Plate-Assisted Intramedullary Nailing of Proximal Third Tibia Fractures Has Equivalent Outcomes to Closed Intramedullary Nailing

Porter Young, MD*; Stephen L. Kates, MD; Jibanananda Satpathy, MD; Paul William Perdue, MD; Clarence Toney, MD; Bertrand Perey, MD; Kelly L. Apostle, MD; Farhad Moola, MD; Dory Boyer, MD; Helmut Michael Lemke, MD; Trevor Stone, MD; Darius Viskontas, MD; David Cinats, MD*
Virginia Commonwealth University, Richmond, Virginia, UNITED STATES

Purpose: Unicortical plating proximal third tibia fractures while performing intramedullary nailing (IMN) is a useful reduction technique to combat the deforming forces seen in the proximal tibia. The effect of plate-assisted nailing (P+N) on proximal tibia fractures, especially in open fractures, is unknown. The purpose of this study was to compare outcomes of P+N to IMN alone.

Methods: A retrospective chart review of all AO/OTA 41A and 42A/B/C proximal tibia fractures was performed at 2 high-volume Level I trauma centers in the US and Canada from January 2010 to January 2020. Outcomes analyzed included rate of nonunion, reduction quality, postoperative infection, and rate of implant removal. Cohorts were compared using $\chi 2$ and unpaired t test where applicable.

Results: 825 tibia fractures were reviewed and 77 met the criteria for a proximal third fracture and inclusion in the study. 24 were treated with P+N and 53 IMN alone. Mean age (43 years vs 49 years, P = 0.12), smoking status (38% vs 36%, P = 0.89), diabetes (13% vs 15%, P = 0.77), and mean follow-up (29 months vs 23 months, P = 0.09) were not significantly different. There were more segmental fractures (71% vs 30%, P<0.001) and open fractures (67% vs 26%, P<0.001) in the P+N group compared to IMN group. There was no difference in Gustilo-Anderson grading of open fractures between the 2 groups (P = 0.50). Blocking screws were used in 17% of P+N cases versus 40% of IMN cases (P = 0.046). The rates of nonunion (4% vs 13%, P = 0.228) and postoperative infection (8% vs 8%, P = 0.91) and rates of secondary procedures (29% vs 13%, P = 0.12) were not significantly different. There were 4 implant removals in the P+N group but no implant removals in the IMN group. There was no difference in infection rates of open fractures treated with plating (13%) versus IMN alone (14%). There was no significant difference in sagittal or coronal fracture reduction.

Conclusion: In this retrospective cohort study, plate-assisted IMN was used more in open fractures and segmental fractures. Despite the use of plates in open, higher-energy injuries, there was no difference in complication rates. Unicortical plating is a safe and effective reduction adjunct when nailing proximal third tibia fractures without increasing the rate of nonunion, infection, or implant removal compared to IMN alone.