The Open Tibial Plateau Fracture: Does Wound Status Portend Poor Outcomes?

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Purpose: Open fractures are orthopaedic urgencies that present unique challenges to the treating surgeon. These injuries require timely treatment with antibiotics and debridement. Additionally, they require the evaluation of soft-tissue compromise in order to assess the need for complex closure or soft-tissue flap coverage. This soft- tissue disruption can lead to increased morbidity and mortality. Tibial plateau fractures are associated with soft- tissue disruption even in closed fracture patterns. The aim of this study was to compare the long-term outcomes of open tibial plateau fractures with closed tibial plateau fractures.

Methods: This study was an analysis of a consecutive series of tibial plateau fracture patients treated by one of 3 orthopaedic traumatologists over a 12-year period at a major academic medical center. There were 373 patients with complete follow-up at a minimum of 1 year. Patient data were collected prospectively and included demographics, injury information, and functional outcomes as measured by the Short Musculoskeletal Function Assessment (SMFA) score. Linear regression and binary logistic regression were completed using IBM SPSS, comparing patient outcomes between those with an open tibial plateau fracture to those that were closed.

Results: Of the 373 patients with 376 tibial plateau fractures, 3.5% were open fractures. At final follow-up, at a mean of 11 months (mode of 12 months), open plateau fracture patients had significantly worse bothersome, mobility, functional, and standardized total SMFA scores than their closed fracture counterparts, after controlling for sex, age at injury, body mass index (BMI), and Charlson Comorbidity Index (CCI) ($P = 0.012$, $P = 0.007$, $P = 0.001$, $P = 0.011$). Infection was more frequent in the open fracture group with open plateau fractures having 136 times the odds of infection as compared to closed fracture patients ($P < 0.001$). Additionally, open fracture patients were found to have poorer range of motion with respect to flexion than closed fracture patients ($P = 0.001$). All other outcome measures including patient-reported pain, nonunion rate, operative and inpatient complications, reoperation rate, and range of motion in extension were not significantly different between the open fracture and closed fracture groups ($P = 0.275$, $P = 0.999$, $P = 0.159$, $P = 0.289$, $P = 0.404$).

Conclusion: Open fractures of the tibial plateau portend worse long-term functional outcomes. This is likely in part due to the higher energy mechanisms associated with open fractures that can result in neurovascular and musculotendinous injuries in addition to bony injury. As time to fracture healing was not revealed to be different between the open and closed fracture groups, much of the functional deficits noted in the open fracture group are likely soft tissue-related. Patients with open fractures should be appropriately counseled on these potential long- term functional deficits.