Challenging the "Golden Hour" of Transit Time in Traumatic Brain Injury

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Abstract

This study aimed to examine the relationship between transit time from the scene of injury to hospital and functional outcome in moderate and severe adult traumatic brain injury (TBI). Initial analysis revealed that transit time did not predict functional outcome at discharge from the hospital. Results show that those who arrive at the hospital within 60 minutes after EMS dispatch are less likely to survive Exp(B) = .700, p = .008, and those with severe head trauma were less likely to survive, Exp(B) = .269, p <.001. Additionally, those who died arrived to the hospital almost 4 minutes earlier on average than those who survived, t(644.242) = -3.094, p = .002, *d* = .155.

Introduction

- For a number of trauma related clinical outcomes, the standard has been that receiving treatment within an hour of injury (the "Golden Hour") is essential for optimal outcome.
- However, a study conducted by Newgard et. al. (2010) did not find an association between transport time and mortality in trauma patients.
- This study aims to examine the relationship between transit time and outcome in moderate and severe adult TBI.
- Primary hypothesis: Faster total transit times will be associated with better outcome, as measured in Functional Independence Measure (FIM) scores and discharge destination.

Inclusion Criteria

- Age >17 years
- Clean drug/alcohol screens
- Not referred from another facility
- GCS score at scene 3-12
- Not listed as Do Not Resuscitate
- Did not die on the same day as their admission to the Emergency Department

Methods and Analyses

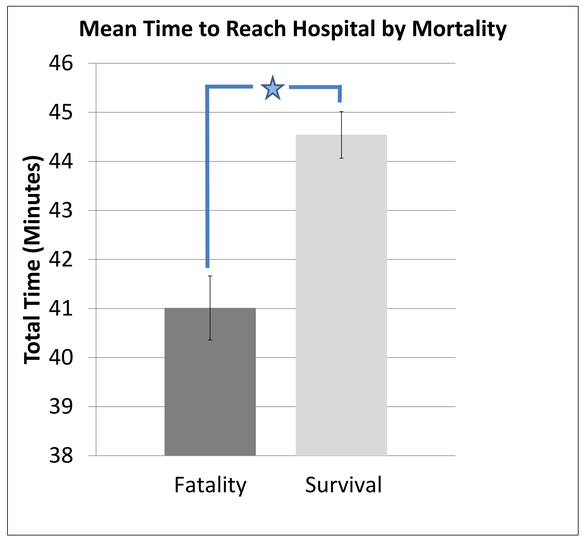
- The Pennsylvania Trauma Outcome Study (PTOS), which includes over 60,000 head injuries from the years 1992-2009, was used in this study.
- Binary logistic regression was conducted on total transit time to predict mortality rates.
- Independent samples t-test was conducted on total transit time for those who arrived within 60 minutes post injury and those who arrived after 60 minutes post injury.
- Total time was defined as the length of time between EMS dispatch and arrival to hospital.
- Discharge destination was used as a measure of outcome, coded as 0 (death), 1 (skilled nursing facility or long term acute care), 2 (trauma center), 3 (transitional care unit, rehabilitation facility, or other hospital), and 4 (home).
- FIM scores were comprised of 5 submeasures of independence: feeding, locomotion, expression, transfer mobility, and social interaction. Scores range from 5-20, with higher scores indicating greater independence.
- Statistics were completed using SPSS version 22.

