Effect of delay to definitive surgical fixation on wound complications in the treatment of closed, intra-articular calcaneus fractures

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John Kwon, Daniel Guss, Darius Lin, Mostafa Abousayied, Clifford Jeng, Steve Kang, J. Kent Ellington

(Disclosures are presented in the AOFAS handbook)
Controversies in rx. of intra-articular calcaneus fractures:

• Operative vs. non-operative management?
• What influences wound complication rates?
• What surgical approach best considering pros/cons of each?
• Optimal timing of surgery?

- Traditionally delay surgery due to swelling
  • “Wrinkle sign” – R Sanders, JOT 1992
- Others suggest no correlation between delay and wound complications
Goals:

• Does surgical delay decrease wound complication rates?

• Are there other contributing factors?
  – Patient demographics
  – Co-morbidities
  – Fracture severity
  – Surgical approach
  – Primary subtalar arthrodesis
  – Surgeon experience
Study design:

- Retrospective, four institutions 2002-2012
  - 405 closed, intra-articular calcaneus fractures identified
- Patient demographics and risk factors examined
- Time to operative fixation examined
- Operative approach
  - Extensile lateral, sinus tarsi, percutaneous
  - Use of subtalar arthrodesis
- Fracture severity (Sanders classification)
- Surgeon experience examined
Wound complications: Defined by treatment rendered

• Infections
  – Superficial: Oral antibiotics
  – Deep: IV antibiotics or return to OR

• Dehiscence
  – Superficial: Local wound care
  – Deep: Return to OR

  – Overlap expected
Results:

- 405 fractures
  - 224 extensile lateral
  - 181 sinus tarsi / percutaneous
- Mean follow up 7 months (range 0.5-13)
- Average age 45 years old (range 17-79)
  - 80% male
- Overall wound complication rate 22%
  - Extensile 32%
  - Sinus tarsi/percutaneous 8%
Results – entire cohort:

- Operative delay *increased* wound complication rate (p = 0.015)

- Extensile approach *5x more likely* to develop a wound complication than less invasive
  - (OR 5.3; 95% CI 2.9-9.5, p<0.001)

- Senior surgeons significantly *higher* wound complications (p = 0.006)

- Fracture severity (Sanders I/II vs. III/IV) did not affect rates
Results:

Figure 1. Demonstrates that delaying surgery does not decrease wound complication rates when using the extensile lateral approach and may actually increase wound complication rates when using the sinus tarsi or percutaneous approach.
Results:

Figure 2: Senior surgeons experienced significantly higher wound complication rates than junior or intermediate surgeons, but their preference for the extensile lateral approach almost certainly underlay these higher rates given that fracture severity did not differ across.
Other risk factors:

• Extensile lateral:
  – Smoking (OR 2.2; p = 0.015)

• Sinus tarsi / percutaneous:
  – Gender (M > F; p = 0.02)
  – Fracture severity (p = 0.017)

• Primary subtalar arthrodesis: Not a significant risk for wound complications (p=0.71)

• Diabetes: Trend towards higher complication rates but not significant (p=0.12)
Limitations:

- Retrospective
  - Sanders I/II vs. III/IV as surrogate for severity
  - Could not assess “wrinkles”

- Loss of follow up

- Unexamined risk factors
  - Body mass index
  - Worker’s compensation
  - Length of surgery

- Surgeon and institutional variability
Major Conclusions:

• Time to operative fixation
  – Surgical delay does NOT decrease wound complications when using an extensile lateral approach
  – Surgical delay INCREASES wound complications when using less invasive approaches

• Fracture severity
  – Increases wound complication rates but only when using a sinus tarsi / percutaneous approach