Comparison of Infection Rates Between Early Primary and Delayed Fixation of 478 Complete Articular Pilon Fractures

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Purpose: Tibial pilon fractures typically occur from high energy axial loading or torsional injuries. Historically, outcomes following surgical fixation have been poor, fraught with high rates of wound infection and dehiscence. Staged open reduction and internal fixation (ORIF) has been advocated to reduce the risk of infection and wound complication. However, there are some reports that early ORIF may be safe when the soft tissues appear appropriate. At our institutions, some surgeons treat pilon fractures with urgent early fixation while others prefer a staged fixation strategy. We sought to compare the infections between early, primary ORIF and delayed fixation.

Methods: Records of 644 patients (19-87 years old) with pilon fractures from 2001-2018 were reviewed. 478 OTA type 43C fractures were identified and included in the study. Patients were divided into three groups based on timing of definitive fixation from initial injury: acute (<48 hours), intermediate (48 hours to 1 week), and delayed (>1 week). Univariate and multivariate logistic regression analyses were performed.

Results: The study population included 478 patients (66% male), mean age of 45.1 years and mean follow-up of 2.8 years. 282 (59%) were initially treated with external fixation (ex-fix) and underwent definitive ORIF at a mean of 14.2 days from time of ex-fix. Regarding timing of ORIF, 140 (29.2%) were fixed within 48 hours, 81 (16.9%) were fixed between 48 hours and 1 week, and 257 (53.4%) were fixed over 1 week from injury. Overall infection rates (early 28.6%, intermediate 33.3%, delayed 28.8%, P = 0.71) and deep infection rates (early 16.4%, intermediate 25.9%, delayed 21.0%, P = 0.23) did not significantly differ between groups. Smoking (odds ratio [OR], 1.9), open fractures (OR, 1.7), and use of an external fixator (OR, 1.7) were found to be independently associated with an increased risk of deep infection. Diabetes (OR, 3.2) was independently associated with an increased risk of superficial infections.

Conclusion: The risk of deep infection following fixation of tibial plafond fractures does not appear to be related to time to definitive fixation. When the soft-tissue envelope presents with limited swelling and blistering, early primary ORIF appears to be a safe strategy. Patients with open fractures, external fixation, and smoking are at increased risk of deep infections while diabetics are at increased risk of wound infections. The increased risk of infection in patients treated with external fixators likely represent patients with higher-energy injuries with open injuries and/or significant soft-tissue damage.