Clavicle Fractures: Should We Fix More, and How?

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Disclosure

- None relevant to this presentation

Anatomy

- Superficial considerations
  - Supracleavicular nerves
  - Platysma
- Midshaft
  - Brachial plexus
  - Subclavian v.
  - Subclavian a.
- Midshaft non-union
  - Infraclavicular adhesions
- Muscular attachments
Biomechanics

- “Suspensory” function
- “Strut” function
- Deforming forces midshaft
  - Medial
    - SCM superior
  - Lateral
    - Weight of arm via CC ligaments inferior
    - Variable effect of pec major

Fracture Epidemiology

- 2.6 – 4% of all fractures
- Up to 10% of adult fractures
- 35% of fractures involving shoulder girdle
  - Shaft: 69 – 83%
  - Lateral: 21 – 28%
  - Medial: 2 – 9.3%
- Bimodal distribution
  - Young, traumatic
  - Old, fragility

Classification

- Allman
  - Group I: middle 1/3rd
  - Group II: lateral 1/3rd
  - Group III: medial 1/3rd
- Neer
- Craig
  - Combined Allman and Neer
- Edinburgh (Robinson)
  - Based on displacement and degree of comminution
Exam

- Observation
  - Scapular ptosis and rotation
  - Skin integrity
    - "Road rash"
- Neurovascular
- Pulmonary status
  - Concomitant rib fractures
    - Pneumo - / Hemothorax

Radiographic Evaluation

- Plain films for
  - Acute trauma
  - Basic fracture pattern
  - Rib fracture
    - Pneumo - / hemothorax
- CT for
  - Nonunion
  - Malunion
- MRI / US for
  - Vascular / neural anatomy

Treatment of Medial Fractures

- Up to 9.3% in Level I Trauma Center
- Often accompanied by multi-system trauma
- Closed
  - Nonoperative treatment with mobilization as other injuries permit
- Open
  - Irrigation, debridement
  - Partial resection of comminuted fractures
  - ORIF low success rate
Treatment of Lateral Fractures

- Craig Types I, III, IV
  - Non-operative
  - Symptomatic support in sling
  - Early mobilization
  - Potential for late arthroscopic distal clavicle excision in Types I and III

- Craig Types II and V
  - Non-operative
    - 11% average nonunion rate
    - Elderly
  - Rigid ORIF with plate
    - Hook plate
    - Removal prior to 6 months post-op
    - Purposed distal clavicle plate
  - Tight-rope construct +/- biological augment with soft tissue allograft

Treatment of Midshaft Fractures

- Nonunion rate of nonoperatively treated fractures
  - Mean as high as 15%
  - Positive correlation with smoking, sex, comminution, degree of displacement, age
Treatment of Midshaft Fractures

- ORIF for nonunion
  - > 2-fold risk of short-term complication
  - E.g., peripheral nerve injury, vessel damage requiring repair
  - > 3-fold risk of wound complication
  - Operative time significantly longer

- ORIF vs. Intramedullary fixation
  - Cochrane Database
    - No high quality data to suggest significant difference
    - Weak trend towards lower rate of adverse events with IM fixation

- Superior vs. anterior plating
  - No significant difference
  - Rate of union
  - Hardware removal
Conclusions

- Nonoperative treatment for medial fractures
- Consider operative treatment for displaced (Type II, V) lateral fractures in active, younger individuals
- Consider operative treatment for patients with comminuted, displaced midshaft fractures
- Utilize the fixation technique with which you are knowledgeable and comfortable

Thank You!