Os calcis fractures

Trauma Topics – Basingstoke 2010
Mr Neeraj Purohit & Mr Hawar Akrawi
Epidemiologically

- Annual incidence of fracture - 11.5 per 100,000
- 2.4 X more common in males
- Males peak age 20-29
- 72% - fall from height
- Concomitant injuries:
  - lower limb 13.2%; spinal 6.3%

Why not to rush in...

• 3 factors
  – Surgeon
  – Injury
  – Patient

“BEST” treatment method Controversial
Why not to operate...Surgeon

- Substantial learning curve involved

- Infection and subtalar arthrodesis increased exponentially with decrease in fracture load

- Institute that does less than 1 # ORIF per month jeopardises outcome

Why not to operate... Injury

- Open fractures – soft tissue determines outcome
- 503 Calcaneal #s
- 8.5% open (42 patients)
  - Type-I 9
  - Type-II 8
  - Type-III 25

- Infection rate in Type III:
  - 50%; Osteomyelitis 19%

Why not to operate... Patient

- Assess each case – personality of patient
  - 179 patients with 190 #s

  1) Smoking
  2) Diabetes
  3) Vascular insufficiency

  - Elderly??

  - If all 3 > 90% wound problems

Folk et al. JOT 13(5), 1999
Basile. J of Foot Ankle Surg. 49; 25-32. 2010
Any good, hard evidence...?

- Few trials DO show some benefit of surgery
  - Better functional scores
  - Return to work sooner
- BUT
  - small studies
  - Not randomised
  - Patient selection bias
  - Fracture not classified
  - Short follow-up
  - Strength of evidence weak

Thordason et al. Foot Ankle Int. 17:2-9 (1996)
…results of crush fractures of the os calcis are rotten.”
- Bankhart, 1942

- <1850: bandages/elevation
- 1850: Clark: traction
- 1931: Bohler: cl. red./cast
- 1952: Essex-Lopresti: perc. fixation
- 1993: Benirschke/Letournel/Sanders: “modern” plating
Displaced Intra-Articular Calcaneal Fractures

- Effect of operative treatment compared with non-operative treatment on rate of union, complications, and functional outcome after intra-articular calcaneal fracture.

- Among 27 relevant articles:
  - 5 RCTs:
    - O'Farrell 1993
    - Parmar 1993
    - Thordarson 1996
    - Buckley 2002
    - Ibrahim 2007
  - 2 ongoing trials
  - 3 systematic reviews
    - Randle 2000
    - Bridgman 2000
    - Poeze 2008

• Evidence from RCTs with methodological limitations revealed:

  – No significant difference in pain and functional outcome between the two groups

  – Operative treatment maybe superior
    • Return to work
    • Ability to wear the same shoes
    • Subtalar fusion
Based on subgroup analyses:

- Potential benefit of operative treatment in:
  - Women
  - Not receiving workers’ compensation
  - younger males
  - higher Böhler angle
  - light workload
  - single, simple displaced intra-articular fracture.

- Potential benefit of nonoperative treatment in:
  - 50 years or older
  - males
  - receiving workers’ compensation
  - heavy workload

(Buckley et al, 2002 JBJSA)
• Arthrodesis rates are significantly reduced with operative treatment compared with nonoperative treatment

• From societal perspective, operative management is less costly and more effective than nonoperative care
Displaced Intra-articular Calcaneal Fractures: Variables Predicting Late Subtalar Fusion

- Amount of initial injury involved with the calcaneal # is the 1ry prognostic determinant of long-term patient outcome

- A distinct patient group with a displaced intra-articular calcaneal who are at high risk of subtalar fusion, These include:
  - Male
  - Receiving worker’s compensation (3 times)
  - Heavy labor work
  - Böhler angle less than 0° (10 times)
  - Sanders-type IV calcaneal fractures (5.5 times)
  - Initial treatment was nonoperative (6 times)

- Initial ORIF of patients with displaced intra-articular calcaneal # minimized the likelihood that subtalar fusion would be required.

Csizy et al 2003, J Orthop Trauma
Bilateral calcaneal fractures
Operative versus nonoperative treatment

• Pts sustaining bilateral calcaneal # are very similar to those in whom the injury is confined to one side.

• Neither objective nor subjective functional outcomes are significantly improved following operative intervention.

• However, careful operative pt selection will minimize complications and lessen need for late subtalar fusion.

Buckley et al Foot Ankle Int. 2004
Other operative modalities

• External fixation
  – Magnan 2006
  – McGarvey 2006

• Minimally invasive fixation
  – Percutaneous, Schepers 2007
  – Arthroscopic assisted
ORIF by primary subtalar fusion for intraarticular calcaneal #

- 6 out of a total of 434 patients
- Sanders type IV # with severe and extensive cartilage destruction.
- Healing within 4 m.
- F/U 4.9 years
- Radiologically, almost anatomic reconstruction
- AOFAS Score of 88 points and a Hanover Score of 84 points

Hüfner et al Oper Orthop Traumatol. 2007
Orthopaedic literature is lacking

No prospective, randomized studies with long-term follow-up
Summary

• Benefits of Surgery outweigh risks ??
• Treat each case individually – S I P
• Can always fuse later on
• Long term outcomes studies are needed comparing different treatment options