Proximal Humerus Fractures: Evaluation and Management
I have no disclosures to report
Anatomy

- acromion process
- supraglenoid tubercle
- clavicle
- 1st rib
- head humerus
- greater tuberosity
- surgical neck
- lesser tuberosity
- infraglenoid tubercle
- scapula
- coracoid process
- glenoid cavity
- anatomical neck
- lateral border
- medial border
- inferior angle
Pathophysiology

- Low energy falls - elderly
- High energy trauma - young
• 6% of all fractures in Western world
• 85% occur in individuals 50 or older
• Peaks in 60-90 year olds
• Female : Male ratio 70:30
Tendons produce reliable deforming forces

- Supraspinatus and teres minor-posteriosuperior deformity
- Subscapularis – medial deformity
- Pectoralis major – medial deformity
- Deltoid – lateral deformity
Blood Supply

- Anterior and posterior humeral circumflex (branches of axillary artery)
- Arcuate artery enters humeral head
Nerve Injury

- Rare
- Most commonly injured: axillary, suprascapular, radial, musculocutaneous, median, ulnar
- Most commonly traction injuries that fully recover
Neer Classification

- Based on 4 fracture parts:
  - Greater tuberosity
  - Lesser tuberosity
  - Humeral head
  - Humeral shaft
Neer Classification System for proximal humeral fractures
Historical elements
• Level of independence
• Functional demands
• Pre-existing rotator cuff conditions
Evaluation

• Skin and soft tissue
• Neurologic
  • Fingers, Wrist, Elbow

X-rays

• AP, lateral, axillary views
CT scan
- Complex fractures
- Fracture lines not clear

MRI
- Assessing RTC when considering non-operative treatment

Bone density
- Predictor of surgical reduction and screw cut out
Non-operative Management

- Minimally displaced
- Poor surgical candidates
- Low demand patients

Treatment

- Sling 4-6 weeks, Codman exercises early, PT at 4-6 weeks depending on bone healing
Operative Treatment

- Patient age
- Fracture type and displacement
- Bone quality
- Hand dominance
- General medical condition
- Other injuries
Types of fixation

1. Percutaneous pinning
   - 2-part surgical neck
   - 2-part and valgus impacted 4-part fractures

2. Intramedullary rodding
   - Surgical neck
   - 3-part greater tuberosity fractures
   - Combined proximal humerus and shaft fractures
3. ORIF with locking plates
   - Greater tuberosity displaced > 5mm
   - 2-, 3-, and 4-part fractures in younger patients
   - Head splitting fractures in younger patients

4. Hemiarthroplasty or RTSA
   - Complex fractures
   - Humeral head ischemia
   - Poor bone quality
Conclusions

• Common in the elderly
• Majority can be treated non-op
• Early movement and PT
• Multiple factors play into op treatment
• Multiple ways to treat operatively depending on fracture type.
References

Proximal humerus fractures: Evaluation and Management in Elderly Patients, Adam Schumaier, MD and Brian Grawe, MD