Displaced Tibia Fractures in Adolescents: Closed Reduction and Casting vs. Flexible Intramedullary Nails

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INTRODUCTION: Although there has been a recent trend towards operative intervention of pediatric diaphyseal tibial fractures, there is sparse literature that supports this trend. This study compares the outcomes in children between 10 and 18 years of age with diaphyseal tibial fractures who undergo nonoperative treatment with closed reduction and casting (CRC) to those who undergo operative treatment with flexible intramedullary nailing.

METHODS: A retrospective chart review was performed of all patients between 10 to 18 years of age who underwent treatment for tibia fractures at the authors home institution between 2005 and 2018. Radiographs and medical records were reviewed for duration of immobilization, time to fracture healing and complications including delayed union, malunion, non-union, and surgical site infection. All statistical analysis was performed using an alpha of 0.05.

RESULTS:

141 patients (81.8% males) were included in the final analysis (tables 1 and 2). Patients treated with flexible nailing took an average of 7 weeks ($p<0.001$) longer than patients treated with CRC to achieve complete radiographic healing (table 3). The average time to full weight-bearing activities was longer by 1 week in the patients treated nonoperatively with CRC ($p=0.001$) (table 4). There was no statistically significant difference in the malunion rates between the two groups ($p=0.067$), but delayed union and nonunion were exclusively seen in the flexible nailing group (table 5). There was a total of 40 complications among 33 (23.4%) patients, most of whom were in the CRC cohort (60.6%, n=20), but there was no statistically significant difference in complication rates between the two cohorts (tables 6 and 7).

DISCUSSION AND CONCLUSION: Most adolescents presenting with closed diaphyseal tibial fractures of moderate severity can be successfully treated both nonoperatively with CRC and operatively with flexible intramedullary nailing. However, we recommend an initial attempt at nonoperative treatment be performed in these patients due to the association of more severe complications with flexible nailing. Further multi-center, prospective studies are warranted to confirm these findings.