

Management of Aseptic Failure After Open Reduction and Internal Fixation of Complete Articular Tibial Plateau Fractures

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Purpose: Bicondylar tibial plateau (BTP) fractures are complex injuries associated with high complication rates following fixation. While infection has received the greatest focus in existing literature, aseptic failures after open reduction and internal fixation (ORIF; loss of reduction, nonunion, symptomatic malunion, or hardware failure) have also been reported and necessitate reoperation with potential morbidity. The primary aim of this study was to review the clinical course associated with aseptic failure following ORIF for BTP fracture.

Methods: This is a retrospective case series of adult patients who underwent fixation of AO/OTA 41-C (Schatzker 6) BTP fractures at 2 Level I trauma centers between 2001 and 2018 and developed aseptic failure. Patients with deep surgical site infection or malunion without reoperation were excluded. Demographic, injury, fracture, and initial fixation characteristics were collected. Clinical course following diagnosis of the index complication was reviewed. Revision operation surgical characteristics, timing, and outcomes were recorded.

Results: 508 AO/OTA 41C fractures were identified, with 26 experiencing aseptic failure (5%): 15 nonunion, 7 symptomatic malunion, 3 loss of reduction, and 1 hardware failure. Mean age 52.7 years (standard error [SE] 2.4), 50% female, mean follow-up 4.0 years (SE 0.8). Regarding initial injury, 3 (11.5%) were open fractures, 6 (23.1%) were staged with external fixation, and 4 (15.4%) required flap coverage. During the course of treatment for aseptic failure, 15 patients (57.7%) underwent revision ORIF, 5 (19.2%) had a realignment osteotomy, and 10 (38.5%) underwent total knee arthroplasty (TKA). Among nonunions, mean time from initial ORIF to first revision was 260.2 days (SE 31.1). First revision procedure was revision ORIF in 11 cases (73.3%), 6 (54.5%) of which required bone grafting. 8 patients (53%) achieved union at final follow-up. 2 patients (13.3%) had TKA as first revision procedure for nonunion and 3 went on to TKA following revision ORIF at a mean of 684.0 days (SE 242.8) after revision.

Conclusion: BTP fractures are complex injuries that require prolonged monitoring of bony healing. Aseptic failure encompasses a range of complications and is relatively rare but can lead to a protracted treatment course requiring multiple operations. Revision ORIF for aseptic nonunion presents particular challenges and was successful in only 63% of cases in this series. A high percentage of nonunited fractures required eventual TKA. Further study is warranted to identify which failures are best suited for early TKA compared to revision ORIF.