What is the Ideal Time to Surgery After Hip Fracture? A Retrospective Cohort Study of 2,788 Patients from 2015-2020

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INTRODUCTION: Hip fractures represent a major risk of mortality for elderly patients. A rapidly growing elderly population in the United States has been accompanied by an increased incidence of hip fractures. Previous studies have investigated the impact of early operative fixation of hip fractures, however there is a lack of unified support for a definitive surgical timeline. The purpose of this study was to further determine the impact of time to operative fixation of hip fractures on mortality in patients over 60-years old.

METHODS: A retrospective cohort analysis was performed on all surgically managed, low-energy hip fractures in our hospital system from 2015 to 2020. Stratum-specific likelihood ratio (SSLR) analysis was used to define time to surgery (TTS) strata associated with the risk of 30-day and 1-year mortality after surgical management. SSLR is a modified approach to analyzing Receiver Operating Characteristics (ROC) curves that allows for the identification of multiple data-driven strata that optimize differences in the likelihood of complications. The relative risk (RR) for each stratum with respect to the lowest matched stratum was analyzed using a multivariable logistic regression model while controlling for factors such as age, gender, race, ethnicity, BMI, insurance type, ADI quartiles, surgery type, fracture type, and hospital type (tertiary vs community center). Incidence rates, via unmatched analysis, and risk, via matched analysis, of 30-day and 1-year mortality between strata were observed.

RESULTS: 2,788 patients met inclusion criteria. Two TTS strata for 30-day and 1-year mortality were identified via SSLR analysis for each patient cohort. After matching, the relative risk (RR) of mortality for all patients whose TTS was >36-hours was found to be 1.95 (95% CI, 1.35-2.83; p = <0.0001) at 30-days and 1.49 (95% CI, 1.29-1.72; p = <0.0001) at 1-year compared to those with a TTS <36-hours. Patients with an ASA classification of 1 or 2, whose TTS was >48-hours, had a RR of 2.94 (95% CI, 0.61-14.12, p = 0.177) and 1.04 (95% CI, 0.51-2.11; p = 0.911) RR of mortality at 30-day and 1-year intervals, respectively. Those with an ASA classification >2 whose TTS was >36-hours had a 1.73 (95% CI, 1.18-2.52; p = 0.005) and 1.43 (95% CI,1.23-1.65; p = <0.0001) RR of mortality at respective 30-day and 1-year intervals.

DISCUSSION AND CONCLUSION: We found that operative fixation of hip fractures after 36-hours significantly increases the relative risk of mortality at 30-days and 1-year for all patients, regardless of ASA classification. In patients with an ASA classification >2, TTS of >36-hours significantly increased RR of mortality at 30-days and 1-year. In contrast, with a TTS of >48-hours amongst patients with an ASA classification of 1 or 2, no significant difference in RR of mortality was found, compared to that of ASA 1 or 2 patients with an earlier TTS. Our results suggest that earlier operative fixation of hip fractures decreases the RR of mortality. Orthopaedic surgeons should consider prioritizing earlier operative interventions in patients with higher ASA scores, and coordinate and triage accordingly with other physicians caring for these patients, such as internal medicine and hospitalist co-management services.