

Plating versus Intramedullary Nailing of AO/OTA C Type Intra-Articular Distal Tibia Fractures

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Purpose: We sought to compare rates of loss of reduction, nonunion, infection, and Patient-Reported Outcomes Measurement Information System (PROMIS) scores in intra-articular distal tibia fractures (IADTFs) treated with limited open reduction and internal fixation (ORIF) and intramedullary nailing (IMN) as compared to ORIF with plate and screws (PF).

Methods: Patients >18 years with AO/OTA C1 and C2 IADTF at a Level I trauma center between 2013 and 2021, who were determined radiographically healed or had a minimum 1-year clinical follow-up, were included. Outcomes assessed were (1) loss of reduction: unplanned surgery for failure of fixation within 6 weeks; (2) nonunion: lack of healing on serial radiographs and an unplanned procedure to promote fracture healing after 6 months; (3) deep surgical site infection (SSI): unplanned surgery for irrigation and debridement; and (4) PROMIS: physical function and pain interference during 12 months follow-up. Demographic, injury, and surgical characteristics were recorded. Bivariate analysis was performed followed by multivariate analysis incorporating variables significant in bivariate analysis ($P < 0.05$). A separate propensity score analysis was performed to account for the demographic and injury characteristics in a logistic regression to determine if the results were similar to the multivariate model. PROMIS values were analyzed using repeated measures mixed linear models to allow for use of all data.

Results: 110 patients met inclusion criteria (IMN 33, PF 77). There was no loss of reduction reported. 17 (IMN 4/33, PF 13/77) nonunions and 13 (IMN 2/33, PF 11/77) SSIs were identified. In the multivariate model, only open fracture remained significant as a risk factor for both nonunion and SSI. Propensity scoring was significantly different between patients that received IMN vs PF ($P = 0.03$); however, logistic regression incorporating the propensity score revealed no significant association with nonunion and SSI. Adjusting for the propensity score, there remained no association between IMN/PF with nonunion and SSI. There was no difference in PROMIS scores between IMN and PF (physical function: $P = 0.25$, pain interference: $P = 0.21$).

Conclusion: Overall nonunion and SSI prevalence in our cohort was 15% and 12%, respectively, in operatively treated AO/OTA C1 and C2 IADTFs. Open fracture is a significant risk factor for nonunion and SSI. Metaphyseal fixation via IMN or PF in IADTFs did not make a difference in loss of reduction, nonunion, SSI, and PROMIS.