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Third Delay in TBI: Time to Assessment as a Vital Predictor of Mortality

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Introduction

Traumatic brain injury (TBI) is a worldwide epidemic with increasing in low-and-middle income countries (LMICs). The time from arrival to the hospital to assessment ("third delay") can vary widely in LMICs, though its application and association with mortality in TBI remains unknown.

Methods

A retrospective cohort analysis with multivariable logistic regression was conducted with the Towards Improved Trauma Care Outcomes in India database, which contains data from 4 urban trauma centers in India from 2013-2015.

Results

Results: There were 7,851 TBIs included in the cohort. The median age was 32 (IQR 20-49) and 78% of patients were male. The most frequent mechanisms of injury were road traffic accidents (48%) and falls (39%). A majority of cases were transfers from outside facilities (80%). In-hospital 30-day mortality was 24%; of patients who died, 22% died within 24 hours of arrival. The median third delay was 10 minutes (IQR 0-60 minutes); 34% of cases had moderate third delay (10-60 minutes) and 23% had extended third delay (61+ minutes).

Overall 30-day mortality was associated with moderate third delay (OR 1.24, $p = 0.003$) and extended third delay (OR 1.28, $p = 0.003$) after adjustment by pertinent co-variates. This effect was pronounced for 24-hour mortality: moderate and extended third delay were independently associated with odds ratios of 2.7 and 3.3 for 24-hour mortality, respectively (both $p < 0.001$). Patients who were transferred from outside hospitals had elevated adjusted odds of both moderate third delay (OR 1.7, $p < 0.001$) and extended third delay (OR 2.6, $p < 0.001$).

Conclusions

Third delay is associated with early mortality in TBI and represents a target for process improvement in trauma centers. Transferred patients may be especially susceptible to third delay.

Learning Objectives

By the conclusion of this session, participants should be able to:

1) Describe the relationship between third delay and mortality for TBI

2) Appreciate that transferred patients may be at higher risk of prolonged third delays

3) Identify third delay as a vital hospital process metric that may improve neurotrauma survival

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