Rate of Compartment Syndrome after Tibial Tubercle Fractures in Pediatric Patients

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INTRODUCTION: Tibial tubercle fractures represent between 0.4% and 2.7% of all pediatric fractures, although the incidence appears to be rising due to increased participation in youth athletics. While the overall rate of complications, including hardware prominence and bursitis, remains low, acute compartment syndrome poses a significant limb-threatening complication that often requires surgical management. Despite its severity, to our knowledge the incidence of compartment syndrome in pediatric patients with tibial tubercle fractures has never been studied directly. The current study aims to quantitatively assess the incidence and risk factors of compartment syndrome in pediatric patients with tubercle fractures in a large-scale data set.

METHODS: Data was drawn from the Pediatric Health Information System (PHIS), a robust inpatient and outpatient database sourced from over 49 children's hospitals nationwide. Our analysis initially included 13,068 patient encounters between 2015 and 2023. We included patients ≤18 years of age with ICD 10 codes for tibial tubercle fractures. We excluded individuals with underlying hematologic or genetic conditions. The database was queried for details from the index admission including management and concomitant diagnosis codes. Descriptive analyses were performed.

RESULTS: This study included 6,830 patients with tibial tubercle fractures. The average age of patients was 13.27 years (SD: 2.40), and the majority of patients were male and white (Table 1). Approximately 56.9% of patients were treated operatively for their injury. In our cohort, 1.14% of all patients with tibial tubercle fractures were also diagnosed with compartment syndrome. Of the patients who received operative treatment, 1.85% were found to have compartment syndrome; whereas of the patients with non-operative treatment, 0.02% had compartment syndrome (p<.01). Additionally, 3.24% of all patients with tibial tubercle fractures received a fasciotomy at the time of fracture fixation. DISCUSSION AND CONCLUSION:

Tibial tubercle fractures typically occur in males and is treated with operative fixation. This study shows that compartment syndrome is an important and non-negligible complication of pediatric tibial tubercle fractures. Prophylactic fasciotomies are performed at the time of operative fixation in several patients. Additional studies are needed to quantify the risk of compartment syndrome across other populations as well as identify risk factors. To our knowledge, this is the largest study to report the incidence of compartment syndrome after tibial tubercle fractures in pediatric patients.