Assessing Clinical Outcomes and Trends in Acute Versus Staged Fixation of Bicondylar Tibial Plateau Fractures

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Purpose: Bicondylar tibial plateau fractures can pose many treatment challenges. Historically treated with staged open reduction and internal fixation (sORIF), many surgeons are performing acute fixation (aORIF) more often. This study aims to examine trends in aORIF and sORIF and assess differences in postoperative outcomes between the 2 fixation strategies.

Methods: This is a retrospective review of all consecutive operatively treated patients with AO/OTA 41-C fractures from 2013 to 2022 at a Level I trauma center. Patients were divided into aORIF (definitive fixation <72 hours from injury) or sORIF (initial external fixation with definitive ≥5 days later). Included patients were followed for ≥6 months.

Results: A total of 265 patients were included. 103 patients (38.9%) had sORIF, and 162 (61.1%) had aORIF. Acute ORIF increased from 23.1% in 2013 to 75% in 2022, and sORIF correspondingly decreased from 76.9% in 2013 to 25% in 2022. There was a 0.22 reduction in the odds of sORIF relative to aORIF every year (P<0.001). There was no significant difference in demographics, comorbidities, and fracture pattern between the 2 groups. ISS was significantly higher in patients with sORIF vs aORIF (21.1 vs 16, P = 0.001). Patients in sORIF had higher intraoperative blood loss (227.5 mL vs 140.5 mL, P<0.001), and longer operative times (197.9 vs 163.6 min, P<0.001). Quality of reduction was equal between the groups (aORIF with 97.5% excellent, sORIF with 96.1% excellent, P = 0.518). Patients in the sORIF group had a higher rate of nonunion (7.1% vs 1.3%, P = 0.030) and any composite complication (35% vs 22%, P = 0.023). Regression analysis showed a 0.69 increase in the odds of experiencing any adverse clinical outcome for sORIF vs aORIF (P = 0.017).

Conclusion: We found a higher risk of complications with sORIF compared to aORIF for bicondylar tibial plateau fractures, in part likely due to selection bias. Our results demonstrate that aORIF can have acceptable outcomes when patients are properly selected by experienced fracture surgeons.