Treatment of Severely Comminuted Tibial Pilon Fractures with Primary Ankle Arthrodesis

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Disclosure

• I have no relevant disclosures
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Methods

• Retrospective case series of 11 patients (12 ankles) treated with ankle arthrodesis as the initial surgical reconstruction for tibia pilon fracture
• All pts treated by 2 surgeons at Level I trauma center
• Excluded patients treated with bone transport or lengthening to treat bone loss

Indication for fusion

• Rueidi-Allgower, Feibel modification Grade 3B, AO/OTA Type 3C with:
  • >50% loss of articular cartilage identified at open reduction
  • Preoperative imaging
    – CT and Xrays at length
**Treatment Protocol**

- Spanning External Fixation done acutely
- Definitive reconstruction timing - based on soft tissue envelope
- Bone defects managed with graft (or cement beads)

**Treatment Protocol**

- 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 average age 58 yrs (25-76)
- Follow-up: 14 months (6-22 months)
- 7 closed, 5 open
- 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
  - Ilizarov only 2
- Ilizarov frame added in 7 pts with plate fixation to manage tibia shaft component or other foot fxs
- 4 fibula ORIF
- Approach: anterior (10); lateral (1); med &lat (1)

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 (92 max)
- Average 83 (69-91), 8 pts with 80 or better
- Pain 40, Function 42 (activity, walking, gait, motion excluded) Alignment 10
- 5 excellent (90-100%), 2 good (80-90%), 1 fair (70-80%)

Complications

- 1- superficial anterior wound dehiscence- STSG
- 1- shaft nonunion occurred when frame was removed at 8 wks. 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 (treated with allograft bone)
• Ring external fixation helped stabilize the tibial shaft component of most fracture patterns and allowed early weight bearing