Open Reduction and Internal Fixation Versus Closed Reduction and Percutaneous Fixation for Fractures of the Medial Malleolus: A Comparative Analysis of Clinical and Radiographic Outcomes

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Purpose: Surgical reduction and fixation of medial malleolus (MM) fractures can be performed through either an open or percutaneous approach. Although the existing literature supports the use of numerous surgical techniques executed via the open approach, a paucity of data exist regarding the relative efficacy of repair via closed reduction and percutaneous fixation (CRPF). This study thus serves to directly compare clinical and radiographic data before and after CRPF versus open reduction and internal fixation (ORIF). Specifically, it serves to determine if either procedure is associated with a statistically significant (SS) difference in rates of postoperative wound complications and/or symptomatic malunion/nonunion (MU/NU).

Methods: 120 consecutive patients from 2017 to 2021 underwent surgical fixation of a closed MM fracture, performed at a single institution by a single fellowship-trained orthopaedic traumatologist. 47 CRPF and 44 ORIF patients were subsequently identified as eligible for inclusion. Patient demographics, injury characteristics, treatment methods, and both clinical and radiographic outcomes were determined via review and analysis of patients charts, operative notes, and radiographs. Nominal outcome variables were compared between the 2 cohorts using $\chi 2$ tests of association. An alpha level of .05 was set as the standard cutoff for statistical significance.

Results: There was no SS difference between patients of each cohort in terms of age, sex, body mass index (BMI), and smoking status. Detailed fracture-specific variables (eg, presence of comminution, orientation of fracture line, maximum displacement distance, etc) and their potential impact on the primary outcomes of interest are currently under investigation via multivariate multiple regression analyses. $\chi 2$ analysis demonstrated the following: a SS increase in the proportion of CRPF patients with radiographic evidence of MU/NU at 1-year follow-up, relative to the ORIF cohort. However, there was no SS difference in the proportion of patients with symptomatic MU/NU following CRPF vs ORIF (ie, radiographic MU/NU in combination with tenderness to palpation over the MM fracture site and/or pain over the MM fracture site with weightbearing). Regarding the relative rate of postoperative wound complications, no SS difference was found between the 2 cohorts. Regarding painful weightbearing at the MM fracture site, independent of union status, a SS increase was found following ORIF, relative to CRPF.

Conclusion: A significant proportion of CRPF patients demonstrated radiographic signs of MU/NU at a minimum 1-year follow-up; however, only a small minority of this subgroup also reported ankle pain and/or impaired function. Overall, there was no significant difference between the 2 cohorts in terms of wound complications or symptomatic MU/NU rates.