Fractures of the Calcaneus and Talus: Is this in my Wheelhouse?

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• None pertinent to this presentation
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  – Techniques in Orthopaedics

Outline

• Calcaneus
  – Staged Protocol
  – Limited Approaches
  – Extensile Lateral
  – Reduction Techniques

• Talus
  – Staged Protocol
  – Approaches
Fractures of the Calcaneus

**Literature**
- Inconsistent regarding benefits of operative treatment
- Trends suggesting best outcomes with anatomic reduction (articular and shape) and stable fixation
- Non-operative managed: 6X greater risk of requiring a salvage subtalar arthrodesis
- Worst outcomes: operatively treated with failure to achieve adequate reduction or had a significant complication

**Fractures of the Calcaneus**

**Patient Selection is Critical**

1. Identify accurately those that will do well from non-operative management
2. Those that will benefit from surgery while reducing the risks of a poor surgical result

**Fractures of the Calcaneus**

**In My Wheelhouse?**
- Do I have an interest
- Am I able
- # Cases Per Year
- Training
- Hospital Resources
Fractures of the Calcaneus

Decision Making

Patient Factors
- Comorbidities
- Age
- Gender
- Functional Demand
- Smoking
- Compensation
- Schemes
- Psychiatric

Soft Tissue
- Open Fractures
- Severe Swelling
- Blistering

Fracture
- Sander’s Classification
- Bohler’s angle
- Intra- or Extra-articular

Fractures of the Calcaneus

Who is Your Patient

• Detailed History
• Pre-injury level of function
  – Recreational Activity
• Occupation
  – Heavy Manual Laborer
• Habits
  – Smoker
• Comorbidities

Fractures of the Calcaneus

Management Options
1. Non-operative Treatment
2. ORIF
3. Minimally Invasive Reduction and Fixation
4. Primary ORIF and Subtalar Arthrodesis
Fractures of the Calcaneus

- Associated Injuries

Fractures of the Calcaneus

- 3 View Foot
- 2 View Ankle (AP and Mortise)
- Harris View
- CT scan

Fractures of the Calcaneus

Spectrum of Operative Fixation
Fractures of the Calcaneus

Displaced Intra Articular Calcaneus Fractures

Sanders Classification

Pros:
- Visualization of entire lateral calcaneus
- Direct view of posterior facet
- Direct reduction of anterior process
- Stable fixation with lateral plate

Cons:
- Increased risk of wound healing problems

Approaches

Pros:
- Lower risk of wound complications
- Operate earlier (fracture mobile)
- Direct view of posterior facet
- Direct reduction of anterior process
- Direct access to lateral wall "Blow-out"

Cons:
- Indirect reduction of tuberosity
- Difficult to address lateral wall blowout
- Limited fixation options

NOT amenable to all fracture patterns
- Challenging indirect reduction requires surgeon experience
- Limited body of literature
- May be an option for patients with risk factors for wound problems prohibiting extended lateral approach

Well described in literature
- Not for patients with significant risk factors for wound healing complication

For patients with significant risk factors for wound healing complication
Fractures of the Calcaneus
Operative Fixation

Fractures of the Calcaneus
Patient Positioning

Fractures of the Calcaneus
Understand Radiographs
Fractures of the Calcaneus

Fractures of the Calcaneus

Fractures of the Calcaneus
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Fractures of the Calcaneus

Fractures of the Calcaneus
Fractures of the Calcaneus

Epidemiology

- Rare Fracture
- 0.14 – 0.32% incidence
- 6-8 % of Foot Fractures
- Approx 50% Talar Neck
Fractures of the Talus

Complications

- High Rate of Complications
  - Avascular Necrosis
  - Post Traumatic Arthritis
  - Malunion
  - Nonunion

Fractures of the Talus

High Mechanical Demand

- Anatomic Link between Leg and Foot
- Transmits entire body weight

Fractures of the Talus

Vascularity

Artery of Tarsal Canal Supplies Majority of Talar Body
**Fractures of the Talus**

**Vascularity**

- Substantial Portion of blood supply enters posteriorly
- Helps to explain why all talar neck fractures do not go onto AVN

**Fractures of the Talus**

**Injury Mechanism**

- High Energy Injuries
- Often due to motor vehicle accidents or falls from height
- Approximately 50% of patient have several traumatic injuries

**Fractures of the Talus**

**Predicting Avascular Necrosis**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Probability</th>
</tr>
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<tbody>
<tr>
<td>I</td>
<td>0-13%</td>
</tr>
<tr>
<td>II</td>
<td>20-50%</td>
</tr>
<tr>
<td>III</td>
<td>83-100%</td>
</tr>
<tr>
<td>IV</td>
<td>Approx 100%</td>
</tr>
</tbody>
</table>

Hawkins LG: JBJS 1970; 52-A
Fractures of the Talus

Radiographic Assessment

• Radiographs
  – 3 views foot and ankle, Canale view
• Computed Tomography
  – Important tool: identify degree of displacement, location of comminution, and presence of osteochondral injuries

Fractures of the Talus

Timing of Treatment

Not emergent based on several studies


Fractures of the Talus

Timing of Treatment

• Acute treatment for the following:
  – Open fracture
  – Soft Tissue Concerns
  – Neurovascular compromise
  • Especially Posteromedial
Fractures of the Talus

Principles of Fixation

- Accurate Alignment of the Talar Neck
  - 15 to 20 degrees medial to the body
- Stable Fixation
  - Optimize revascularization potential
  - Allow early range of motion

Fractures of the Talus

Implant Selection

- Predicated upon pattern, degree of comminution, and bone quality
- Aim to provide sufficient fixation to enable early ROM
- Partially Threaded Screws
- Fully Threaded Screws
- Mini-Fragment Plates

Fractures of the Talus

Surgical Approaches
Fractures of the Talus

In My Wheelhouse?

• High-energy injuries
• Unique Anatomy
• Visualization is Key
• Complications

Thank You