Treatment of Severely Comminuted Tibial Pilon Fractures with Primary Ankle Arthrodesis

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Disclosure

• Acumed

• Smith-Nephew
Methods

- Retrospective clinical review of patients treated with ankle arthrodesis as the initial surgical reconstruction for tibia pilon fracture
- Excluded patients treated with bone transport or lengthening to treat bone loss
Indication for fusion

• Preoperative imaging
  – CT
  – Xrays at length

• Intraoperative findings
  – Severe intra-articular comminution
  – >50% loss of articular cartilage
Treatment Protocol

- Spanning External Fixation done acutely
- Definitive reconstruction timing based on soft tissue envelope
- Fractures reduced to maintain length and alignment
- Bone defects managed with graft (or cement beads)
- Residual joint surfaces prepared for fusion
- Ankle fusion and fractures internally fixed (pending soft tissue)
- Ring external fixation used to supplement internal fixation or as the primary fixation (compromised soft tissues)
Demographics

• 11 patients (12 ankles)
• 7 male, 4 female with ave age 58 yrs (25-76)
• Follow-up: 14 months (6-22 months)
• 7 closed, 5 open
• Classification: Ruedi-Allgower 3B (Feibel mod):
  Loss of bone and cartilage requiring primary arthrodesis
• 9 shaft component
Demographics

- MOI: 7- fall or jump; 2- MVA; 1-logging; 1-kiteboarding
- 6 sustained other significant orthopaedic injuries
- Time from injury to fusion: 15 days (8-24 days), excluding one at 67 days (had 2 cm bone resected for soft tissue healing)
Results

• Definitive fixation: anterior plate 10 (2 additional plate); Ilizarov 9 (2 primary), 4 fibula ORIF

• Approach: anterior (10); lateral (1); med & lat (1)

• Tibial shaft component: 7/9 managed with plate and frame (2 plate only)
Results

- Allograft bone 11 (10 acute, 1 delayed at 9 wks)
- ICBG 1 (acute)
- Healing time: Ave 4.4 months (3-5)
- Frame time: Ave 120 days (57-167)
Results

• AOFAS Ankle –Hindfoot Score (100 pt)
• Average 83 (69-91): available for 8 pts
• Pain 40, Function 50 (activity, walking, gait, motion) Alignment 10
• 5 excellent (90-100%), 2 good (80-90%), 1 fair (70-80%)
Complications

• 1- superficial anterior wound dehiscence- STSG
• 1- PE- medical treatment
• 1- shaft nonunion- healed with revision internal fixation and ICBG
• 1- revision of rotational malalignment
• 2- hardware removal (after healing for sx’s with activity)
• No deep infections
Radiographic Analysis

- Tibia anatomic axis on AP, LAT, HFA views
- AP: 1.3 mm lateral mid-talus (6 med-5 lat)
- Lateral: 8 mm posterior to lateral talar process (2-11); Angle to sole- 89 deg (83-95)
- HFA: 2.4 mm lateral to plantar calc (9 med-10 lat)
Conclusions

• Primary ankle arthrodesis (and ORIF) resulted in good clinical outcomes with few complications in a select group of difficult pilon fractures with severe joint damage.

• The anterior approach with an ankle arthrodesis plate treats most fractures, using modern soft tissue principles.

• Anterior plating is helpful in achieving good alignment and healing, but may anteriorly translate the talus.
Conclusions

• Fusion and fracture healing occurs reliably despite significant bone defects (often treated with allograft bone)

• Ring external fixation helped stabilize the tibial shaft component of most fracture patterns and allowed early weight bearing