A Bed Ahead: Decreasing ED Dwell Time and Improving Trauma Outcomes

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The Challenge

It has been shown that prolonged ED length of stay before admission to an ICU is associated with poor patient outcomes and that earlier admission to an ICU can alter that relationship. The literature is replete with one recurring theme responsible for prolonged ED dwell times: Lack of bed availability in the ICU. Intentional and planned unidirectional flow of the trauma patient from the trauma receiving area, through the diagnostic process, and then directly to the ICU without a return to the ED has been shown to reduce the time from patient initial arrival to ICU admission. NUMC is a Level 1 trauma center that admits approximately 1700 patients per year. As part of a performance improvement project, we retrospectively reviewed our ED dwell times for all trauma patients admitted to the ICU for the last 6 months of 2014.

The average ED dwell time for trauma Full Activations admitted to the SICU (N=55) was 2.0 hours ± 2.1 hours. The average ED dwell time for Full Activations admitted to the ICU (N=79) was 3.2 hours ± 2.0 hours. The average ED dwell time for Trauma Consultations admitted to the ICU (N=79) was 3.2 hours ± 2.0 hours. The average ED dwell time for trauma Full Activations admitted to the ICU (N=185) decreases by 1.2 hours to 2.0 hours ± 1.2 hours. The average POST ED dwell time for Trauma Consultations admitted to the ICU (N=89) decreased 1.5 hours to 5.0 hours ± 2.9 hours. These reductions were all statistically significant (p<0.05; Mann-Whitney U Test).

The odds ratio of in-hospital mortality (Post-policy vs. Pre-policy) was 0.42 [95% CI (0.20, 0.88)].

Table 1: Comparison of ICU admit patient characteristics between implementation periods by activation level

Table 2: Comparison of ICU admit patient characteristics between implementation periods by activation level

The Intervention

We hypothesized that unidirectional flow of the patient from the trauma room to the ICU would be facilitated by performing ICU bed triage in a proactive non-emergent manner. In a joint initiative between the Department of Nursing and the Department of Surgery Divisions of Trauma and Surgical Critical Care, a “Bed Ahead” policy was implemented in our 11 bed SICU, in which one bed was always kept available and unoccupied to so the “next” trauma patient could be immediately accepted. In the event of the last empty bed being occupied by that “next” trauma patient, bed triage would be performed by ICU Nursing and the Critical Care team to assure that an SICU bed would be made available within 60 minutes. ED dwell time was then tracked through the PIPS process.

The “Bed Ahead” policy was implemented in May 2016 and the ED dwell time for all trauma patients admitted to an ICU was tracked. A focused review was then performed on the last 6 months of 2016. There were more patients admitted to the ICU POST (N=331) than PRE (N=185).

Effects of the Intervention

The average POST ED dwell time for trauma Full Activations admitted to the SICU (N=57) decreased by 42 minutes to 1.3 hours ± 0.6 hours. The average POST ED dwell time for Trauma Consultations admitted to the ICU (N=89) decreased 1.2 hours to 2.0 hours ± 1.2 hours. The average POST ED dwell time for Trauma Consultations admitted to the ICU (N=98) decreased 1.5 hours to 5.0 hours ± 2.9 hours. These reductions were all statistically significant (p<0.05; Mann-Whitney U Test).

The odds ratio of in-hospital mortality (Post-policy vs. Pre-policy) was 0.42 [95% CI (0.20, 0.88)].

Sustain

At our Trauma Center, ED dwell time is a routine data point, and as such is determined for every trauma patient who is admitted. We have chosen less than 2.5 hours for Full and Partial Activations as our performance target. While the time frame chosen was rather arbitrary due to the absence of best practice recommendations, this was felt to be a reasonable time frame for patient evaluation and diagnostic assessment, above which a more detailed level 2 or level 3 review through our PIPS would be more likely to be warranted. The implementation of this “Bed Ahead” policy has also changed the culture and expectations of the physicians and nurses caring for the acutely injured. The unidirectional flow of the patient to the ICU, rather than back to the trauma room or ED, is now the expectation.

REFERENCES

1. Parke: Outcome of emergency department patients with delayed admission to an intensive care unit. Emergency Medicine 2002
2. Mowery: ED length of stay is an independent predictor of hospital mortality in trauma activation patients. Journal of Trauma 2011

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Table 3: Odds ratios and 95% confidence intervals of in-hospital mortality by activation level

1. QOR Interquartile Range, ISS Injury Severity Score, GCS Total Glasgow Coma Scale Score, RTS Revised Trauma Score, SBP Systolic Blood Pressure, HR Heart Rate, RR Respiratory Rate, ED Emergency Department, ICU Intensive Care Unit, LOS Length of Stay
2. (a) Mann-Whitney U Test, b Chi-Square, c Student’s T-Test
3. Bold: p<0.05