Segmental Tibia Fractures: They Don't Stand Alone

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Purpose: Segmental tibial fractures are usually the result of high-energy trauma. Reports specifically including these fractures typically include relatively few cases. The purpose of this study is to determine the most commonly associated injuries and complications of patients sustaining segmental tibial shaft fractures.

Methods: A retrospective review of all segmental tibial shaft fractures that presented to 2 Level I trauma centers between 2005-2013 was performed. The radiographs of these patients were reviewed. The minimum time for follow-up for inclusion was 12 months. The eligible patient charts were analyzed for patient demographics, presence of comorbidities known to affect bone healing, mechanism of injury, fracture details, surgical procedures, and complications. Outcome variables that were analyzed include union rate, average time to union, and the need for additional surgeries to promote healing.

Results: Approximately 3300 tibia fractures were treated during the study period. 108 patients met the inclusion criteria. All fractures were AO Type 42C2. 73 patients (67%) sustained open fractures, while 34 patients (31%) had compartment syndrome. The mean ISS was 29 (range, 4-75). No patient experienced an isolated tibia fracture. 95 patients underwent intramedullary nailing of the tibia, 4 underwent open reduction and internal fixation, and 2 patients were definitively treated with external fixation. 8 patients (7%) underwent amputations. Of the 73 patients who sustained open fractures, 24 (32%) underwent reamed intramedullary nailing of the tibia with primary wound closure at the time of initial operative intervention. Three patients required flap coverage of their open wounds. The mean length of hospital stay was 13 days (range, 3-48). The mean time to union was 27 weeks (range, 14-48). The delayed union rate was 43%; the nonunion rate was 9% (9 of 100). In those patients with open fractures, the patient's diabetes status, body mass index, and smoking status were not statistically significant factors with time to union ($P = 0.19$, $P = 0.28$, and $P = 0.47$, respectively). Additionally, the presence of compartment syndrome and the location of the fracture pattern for open fractures were also not significant in union rate ($P = 0.06$ and $P = 0.92$, respectively).

Conclusion: We present the largest series of patients with segmental tibia fractures. Our study demonstrated that these fractures are not isolated injuries and these are multitrauma patients with a mean ISS of 29. There is a high rate of open fractures and compartment syndrome. Patients should be appropriately counseled regarding the nature of this injury and complications.