Distal Humeral Fractures: Fixation and Replacement, Patient Selection and Outcomes

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Disclosure

• Studies supported by:
  - OTA, COA, ASES, CIHR
  - Zimmer Inc.
  - Stryker, Olympus Biotech, AO

• I am a consultant for Stryker, Acumed, Zimmer
• Receive royalties from Stryker (elbow, clavicle plates), LWW (publisher)
Patient Selection

• Non-operative treatment
  - elderly, low-demand, demented, medical co-morbidities, active infection, etc

• TEA
  - > 70 years, active, rehab potential, “C3” fracture,
  - low-demand, pre-existing arthritis

• ORIF
  - everyone else

Patient Selection

• Non-operative treatment
  - elderly, low-demand, demented, medical co-morbidities, active infection, etc

  “Functional outcomes of distal humeral fractures managed nonoperatively in medically unwell and lower-demand elderly patients”

  Desloges W, Faber KJ, King GJ, Athwal GS.
  J Shoulder Elbow Surg. 2015
  32 patients, 9 died, 5 lost, 19 followed
  13 good/excellent, 100˚ ROM, 16 united, 2 TEA’s

Patient Selection

• TEA
  - > 70 years, active, rehab potential, “C3” fracture
  - Low demand, pre-existing arthritis
Total Elbow Arthroplasty as Primary Treatment for Distal Humeral Fractures in Elderly Patients

BY TYSON S. COOK, M.D., AND RICHARD F. MORELLI, M.D., ROCHESTER, MINNESOTA.
Investigation performed at the Mayo Clinic, Rochester.

- 20 patients, mean age 72 yrs
- Average f/u 3.3 years
- 15 excellent, 5 good, 1 poor
- MEPS mean 91
- Immediate stability
- Quicker rehab
- Low complication rate
Treatment Allocation

21 TEA
1 death
20 TEA

21 ORIF
1 death
20 ORIF

5

25 TEA
15 ORIF
Mayo Elbow Performance Score

<table>
<thead>
<tr>
<th></th>
<th>Excellent (≥ 90)</th>
<th>Good (75-89)</th>
<th>Fair (60-74)</th>
<th>Poor (&lt;60)</th>
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</thead>
<tbody>
<tr>
<td>ORIF</td>
<td>1</td>
<td>7</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>TEA</td>
<td>12</td>
<td>9</td>
<td>3</td>
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P=0.03
Patient Selection

- ORIF
  - everyone else
  - Approach?
  - Type, configuration of plates?
  - Ulnar nerve?
Patients treated with triceps split had:
- 11˚ better arc of motion
- 10 point improvement in Mayo Elbow score
- less hardware irritation
Successful fixation when:

1) Parallel plates are placed that permit a total of four to six long (45-70mm) screws in the distal fragments, from one side across the other.

2) Screws interdigitate

3) Plates are precontoured particularly on the lateral side.

O’Driscoll et al. OCNA 2002
Shin SJ, Sohn HS, Do NH.

• 17 patients 90/90 plating > 2 nonunions

• 18 patients parallel plating > 0 nonunions

• Outcome scores similar
What to do with the ulnar nerve?

- Transpose?
- Leave in situ?
- OTA 2016

ORIF for intra-articular distal humeral fractures: Standard of Care

- Reliably “good” results in the majority of cases
- Mean flexion contracture of 25°
- Mean 108° arc of motion (25° to 133°)
- Return of 71% to 76% of flexion/extension strength
- Low rate of arthrosis
- Re-operation rate of 24% (hardware removal, elbow release)

Conclusions

- A triceps-splitting approach has some advantages, especially in open fractures
- ORIF with medial and lateral column plates remains the treatment of choice for the majority
- Semi-constrained TEA has a role in elderly, low-demand patients (pre-existing arthritis, severe comminution, etc)
- Management of the ulnar nerve remains controversial – it must be isolated and protected, but final disposition remains unclear