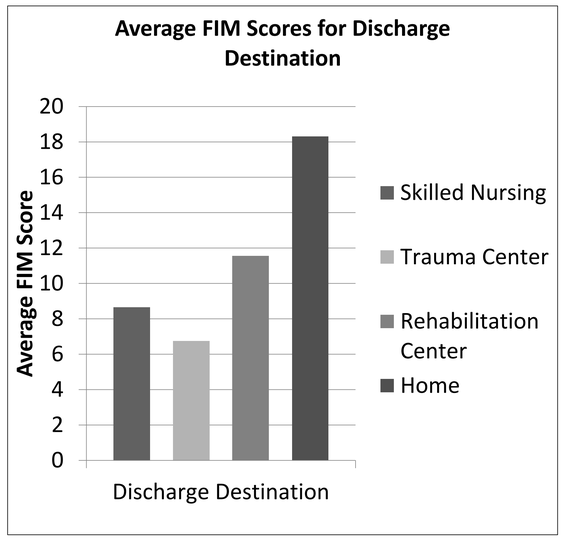
Sample Demographics

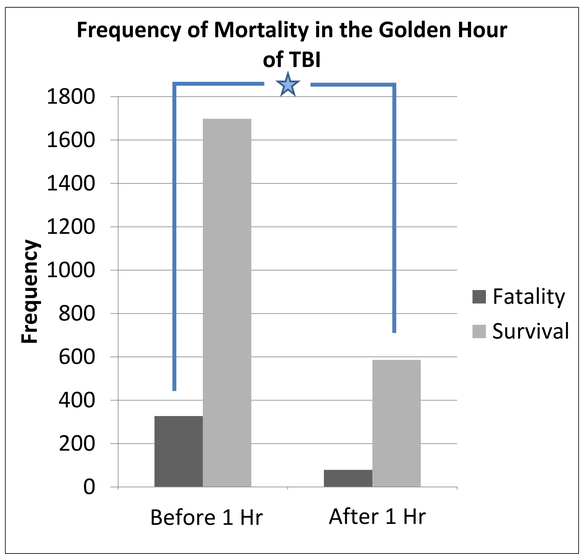
- A sample of 2690 moderate (GCS 9-12) to severe (GCS 3-8)TBI blunt head injury cases were included for analyses.
- Males = 1777, 60.9%, Females = 1142, 39.1%, Mean Age = 48.83, Mean GCS = 6.49

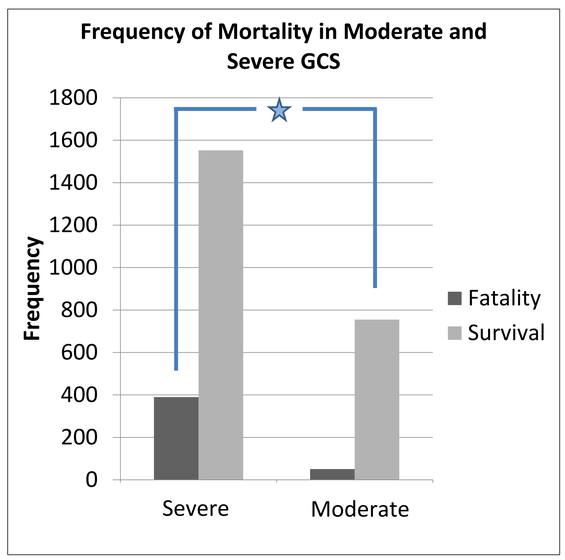
	n	Mean Age*	Male	Female	Alive	Dead	Mean GCS	Avg Destination*	Avg FIM
Before 60 Min	2025	50.77	1230	795	1698	327	6.49	2.36	12.67
After 60 Min	665	44.88	411	254	586	79	6.66	2.55	12.79

Results









Regression Analysis of Mortality in the Golden Hour of TBI

	B	S.E.	Wald	df	Significance	Exp(B)
Before 60 Min	-0.357	0.134	7.061	1	0.008	0.700
Constant	2.004	0.120	279.539	1	0.000	7.418

Regression Analysis of Mortality in Moderate and Severe GCS

	B	S.E.	Wald	df	Significance	Exp(B)
Severe GCS	-1.314	0.155	71.494	1	0.000	0.269
Constant	2.695	0.145	346.948	1	0.000	14.804

Conclusions

- Individuals who arrived at the hospital within 60 minutes had a higher mortality rate compared to those who arrived after 60 minutes. In addition, those who arrived at the hospital within 60 minutes were on average discharged to worse locations. These findings may be attributed to the fact that EMS staff have a greater sense of urgency when dealing with more severe injuries.
- Individuals with severe head trauma were less likely to survive than those with moderate head trauma. This finding is supported by previous research (Utomo et. al., 2009).
- Total transit time did not predict functional outcome (FIM) at discharge. This finding displays that time may not be the most important factor to consider when examining functional outcome. Future studies should look at severity of the injury and premorbid functioning as an influence of functional outcome.

Limitations

- There is a possible difference between the EMS dispatch time and the exact time of injury. This unknown time frame may influence outcome.
- Treatments provided during the hospital stay were not accounted for when examining outcome.
- The results all had a small effect size. However, they were all statistically significant.

References

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Acknowledgements

- PTOS DISCLAIMER: THESE DATA WERE PROVIDED BY THE PENNSYLVANIA TRAUMA SYSTEMS FOUNDATION, MECHANICSBURG, PA. THE FOUNDATION SPECIFICALLY DISCLAIMS RESPONSIBILITY FOR ANY ANALYSES, INTERPRETATIONS, OR CONCLUSIONS. CREDIT MUST BE GIVEN TO THE PENNSYLVANIA TRAUMA OUTCOME STUDY (PTOS) AS THE SOURCE OF DATA.

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