

Comparison of Outcomes of Pediatric Femoral Shaft Fracture Repair by Pediatric and Nonpediatric Orthopaedists

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INTRODUCTION: While pediatric femoral shaft fractures account for less than 2% of all fractures in children, they are the most common pediatric fracture requiring hospitalization. Management of pediatric femoral shaft fractures is challenging, with various treatment options relating to severity and patient age. In the last few decades, there has been an increase in pediatric orthopaedic surgeons (POS), along with increased referral rates. However, there continues to be a maldistribution of POS throughout the country, leaving many pediatric femoral shaft fracture managements to non-pediatric orthopaedic surgeons. This study sought to determine outcomes following femoral shaft fracture repair by POS compared to non-pediatric trained orthopaedic surgeons.

METHODS: The National Surgical Quality Improvement Program-Pediatric database was queried to identify pediatric patients (age less than 18 years old) who underwent open treatment of femoral shaft fracture from 2012 to 2019. Differences in patient demographics, comorbidities, and postoperative complications were assessed and compared between patients who were treated by pediatric subspecialty-trained orthopaedic surgeons and those treated by non-pediatric orthopaedic surgeons. Bivariate and multivariable regression analyses were utilized.

RESULTS: Of the 5,862 pediatric patients who underwent femoral shaft fracture treatment, 4,875 (83.2%) had their surgeries performed by a POS whereas 987 (16.8%) were operated on by a non-pediatric surgeon. Baseline patient demographics and comorbidities are shown in Tables 1 and 2, respectively. POS were more likely to operate on patients with a higher American Society of Anesthesiologists classification, and those with medical comorbidities, including gastrointestinal and neurological. After controlling for baseline patient characteristics on multivariable regression analysis, patients treated by non-pediatric orthopaedic surgeons are at an increased risk of prolonged hospital stay (OR 2.595; p<0.001) when compared to patients operated on by POS (Table 3).

DISCUSSION AND CONCLUSION: The results indicated that patients undergoing surgical treatment for a femoral shaft fracture by a non-pediatric trained orthopaedic surgeon were at increased risk of a prolonged hospital stay compared to those being treated by POS. Additionally, POS were more likely to operate on more medically complex patients.

Table 1. Demographics and Clinical Characteristics Among Femoral Shaft Fracture Patients

Variables	Pediatric Surgeons	Non-Pediatric Surgeons	P-value
Total patients, n	4,875	987	
Sex, n (%)			0.100*
Female	1,319 (27.1)	242 (24.5)	
Male	3,556 (72.9)	745 (75.5)	
Race, n (%)			0.014*
White	2,951 (60.6)	624 (63.1)	
Black or African American	789 (17.8)	146 (15.0)	
Hispanic	567 (12.8)	87 (9.3)	
American Indian or Alaska Native	17 (0.4)	3 (0.3)	
Asian	96 (2.2)	25 (2.7)	
Native Hawaiian or Pacific Islander	13 (0.3)	2 (0.2)	
ASA, n (%)			< 0.001*
I	1,982 (40.7)	417 (42.7)	
II	1,482 (30.7)	293 (29.8)	
III	529 (11.0)	51 (5.7)	
IV	25 (0.6)	1 (0.1)	
Mean age, yrs	10.01 (3.82)	10.50 (4.28)	< 0.001**
Mean operation time, min (SD)	102.67 (53.85)	93.93 (62.05)	< 0.001**

*Pearson's chi-squared test

**Analysis of variance

Bolding equals significance p<0.05

ASA, American Society of Anesthesiologists; SD, standard deviation.

Table 2. Comorbidities Among Femoral Shaft Fracture Patients

Comorbidities	Pediatric Surgeons	Non-Pediatric Surgeons	P-value*
Total patients, n	4,875	987	
Cardiac comorbidity, n (%)	110 (2.3)	17 (1.7)	0.293
Pulmonary comorbidity, n (%)	347 (7.1)	55 (5.6)	0.080
Gastrointestinal comorbidity, n (%)	155 (3.2)	18 (1.8)	0.022
Biliary comorbidity, n (%)	7 (0.1)	0 (0.0)	0.267
Neurological comorbidity, n (%)	484 (9.9)	60 (6.1)	< 0.001
Diabetes, n (%)	4 (0.1)	0 (0.0)	0.402
Stroke, n (%)	22 (0.5)	2 (0.2)	0.265
Nutritional support, n (%)	120 (2.5)	11 (1.1)	0.009
Failure to thrive, n (%)	5 (0.1)	0 (0.0)	0.341
Hematologic disorder, n (%)	58 (1.2)	16 (1.6)	0.268
Bleeding disorder, n (%)	5 (0.1)	0 (0.0)	0.349
Prior operation within 90 days, n (%)	7 (1.2)	1 (1.1)	0.927

*Pearson's chi-squared test

Bolding equals significance p<0.05

Table 3. Multivariable Regression Analysis of Postoperative Complications of Patients Following Femoral Shaft Fracture Treatment

Non-Pediatric Surgeons (versus Pediatric Surgeons)	Odds Ratio	95% CI	P-Value
Verous Intravenous/Enteral	4.725	0.922 - 24.221	0.063
Extended length of stay (> 5.5 days)	2.595	1.775 - 3.794	< 0.001

Bolding equals significance p<0.05

CI, confidence interval.