• Intra-articular involvement
• Open fracture

Techniques to improve healing

• Minimally invasive
• Bone impaction
• Buttress fixation
• Bone augmentation
• Lever-arm modification

Biologically friendly

• Preserve blood supply
• Preserve fracture hematoma
• Improved union rates
• Length/rotation/alignment
• Articular joint reconstruction
Impaction

Buttress fixation

Bone augmentation
- Allograft
- TCP
- BMPs
- PDGFs
- PTH

Lever-arm

Implants
- Medullary nails
- Fixed angle devices
- Nonlocking and locking plates
Implants

• Bridge constructs
• Implant coating
• Arthroplasty
• Periprosthetic fractures

Medullary nail

• Load sharing
• Immediate WBAT
• Biologically friendly
• Relative stability c secondary bone healing

Nonlocking plates

Locking technology

Bridge plating
**Arthroplasty**
- Early motion
- Immediate weight bearing
- Realistic expectations
- Communication

**Periprosthetic fracture**
- Often require fixation/revision TJA
- Difficult problems/difficult solutions
- Poor bone stock/require extensive procedures

**Perioperative optimization**
- Team approach
- Assess risk
- Physiologic parameters
- Timing of surgery

**Team Approach**
- Co-management between ortho/geriatrician/hospitalist
- LOS
- Post-op complications
- 1 yr mortality
- Delerium

**Team Approach**
- Improves communication
- National/hospital standardization/guidelines improve care
- Mitigate complications
Risk Assessment
• Comorbidities
  • Dementia
  • COPD
  • CHF
  • Cancer
  • Previous MI

Risk Assessment
• Gender
• Nutritional status
• Admitting cognitive status

Risk Assessment
• ASA Score
  • Not designed to assess surgical risk
  • However, studies have correlated ASA with outcome

ACC/AHA guidelines
• Risk of perioperative cardiac events
  • Recent MI
  • Decompensated CHF

Optimizing patient
• Oxygenation
• Fluid/electrolyte balancing
• Pain management
• Medication elimination
• Bowel/bladder focus
• Early mobilization
• Delerium treatment/prevention

Timing of surgery
• As early as possible when it is as safe as possible
Minimize morbidity

- VTE prophylaxis
- Anesthetic considerations
- Treatment of anemia
- Pain management
- Address cognitive deficits

VTE prophylaxis

- Up to 5 wks LMWH for HFS (Chest)
- Not indicated for fractures below the knee
- Pelvis-->knee **

Anesthesia

- General/regional
- Beta blockade
- Normothermia
- Safe/efficient operating experience
- Transfusion
  - Antibodies (3% gen, 25% in prev transf)

Anemia

- Preoperative anemia
- LOS
- 1 year mortality

Anemia

- Estimated EBL
- 1 L hip fracture
- Predictors of blood loss
- Anticoagulants
- Intraoperative hypotension
- GI bleed

Anemia considerations

- Perioperative anemia
- 550 pts
- Hb < 12 mg/dl
- Longer LOS
- Higher readmission rate
**Optimal Hb levels?**

- Optimal Hb 10 mg/dl
- CV complications
  - 2% vs 10%
  - Mortality
  - 0% vs 8%

**Pain management**

- Debate of over vs under medication
- Importance of physiologic parameters
- Delerium prevention

**Delerium**

- Most important factors predicting mortality following hip fracture
  - Concomitant illnesses
  - Delerium on admission

**Maximize outcome**

- Postoperative mobilization
- Rehabilitation
  - Fall risk

**Postoperative mobilization**

- WBAT for all UE fxs
- WBAT for all hip fractures
- Ideally, WBAT for all LE fx
- Realistically, 6-8 wks of protected WB for LE fx/intra-articular fxs
- 6wk/3mo/1 yr mortality improvement

**Rehabilitation**

- Improves nutritional status
- Strength/stamina improvements
- Fall/fracture prevention strategies
- Depression
- Osteoporosis treatment
Fall risk

- Exercise decreases fall risk
- Ca+2/Vit D
- Medication review and changes
- Clutter elimination/household changes

Summary

- Establish goals of treatment and discuss with patient/family
- Familiar with techniques to improve union
- Utilize biologically friendly procedures/load sharing implants
- Optimize patients
- Early motion and weight bearing