

Type C Tibial Pilon Fractures: Rate and Risk Factors for Complications Following Early Operative Intervention

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Purpose: The optimal treatment for tibial pilon fractures remains controversial, with advocates for both early fixation versus two-stage delayed fixation. It is acknowledged that further data are needed to document the outcome of these complex injuries. The aim of this study was to document the outcome following either early or delayed fixation for complex fractures of the tibial plafond.

Methods: We identified 112 skeletally mature patients from our trauma database over an 11-year period, which were managed acutely for a complex intra-articular fracture (type C) of the distal tibia. Demographic data, fracture classification, management, complications, and subsequent surgeries were recorded following retrospective clinical record review. A minimum follow-up of 3 months was used to detect any complications from surgery. Patients with incomplete data or inadequate follow-up were excluded. The primary outcome measure was the development of complications following the acute management of these injuries.

Results: There were 96 patients in the study cohort with a mean age of 42 years (range, 16-86) and 74% (n = 71) were male ($P < 0.001$). There were ≥ 1 comorbidities documented in 42 (43.8%) patients, with 40 (41.7%) smokers and 33 (34.4%) with a background of alcohol excess. High-energy injuries accounted for 79 (82.3%) of all fractures, with a fall from height (n = 66, 68.8%), motor vehicle collision (n = 8, 8.3%), and sports injuries (n = 7, 7.3%) most common. There were 22 (22.9%) patients with multiple injuries and 12 (12.5%) patients with an open fracture. The median time to definitive surgery was 2 days (range, 0-15). There were 71 (74%) patients who underwent primary open reduction and internal fixation (ORIF), 17 (17.7%) primary external fixation with delayed ORIF, 5 (5.2%) primary ORIF + external fixation, and 3 (3.1%) primary fusion. There were 33 complications recorded in 24 (25%) patients. There were 13 (13.5%) infections, with a deep wound infection in 7 (7.3%) patients and a superficial wound infection in 6 (6.3%). There were 9 (9.4%) patients who went onto a nonunion, of which 5 were infected nonunions. Other complications included a loss of reduction (n = 5, 5.2%), acute compartment syndrome (n = 1, 1%), and complex regional pain syndrome (n = 1, 1%). There were 34 (35.4%) patients who underwent ≥ 1 subsequent procedures, with 26 (27.1%) requiring removal of metalwork. The only risk factor identified for developing any complication was multiple comorbidities ($P = 0.033$). Risk factors for developing infection were multiple comorbidities ($P = 0.046$) and primary external fixation with delayed ORIF ($P = 0.035$), with an open fracture approaching significance ($P = 0.055$).

Conclusion: This is one of the largest series in the literature documenting the outcome following fixation for type C tibial pilon fractures. Despite the severity of these injuries, we

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have demonstrated a satisfactory outcome using primary early fixation in the vast majority of cases. The primary risk factor we identified for developing a complication was multiple comorbidities, with primary external fixation with delayed ORIF also a risk factor for infection.