

The Effect of Nail Diameter to Medullary Canal Ratio in Pediatric Forearm Fractures Treated with Intramedullary Nailing

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INTRODUCTION

Intramedullary nailing is one of the preferred operative fixation methods for pediatric diaphyseal forearm fractures. The aim of our study was to assess the impact of nail diameter to medullary canal diameter (ND/MCD) ratio on postoperative outcomes in these patients.

METHODS

301 pediatric patients that underwent intramedullary fixation of diaphyseal forearm fractures (OTA 22A and 22B) at a level I pediatric trauma center between January 2004 and September 2014 were retrospectively reviewed. Patients who sustained pathologic or radial neck fractures, and those with inadequate follow-up (<6 months) were excluded. The ND/MCD ratio was calculated using the nail diameter and the intramedullary canal isthmus measured radiographically. Univariate regression analysis was performed to test the association between the ND/MCD ratios and outcomes. One-way analysis of variance, t-tests, and chi-square tests were used to compare the differences between fractures with ND/MCD ratios of <40%, 40-49%, 50-59%, and $\geq 60\%$ in terms of demographic and clinical characteristics.

RESULTS

The average age among the 73 patients included in the study was 9.6 years (range: 2.0-18 years). Average ND/MCD ratio was 52.2% (range: 27.3-77.6%) and 65 patients (89%) had a ND/MCD ratio of greater than 40%. There was a trend towards shorter times to union with an increased ND/MCD ratio, but it failed to reach statistical significance. There was no statistically significant difference in the ND/MCD ratios between patients who experienced complications and the ones who did not. Univariate regression analysis revealed that the ND/MCD ratio was not associated with time to union, complications, or time to hardware removal.

DISCUSSION AND CONCLUSION

ND/MCD ratio is not associated with complications, time to union, or time to hardware removal in pediatric diaphyseal forearm fractures.