The Prevalence of Acute Compartment Syndrome in Pediatric Tibial Tubercle Fractures

Victor H Martinez¹, Natalia Pluta², Joshua Tadlock³, Daniel J Cognetti⁴

¹Orthopaedic Surgery, UT Health San Antonio, ²Orthopaedic Surgery, ³Brooke Army Medical Center, ⁴SAUSHEC Orthopaedic Surgery Residency

INTRODUCTION: Tibial tubercle fractures are a unique class of pediatric orthopaedic injuries that frequently necessitate surgical treatment and strict monitoring due to the associated risk of acute compartment syndrome (ACS). However, the current literature is conspicuously limited in its ability to estimate the risk of compartment syndrome following these fractures accurately. Therefore, the purpose of the current study is to utilize a nationwide database to estimate the prevalence of compartment syndrome following pediatric tibial tubercle fractures more rigorously.

METHODS: We utilized the Healthcare Cost and Utilization Project's (HCUP) Kids' Inpatient Database (KID) (2019) to identify all pediatric patients, 18 years of age and under, diagnosed with isolated tibial tubercle fractures (ICD-10-CM diagnostic codes S82.151-S82.156). Patients were excluded if they had additional lower extremity injuries (i.e., tibial shaft, plateau, etc.). After identifying all patients with tibial tubercle fractures, cases of compartment syndrome were identified in this cohort (T79.A0, T79.A2, T79.A29).

RESULTS: There were 8 cases of ACS occurring in 591 isolated tibial tubercle fractures, representing a prevalence of 1.36%. All patients who developed ACS were diagnosed during the original hospitalization; all were male and had closed fractures. There were 469 teenage patients (13 years and older) and 77 pre-teens, comprising 40 females and 506 males. Racial demographics included 132 patients of white race, 232 patients of black race, 112 patients of Hispanic race, 15 patients of Asian race, four patients of Native American race, 23 patients of unknown race, and 28 patients who identified as other race. There were no statistically significant associations between age, race, insurance status, mechanism of injury, or hospital region and the diagnosis of ACS in isolated tibial tubercle fractures.

DISCUSSION AND CONCLUSION: The prevalence of ACS following pediatric tibial tubercle fractures is much lower than previously reported, at 1.36%. This is the first and largest study to employ a nationally representative database to investigate the prevalence of ACS following tibial tubercle fractures.

Demographics	Tibial Tubercle Fractures	Acute Compartment Syndromes
	591	8
Sex		
Male	506 (92.7%)	8 (100%)
Female	40 (7.3%)	0 (0%)
Race		
White	132 (24.2%)	
Black	232 (42.5%)	3 (33.3%)
Hispanic	112 (20.5%)	4 (44.4%)
Asian	15 (2.7%)	1 (11.1%)
Other	28 (5.1%)	
Unknown	24 (4.2%)	
Insurance Type		
Medicaid	243 (44.5%)	3 (33.3%)
Private	257 (47.1%)	5 (55.6%)
Self-pay	19 (3.5%)	
Medicare	2 (0.4%)	1 (11.1%)
Other	22 (4.0%)	
Type of Fracture		
Closed	583 (98.6%)	8 (100%)
Open	8 (1.4%)	0 (0%)
Age Group		
> 13 years	469 (85.9%)	7 (87.5%)
< 13 years	77 (14.1%)	1 (12.5%)