Titanium Elastic Nailing for Pediatric Tibia Fractures: Do Older, Heavier Kids Do Worse?

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INTRODUCTION: Elastic nailing is a common method of fixation for tibial shaft fractures in skeletally immature individuals. Poor outcomes of titanium elastic nails for femoral shaft fractures have been associated with increasing patient age and weight, especially patients weighing more than 50 kilograms. Our objective is to determine if there is an upper weight or age limit to the safe and effective use of titanium elastic nails for tibial shaft fractures in the pediatric population.

METHODS: This is a retrospective cohort study of patients who underwent stabilization of a tibial shaft fracture with titanium elastic nails at a large tertiary care pediatric trauma center. Data collected included patient demographics, weight, fracture type; fracture angulation at time of injury, immediately postoperatively, and at nail removal; time to fracture union, and any significant complications. Weight groups were stratified as ≥ 50 kilograms and < 50 kilograms, and age groups as ≥ 14 years old and < 14 years old. Malunion was defined as 10 degrees of angulation, in either the sagittal or coronal plane, at the final visit prior to nail removal. Union was defined as bridging of at least three cortices on orthogonal radiographs. A significant delay in union was considered to be a difference of three weeks in time to union between groups.

RESULTS: Ninety-five patients were included in this study with a mean age of 12.1 years (range 6-16, SD = 2.5). Malunion rate was similar in each weight cohort: 13.3% (6/45) in the ≥ 50 kilogram group and 10% (5/50) in the < 50 kilogram group (p=0.75). Malunion rate was similarly comparable between age groups: 17.6% (6/34) in the ≥ 14 years old group and 8.2% (5/61) in the < 14 year old group (p=0.19). With respect to healing time, average time to union was 94.4 days (SD=26.8) in the ≥ 50 kilogram group, and 86.5 days (SD=28.4) in the < 50 kilogram group. Paired T-test did not demonstrate this time difference to be statistically significant (p=0.19). When comparing our two age cohorts, we also did not find a significant difference in time to union (mean time to union 93.6 days (SD=25.9) versus 88.4 days (SD=28.8), p = 0.40). In sum, we did not find a significant difference in the rate of malunion or time to healing between younger and older patients or between lighter and heavier patients.

CONCLUSIONS: The use of titanium elastic nails for tibial shaft fractures, unlike for other long bone fractures, seems not to be precluded in older and heavier patients.