

## Judicious Early Primary Open Reduction and Internal Fixation for Closed AO/OTA 41C (Schatzker VI) Bicondylar Tibial Plateau Fractures Is Not Associated with Increased Risk of Deep Infection or Reoperation

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**Purpose:** The optimal treatment for complex bicondylar tibial plateau (BTP) fractures remains controversial. Recent evidence suggests that early surgery by experienced orthopaedic trauma surgeons is safe and cost-effective in appropriately selected patients. The primary aim of this study was to compare rates of deep infection and unplanned reoperation following acute ( $\leq 48$  hours) versus delayed open reduction and internal fixation (ORIF) of closed fractures. The secondary aim was to identify risk factors for deep infection in the entire cohort including open fractures.

**Methods:** This was a retrospective cohort study of consecutive patients  $>18$  years undergoing ORIF of an AO/OTA 41-C (Schatzker 6) BTP fracture at two Level I trauma centers between 2001 and 2018. Rates of deep infection and reoperation were compared for patients with closed fractures undergoing acute ORIF (aORIF) versus delayed ORIF (dORIF).  $\chi^2$  analyses were used for categorical comparisons. Binomial logistic regression controlled for age, gender, open fracture, diabetes, smoking status, alcohol status, and body mass index.

**Results:** 508 OTA / AO 41C BTP fractures were identified (mean follow-up 3.8 years, standard error [SE] 70.7 days). Patients were between 18 and 98 years of age (mean 52.5 years, SE 0.7). Of the 456 patients (89.8%) with closed fractures, 202 (39.8%) underwent aORIF. Average time from injury to surgery was 1.1 days for aORIF and 8.3 days for dORIF. More patients in the dORIF group were managed initially with an external fixator (49.6% vs 3.9%,  $P < 0.001$ ) and more required fasciotomy for compartment syndrome (19.7% vs 12.9%,  $P = 0.041$ ). Infection rate was lower for aORIF compared to dORIF (7.9% vs 19.7%,  $P < 0.001$ ). The rate of unplanned reoperation was also lower for aORIF (14.4% vs 23.6%,  $P = 0.013$ ). In binomial logistic regression modeling, open fracture ( $P = 0.005$  [odds ratio (OR) 3.5, 95% confidence interval (CI) 1.5-8.5]), current smoking ( $P = 0.05$  [OR 2.1, 95% CI 1.0-4.6]), and former smoking ( $P = 0.003$  [OR 3.9, 95% CI 1.6-9.7]) were predictors of deep infection for the entire cohort.

**Conclusion:** Early definitive fixation within 48 hours of injury may be a safe strategy for closed BTP fractures when the timing of surgery is guided by the surgeon's assessment of the soft-tissue envelope. Higher rates of external fixation and compartment syndrome in the dORIF group indicate a tendency to delay more severe injuries. These results must be interpreted with caution due to inherent selection bias, but the findings are consistent with recent literature showing that early ORIF of BTP fractures can be safe in appropriately selected patients.