Who's on First: What Factors Affect Time to Operating Room in Pediatric Femur Shaft Fractures?

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INTRODUCTION: Time from Emergency Department (ED) admission to surgery for femur fractures is a common quality metric in pediatric orthopaedics. United States News and World Report and the American College of Surgeons both track time to the operating room (TTOR) as part of hospital rankings and accreditation. While some studies assess whether TTOR affects clinical outcome, it is unclear what patient factors affect TTOR. The purpose of this study was to evaluate TTOR for pediatric femur fractures as a function of demographic, clinical, and temporal factors to determine which factors are independently predictive of delayed (≥18 hour) TTOR.

METHODS: With IRB approval, we conducted a retrospective review of pediatric patients with an acute femur fracture admitted to the ED at a single pediatric tertiary-care Level 1 trauma center from 2021 to 2023. Patient demographics, injury characteristics, temporal factors, surgical details, and hospitalization characteristics were collected. Univariate and multivariate analyses were conducted to determine independent predictors of TTOR. Fisher's exact tests were used to compare TTOR and immediate in hospital clinical outcomes including length of hospital stay, immediate surgical complications, and need for blood transfusion.

RESULTS:

216 cases were reviewed. Patients had an average age of 6 years (r, 0-18). The majority of patients were male (72%), White (58%), English-speaking (91%), with very high child opportunity index (55%), and had private insurance (50%). Most patients were admitted to the ED between 6 pm and midnight (45%), with 32% being direct ambulance transfers and 43% transferred from other hospitals. Older age, non-white race, ED admission time, transfer status, and comorbidities were associated with delayed TTOR ($p<0.05$) (see Table 1).

Each 1-year increase in age was associated with 9% higher odds of delayed TTOR ($p=0.03$). Compared to white patients (M=15 hours; IQR: 8-11), racial or ethnic minority patients experienced statistically significant longer delays to surgery at 16 hours (IQR: 13-20). Patients with comorbidities were 4.8 ($p<0.001$) times more likely to experience delayed surgery compared to patients without comorbidities (see Tables 2, 3). TTOR was impacted by ED admission time, with admissions between 6 am and noon being the longest TTOR at an average of 21 hours. Patients who experienced delayed time to surgery had a significantly longer hospital stay (M=71 hours) compared to those who were brought to surgery within 18 hours (M=41 hours). The rates of immediate complications and need for blood transfusion were not statistically significant between early and delayed groups.

DISCUSSION AND CONCLUSION: Older age, early time of day of ED admission, non-white race, and comorbidities were independently predictive of delayed TTOR for pediatric femur fractures. Longer TTOR caused no difference in immediate surgical complications but were associated with a disproportionately longer hospital stay. These findings may warrant future studies on whether a delay in TTOR yields a difference in clinical outcomes for certain subsets of patients. Particular attention should be paid to understanding racial disparities in TTOR.