Fixation of calcaneal fractures through a mini-incision technique

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Disclosures

• None
Background

- Calcaneal fractures are a common injury in trauma patients accounting for 1-2% of all fractures\(^1\)
- Displaced fractures usually require operative fixation\(^2\)
- Management is a source of debate due to a high risk of complications\(^3\)
- The lateral extensile approach represents the standard technique, but has wound complication rates as high as 24.6%\(^4\)
- Surgical Goal: restore hind foot anatomy while minimizing complications (an ideal, yet elusive goal)\(^3\)
Purpose

• For the last 5 years surgeons at UAB have been using small incision technique for operative fixation of calcaneal fractures

• Study Purpose: quantify the radiographic outcomes and complications of the mini incision approach to the calcaneus.
Operative technique

- Lateral positioning with the operative leg up and fitted with a thigh-high tourniquet.
- A Steinmann pin was first placed into the tuber piece and used as a joystick to restore anatomic position.
- Once satisfied with the reduction, a guidewire is placed and the Steinmann pin is removed.
- Cannulated crews are placed over the guidewire to fix the fracture fragment.
- Wounds were then irrigated and closed.
Approach: Tongue Type
Approach: Joint Depression Type
Methods

• Retrospective chart review
• Inclusion criteria: patients who underwent a mini-incision approach for intra-articular calcaneal fracture from Jan 1, 2013 to Dec 31, 2015
• Exclusion criteria: < 18 years old, history of prior surgery on the operative foot, polytrauma, and hereditary deformity of the foot
• Demographic information, comorbidities, postoperative complications, and length of follow-up were collected and analyzed.
Methods (cont.)

• Preoperative radiographs were examined for type of fracture (tongue vs. depression), Bohler angle (BA), and Gissane angle (GA)
• Final radiographs were evaluated for BA, GA, and presence of union
• Pre- and postoperative BA and GA were then analyzed for significant change.

Postoperative BA of 36 degrees

Postoperative GA of 107 degrees
Results

• 26 calcanei (23 patients) were included in our study:
  • 16 males (69.6%)
  • Mean age 41.57 years
  • Mean BMI 26.2 kg/m²

• Medical comorbidities:
  • 26.1% hypertension
  • 13.0% Hepatitis B or C
  • 4.3% Diabetes

• Social history:
  • 82.6% tobacco use
  • 39.1% alcohol use
  • 30.4% illicit drug use
Results (cont.)

- Complication rate of 11.5% (3/26) with two infections and one hardware removal
- BA improved significantly following surgery
- GA did not change significantly following surgery

<table>
<thead>
<tr>
<th>Average</th>
<th>Range</th>
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<tbody>
<tr>
<td>Clinical follow-up (months)</td>
<td>6.6</td>
</tr>
<tr>
<td>Radiographic follow-up (months)</td>
<td>4</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Preop avg/range</th>
<th>Postop avg/range</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bohler angle</td>
<td>13.2 (-12 to 31)</td>
<td>27.0 (7 to 39)</td>
</tr>
<tr>
<td>Gissane angle</td>
<td>117.73 (90 to 140)</td>
<td>117.65 (97 to 146)</td>
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Conclusions

• Mini-incision technique is an effective option for restoring calcaneal anatomy while minimizing complications

• Poor follow-up and multiple comorbidities present in patients in this study are likely common in the general calcaneal fracture population

• These risk factors highlight the importance and utility of techniques, such as the mini incision approach, that reduce the risk for wound complications.

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Disclosures/Financial Conflicts of Interest: None

Acknowledgments: None
References


