Talectomy with Tibiocalcaneal Fusion Following Trauma and Charcot Breakdown of the Talus: A Case Report and Literature Review

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Purpose
Charcot arthropathy is a challenging condition faced by foot and ankle surgeons. In the absence of severe deformity, and with good patient compliance, conservative measures such as bracing can be adequate to prevent ulceration and further structural breakdown of the foot and ankle. Despite these measures severe foot and ankle deformities from Charcot can still occur and can lead to ulceration, infection, and lower extremity amputation. When conservative measures cannot adequately address the sequela of Charcot deformity, surgical reconstruction can be implemented in an attempt to save the limb. We present a case where a Charcot patient’s talus underwent severe breakdown leaving an unstable foot. In this case a tibiocalcaneal arthrodesis with bone grafting and placement of an intramedullary nail was implemented as a limb salvage procedure. We present this interesting case and literature review to explore a few possible approaches and outcomes of tibiocalcaneal arthrodesis.

Literature review
A variety of fixation techniques are described in the literature for tibiocalcaneal arthrodesis. Paola et. al1 reported a 100% fusion rate for pantalar arthrodesis utilizing an intramedullary nail. Pertinent to the case study herein, 3 of these patients underwent concomitant talectomy with tibiocalcaneal fusion. Klos et. al2 had 6 cases of tibiocalcaneal arthrodesis done with a femoral head allograft (to maintain limb length) and intramedullary nailing. Mean follow-up was 33 months and 2 had non-unions but all 6 limbs were salvaged. Interesting to note that 3 of the 6 cases were performed after failed total ankle arthroplasty. Aikawa et. al3 used a locking plate and a single compression screw into the talar head on 3 patients after debridement of the talus body only and leaving the talar head intact. They achieved fusion in all 3 patients. Myerson et. al4 used an allograft condylar blade plate for tibiocalcaneal arthrodesis in 10 patients and 28 fused at an average of 16 weeks. External fixation as a sole means of tibiocalcaneal fusion has also been reported. Rochman et. al5 reported a series of 11 patients who underwent tibiocalcaneal fusion with external fixation for infected talar non-unions or extrusions. 9 patients fused successfully. Dennison et. al6 had 6 revision cases where they excised any remaining talus due to avascular necrosis and then fused the tibia to the calcaneus using external fixation. All patients achieved fusion. Kolker et. al7 had a smaller series of 3 patients who also underwent fusion with only using an external fixator. A combination of internal and external fixation has also been reported, which is useful in patients with higher comorbidity and/or poor bone stock. LaPorta et. al8 advocated for a combination of internal and external fixation for tibiocalcaneal arthrodesis and had good outcomes in all six patients when using a combination of intramedullary nails or regular screw fixation combined with an external fixator.

Case Report
A 41 year old diabetic male with history of Charcot arthropathy presented to clinic with right foot pain and swelling. He reported that 2 years prior he had run over his foot with a forklift which started the sequence of events. Pain was minimal but was aggravated with standing. He presented utilizing a crow walker. He reported an acute on chronic Charcot event which began 1 month prior. X-rays revealed Charcot changes to the hindfoot with dorsal dislocation of the navicular and subluxation of the subtalar joint. He was instructed to continue to utilize the crow walker and to offload the foot by using a walker and return for follow up x-rays. On later follow up the talus was fragmented and the foot was unstable. At this point surgery was indicated in an attempt to save the limb. A lateral approach was taken and the distal fibula was removed. Next the fragmented talus was debrided. After removing cartilage, bone graft was harvested from the intramedullary canal of the fibula and mixed with morselized cancellous allograft which was then packed into the arthrodesis site. An intraoperative flouro image and postoperative X-ray 29 months following initial injury (above) are shown.

(Case Continued)
intramedullary tibial compression nail as then applied in typical fashion for fixation. Good compression was noted intraoperatively. The post-op course was unremarkable. Currently, the patient is doing well with radiographic fusion evident. He is now ambulatory in a foot and ankle brace with no further osseous or soft tissue breakdown to this point.

Discussion
As noted in the literature review, a variety of fixation techniques for tibiocalcaneal arthrodesis have been implemented with success. Loss of a viable talus can occur from a variety of etiologies. These include Charcot arthropathy, avascular necrosis, trauma, and infection. In addition, each patient presents with unique circumstances and comorbidities. All these factors will lead to the surgeon’s preference of surgical technique. Ultimately, a tibiocalcaneal arthrodesis is considered a limb salvage procedure that may result in a more proximal amputation if it fails. According to one study, on long term 8 year follow up all patients that had TC arthrodesis had solid fusion9. Fortunately, tibiocalcaneal arthrodesis can be a good surgical option in patients with a non-viable talus, and respectable outcomes are reported.

References