Humeral Fractures

To nail or not to nail?

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Humeral Shaft Fractures

- 3-5% of all fractures
- Bimodal incidence
- >90% unite with conservative treatment
0 – 16 weeks
Humeral Shaft Fractures

- 3-5% of all fractures
- Bimodal incidence
- >90% unite with conservative treatment
- Little functional deficit with malalignment
- Functional bracing most widely accepted – Sarmiento 1977
Indications for Surgery

- Open or Segmental #
- (Associated vascular injury)
Indications for Surgery

- Pathological fractures
Indications for Surgery

- Failure of conservative treatment

Non-union at 6/12
Indications for Surgery

- Progressive neurological deficit
Plate Osteosynthesis

- Good union rate (96%)
- Versatile
- Rapid return to function
- No shoulder / elbow morbidity
- Radial n. palsy (2-5% usually neurapraxia)
- Infection rate (1-2%)
Intramedullary Nail

- **Less invasive** (McCormack, JBJS Br 2000)
- **Autograft**
- **Improved biomechanics**
  - Improved bending rigidity
  - Load-sharing rather than load-bearing
- **Short rehab time** (McCormack, JBJS Br 2000)
- **Shorter operation** (Lin, J Trauma 1998)
- **Less blood loss** (Lin, J Trauma 1998)
Nailing Technique

➢ **Antegrade IMN**
  - Beach chair
  - 2cm incision lateral aspect acromion
  - Split muscles
  - Use image intensifier to determine entry point
  - Awl, guide wire, ream, measure
  - Insert nail and lock

➢ **Retrograde IMN**
  - Prone or lateral decubitus
  - 10cm incision at tip of olecranon
  - Triceps tendon split longitudinally
  - Entry portal between medial and lateral supracondylar ridges
  - Entry portal must measure at least 20mm by 10mm
Complications of IMN

- Shoulder pain (antegrade nail)
- Decreased shoulder ROM
  (Kropfl – Unfallchirurg 2000)
- Higher risk of complications
  - Radial nerve palsy
  - Non-union
- Supracondylar fracture (retrograde nail)
Specific Indications & Contraindications for Nailing

**Indications**
- pathological fractures
- widely separate segmental fractures
- fractures with poor soft-tissues

**Contra-indications**
- permanent upper extremity ambulators
- Exchange nailing inferior to plating in humeral non-union (McKee, J Orthop Trauma 1996)
Evidence

- McCormack *et al* JBJS(Br) 2000 – PRCT report similar outcome scores, quicker return to function with IMN but increased risk of complication and secondary procedure

- Rommens *et al* Injury 2008 – Review article pro-IMN in a defined population but technique dependent

- Bhandari *et al* Acta Orthop 2006 – Meta-analysis
  Not conclusive, Plates probably more versatile + reduce risk of re-operation (12-93%). Numbers needed for RCT power 0.05 = 1,150 pts
Summary

- Humeral shaft fractures are common
- Most can be treated non-operatively
- Those that need surgery should mostly be plated
- IM nailing is preferable in a minority of clinical situations
ORTHOPEDICS: The meatheads

Ugh! New knee no fit!
Why no hammer harder, you?
Me hammer hard already! Need me bissel mallet!

Dude!
Dude!
Tell you me bench press 350 yesterday?

Green Day on iPod

Wimsey