

What Is the Appropriate Time for ORIF of Tibial Plateau Fractures With an Ipsilateral Compartment Syndrome? A Multicenter Retrospective Review

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Purpose: Tibial plateau fractures with an ipsilateral compartment syndrome are a clinical challenge as there is conflicting information regarding the best time of definitive open reduction and internal fixation (ORIF). A previous single-center study demonstrated a significantly higher risk of infection in those tibial plateau fractures with compartment syndrome versus no compartment syndrome (25% vs 8%, $P < 0.0001$). However, previous results were underpowered to determine the best timing of ORIF relative to fasciotomy closure. The purpose of this study is to determine if there is a difference in infection rates based on the timing of ORIF.

Methods: A retrospective review was conducted at 15 US trauma centers to identify patients from 2009-2019 with tibial plateau fractures and an ipsilateral compartment syndrome. All patients were diagnosed by an attending orthopaedic physician and treated with emergent 4-compartment fasciotomy. The primary outcome measure was deep surgical site infection that required operative debridement after open reduction and internal fixation. The results were stratified into 3 treatment groups: (1) ORIF before fasciotomy closure, (2) ORIF at the same time as fasciotomy closure, or (3) ORIF after fasciotomy closure. Fasciotomy closure involved either delayed primary closure or skin grafting. χ^2 analysis and multivariate modeling was performed on categorical variables with $P = 0.05$ determined to be significant.

Results: Consistent with prior results, 115 (22%) of the 531 patients who underwent ORIF of their tibial plateau fracture (AO/OTA 41) subsequently developed a deep surgical site infection. Schatzker 6 tibial plateau fractures comprised the majority of the fractures within this cohort (378 of the 531 fractures, 71%) and had a particularly high infection rate compared to all other Schatzker types (25% vs 14%, $P = 0.01$). A multivariate analysis demonstrated no statistically significant difference in the infection rates based on timing of definitive fixation relative to fasciotomy closure (before: 26%, $n = 32$; same time: 17%, $n = 26$; or after: 24%, $n = 57$; $P = 0.12$).

Conclusion: Our multicenter data confirm that nearly one-fourth of tibial plateau fractures with an ipsilateral compartment syndrome develop a surgical site infection (115 of 531, 22%), consistent with past results from a previous single-center study. Schatzker 6 tibial plateau fractures appear to have a higher infection rate (25% vs 14%) than other patterns. Although these data already represent the largest study on the timing of fasciotomy closure and infection risk, the data do not yet suggest timing of ORIF is a modifiable risk factor for infection. Final results with more sites and an even larger sample size will be presented at the OTA meeting.