

Non-Operative Treatment of Tibial Tubercle Fractures: Who is at Risk for Failure?

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Abstract

Introduction: Given the relative rarity of tibial tubercle fractures and the high proportion that undergo surgical treatment, there is little data on non-operative management of these injuries. Some patients that are initially treated non-surgically may ultimately require operative intervention. The purpose of this study was to identify risk factors for failed non-operative management of tibial tubercle fractures.

Methods: This retrospective comparative study included patients younger than 18 years that underwent initial non-operative treatment of a tibial tubercle fracture at six tertiary children's hospitals. Those that underwent primary surgical intervention were excluded. Demographic, radiographic, and clinical data were reviewed. Conversion to surgical fixation was considered a failure of non-operative treatment. Univariable analysis

was followed by multivariate regression to adjust for confounders.

Results: A total of 136 patients were included, of which 19.1% failed non-operative treatment and subsequently underwent surgery. The median age of patients that ultimately required surgery was 14.0 y [IQR (interquartile range) 2.5 y] compared to 12.0 y (IQR 2.0 y) for those that were successfully managed without surgery. Non-operative treatment failed in 7.8% of Ogden type I fractures, 66.7% of type II, 81.8% of type III, 35.7% of type IV, and 7.1% of type V ($p < 0.001$). After adjusting for confounders, including weight and initial weight-bearing status, each year of increasing age raised the odds of failure by 1.9 (95% CI 1.2-3.0, $p = 0.006$). Additionally, Ogden type II fractures had 23.4 times higher odds than type I (95% CI 2.1-260.8, $p = 0.01$).

Ogden type III fractures had 36.3 times higher odds of failing non-operative treatment than type I (95% CI 4.2-315.4, $p=0.001$).

Conclusion: In this study of patients with a tibial tubercle fracture initially treated non-operatively, 19.1% ultimately underwent surgery. Increasing age and Ogden type II and III fracture classification were associated with failure of non-operative management. These results may

help guide decision-making regarding surgical versus non-surgical treatment.

Significance: There is little data on non-operative treatment of tibial tubercle fractures. This study identifies risk factors for failure of non-operative treatment and may aid clinical decision-making.

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