Assessing Geriatric Patients in the Emergency Department Using A New Trauma Protocol

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Introduction

Head injury is among the most common reason for presenting to the emergency department (ED), with intracranial hemorrhage being one of the most feared outcomes.[1,2] The elderly population is the most predominant demographic presenting to the ED for a head injury after a fall.[3] For this reason, it is not surprising that the incidence of intracranial hemorrhage increases with age.[2] This is especially problematic for the elderly demographic because many elderly patients are taking blood thinning agents, and patients taking anticoagulants have a four-fivefold increased risk of death with an intracranial hemorrhage compared to those not taking anticoagulants.[4,5]

Triaging elderly patients can be difficult because 11% of elderly patients with an intracranial hemorrhage present without focal findings.[6,7] The current clinical evaluation protocols for elderly patients aged > 65 presenting with minor head trauma are insufficient because they do not accurately and consistently identify an intracranial injury.[6]

The William Beaumont Hospital Troy ED created the level III trauma protocols in order to better care for this population. These protocols state that patients > 65 years AND taking blood thinning medications who were presenting after a fall would be evaluated immediately by an emergency medicine physician. The purpose of this study was to assess the effectiveness, efficiency, and impact of these newly implemented protocols.

Aims and Objectives

1. Determine the incidence of intracranial hemorrhages in the patients triaged by the level III trauma protocol.
2. Assess the efficiency of the level III trauma protocol.
3. Determine if the level III trauma protocol has led to better health outcomes.

Methods

Inclusion Criteria

Patient > 65 years old AND taking anticoagulants/antiplatelet agents AND positive CT for intracranial hemorrhage AND not initially triaged by level I or level II trauma protocol

Chart Selection

Pre-Level III Trauma Patients (N=12)	Post-Level III Trauma Patients (N=56)

Chart Review

Collected data on time from arrival to compute tomography (CT), ED length of stay, hospital length of stay, ICU days, ventilator days, discharge location, 1-month mortality, 6-month mortality

Statistical Analysis

Two Independent samples t-tests and Chi-square tests

Results

Results

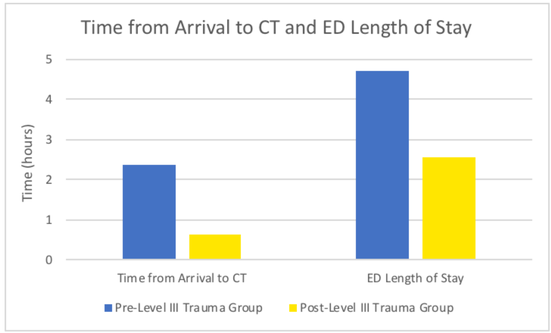

Figure 1 shows the statically significant decrease in time from arrival to CT and ED length of stay for the post-level III patients.

Findings

1. In 2017, approximately 11.4% of the patients triaged by the new Level III trauma protocol had an intracranial bleed.
2. Figure 1 shows the average time to CT (0.64 hours) and ED LOS (2.55 hours) for the post-level III trauma group were significantly shorter than the average time from arrival in the ED to CT (2.37 hours) and time spent in the ED (ED LOS) (4.72 hours) for the pre-level III trauma group ($p < 0.01$).
3. There was no significant difference in health outcomes between the pre and post Level III trauma groups ($p > 0.05$).

Conclusions

1. In 2017, approximately 11.4% of the patients triaged by the new Level III trauma protocol had an intracranial bleed.
2. Figure 1 shows the average time to CT (0.64 hours) and ED LOS (2.55 hours) for the post-level III trauma group were significantly shorter than the average time from arrival in the ED to CT (2.37 hours) and time spent in the ED (ED LOS) (4.72 hours) for the pre-level III trauma group ($p < 0.01$).
3. There was no significant difference in health outcomes between the pre and post Level III trauma groups ($p > 0.05$).

References

1. Byunghyum K, Hyeonjeong J, Joonghee K, Tackeun K, Kyuseok K. Incidence and risk factors of delayed intracranial hemorrhage in the emergency department. *Am J Emerg Med*. 2018;36(2):271-276.
2. van Asch C, Luitse M, Rinkel G, van der Tweel I, Algra A, Klijn C. Incidence, case fatality, and functional outcome of intracerebral haemorrhage over time, according to age, sex, and ethnic origin: a systematic review and meta-analysis. *Lancet Neurol*. 2010;9(2):167-176.
3. TBI-related Emergency Department (ED) Visits. Centers for Disease Control and Prevention. https://www.cdc.gov/traumaticbraininjury/data/tbi-ed-visits.html. Published 2019. Accessed October 2, 2020.
4. Mina A, Knipfer J, Park D, Bair H, Howells G, Bendrick P. Intracranial complications of preinjury anticoagulation in trauma patients with head injury. *J Trauma*. 2022;53(4):668-672. doi:10.1097/00005373-200210000-00008
5. Calland J, Ingraham A, Martin N. Evaluation and management of geriatric trauma: An Eastern Association for the Surgery of Trauma practice management guideline. *J Trauma Acute Care Surg*. 2012;73(5):345-350.
6. Mack L, Chan S, Silva J, Hogan T. The Use of Head Computed Tomography in Elderly Patients Sustaining Minor Head Trauma. *J Emerg Med*. 2003;24(2):157-162.

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