Is Arthroscopic Assisted Percutaneous Screw Fixation As Good As Open Reduction And Internal Fixation For The Treatment Of Displaced Intra-articular Calcaneal Fractures?

EJ Yeap¹,², J Rao¹, CH Pan³, SA Soelar⁴, ASE Younger⁵

¹Tuanku Fauziah Hospital, Kangar, Malaysia
²Parkcity Medical Centre, Kuala Lumpur, Malaysia
³Kedah Medical Centre, Alor Setar, Malaysia
⁴Clinical Research Centre, Kuala Lumpur, Malaysia
⁵St Paul’s Hospital, Vancouver, Canada
Is Arthroscopic Assisted Percutaneous Screw Fixation As Good As Open Reduction And Internal Fixation For The Treatment Of Displaced Intra-articular Calcaneal Fractures?

Ewe Juan Yeap

My disclosure is in the Final AOFAS Mobile App. I have no potential conflicts with this presentation.
Objective & Methodology

• To compare the outcome of arthroscopic assisted percutaneous screw fixation vs open reduction and plating for displaced calcaneal fractures
• Two groups of patients were studied
• Group I were patients who underwent open reduction and plating
• Group II underwent arthroscopic assisted percutaneous screw fixation
• There were 12 fractures in Group I and 15 fractures in Group II
• Follow-up: min 12 months
Methodology

• The primary outcome measures were:-
  – AOFAS Hindfoot scores
  – SF 36 scores

• Secondary outcome measures were:-
  – Bohler’s angle
  – Gissane’s angle
  – Pre and post operative stay duration
  – Time to return to work
  – Duration of surgery
  – Wound complications
  – Time to union and time until full weight bearing
Inclusion & exclusion criteria

Inclusion criteria:
• All patients with displaced calcaneal fracture who presented between October 2005 – November 2011 who agreed for surgical intervention
• Smokers
• Grade 1-2 open fractures

Exclusion criteria:
• Patients unfit for surgery
• Extra-articular fractures
• Concomitant foot fractures
• Inability to position lateral decubitus
• Closed fractures with soft tissue compromise, e.g. skin necrosis from grossly displaced bone fragments
• Vascular insufficiency
Arthroscopically assisted percutaneous screw fixation

- 3 subtalar portals
  - Antero-lateral
  - Central
  - Postero-lateral
- Reduction performed via Essex-Lopresti method
- Separate fragments manipulated with probe, impactors or elevators
- Fixed with 3.5mm or 4.0mm and 6.5mm screws
Results

- Both groups homogenous
- No major wound complications were noted
- No compartment syndrome
- Most of the available CT scans showed Sanders II – III classification in both groups
- Bohler’s and Gissane’s angles were statistically significantly different in both groups pre and post operatively

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre-Intervention Mean (SD)</th>
<th>Post-Intervention Mean (SD)</th>
<th>t statistic&lt;sup&gt;a&lt;/sup&gt; (df)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bohler’s angle</td>
<td>10.2 (11.29)</td>
<td>23.2 (6.82)</td>
<td>-4.923 (21)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gissane’s angle</td>
<td>127.7 (16.08)</td>
<td>109.7 (7.15)</td>
<td>5.080 (21)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

<sup>a</sup> Paired t Test
SD = Standard deviation
AOFAS and SF 36 scores were not significantly different
Pre and post-op stay, back to work duration and pre-op Bohler’s angles were significantly different between both groups
Example of OR, plating

Pre-op
Bohler’s 7.5°
Gissane’s 130°

Post-op
Bohler’s 25°
Gissane’s 100°
Example of scope assisted screw fixation

Pre-op 2°

Sanders IIB

Post-op 22°
Discussion

• Gold standard is extended lateral approach
• May not be necessary in simpler injury patterns
• The APSF group were operated earlier and stayed shorter than the ORIF group. They also returned to work earlier
• ORIF group probably stayed longer for cryocuff therapy, foot pump, daily dressing or IV antibiotics
• Our data suggests that arthroscopic assisted percutaneous screw fixation results in outcomes and radiographic reduction as good as the gold standard
• However, from a statistical viewpoint, there may be a difference which may only be evident with a larger sample size
References

- Lim EVA, Leung JPE. Complications of intraarticular calcaneal fractures.