

# The Effect of Surgical Start Time and Day of the Week on Morbidity and Mortality for Neurological Surgeries

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## Introduction

Patients need elective and emergent neurosurgical operations at all times of the day. Other surgical specialties have examined the effect of the start time of surgeries on morbidity and mortality. However, a similar study has not been performed for neurosurgical cases.

## Methods

We performed a retrospective analysis of all patients undergoing neurological surgery between January 1st 2007 and August 1st 2014 at the University of Michigan Health System. This study included 15,865 patients. 785 complications were identified through the self-reported Morbidity and Mortality (M&M) reports created by the faculty neurosurgeons during this time period. We used standard statistical methodology to investigate the association of surgical start time and day of the week with morbidity and mortality.

## Conclusions

Patients undergoing elective neurosurgical operations after 7:00 PM or on the weekend are at an increased risk for morbidity and mortality. Care should be taken during the scheduling of complex elective neurosurgical cases after 7:00 PM or on the weekends.

## Results

In multivariable logistic regression, later surgical start time (between 9:00 PM and 7:00 AM) during elective cases was significantly associated with an increase in morbidity (odds ratio [OR] 3.31, 95% confidence interval [CI] 1.37 – 8.01,  $p = 0.008$ ; reference 7:01 AM to 9:00 AM). Elective cases starting between 7:00 PM - 9:00 PM were also significantly associated with patient mortality (OR 9.69, 95% CI 1.16-81.13,  $p = .036$ ). There was no significant association between surgical start time and morbidity or mortality for emergent cases. In addition, surgical morbidity was more common during weekend cases versus weekday cases (6.60% vs. 4.65%,  $p = 0.03$ ). Surgical mortality during weekend cases was 0.87% compared to only 0.20% during weekdays ( $p < 0.001$ ). There was not a statistically significant difference in morbidity and mortality between weekend and weekday cases based on whether the case was emergent or elective.

## Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the increased risk of morbidity and mortality associated with later surgical start times for elective cases, 2) Understand that there is not an increase in morbidity and mortality for emergent cases starting at different times of the day, and 3) Describe the increased risk of morbidity and mortality associated with weekend cases.