Clinical Demographics of Early ICU Upgrades

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Background

Emergency Medicine physicians (EMPs) are faced with countless clinically important decisions every shift. Decision making in this context demands a large cognitive load and is prone to human errors. With every patient encounter, one of these decisions is determining disposition. Determining patient need for high level of care [LOC] (e.g. intermediate care, ICU) versus general medical floor is a crucial medical decision in emergency medicine as it affects patient outcomes, hospitalization length, and medical costs among other limited resources [1,2,3,4]. This has proven to be a difficult question to both answer and study.

Current literature supports *APACHE* score when assessing mortality specifically for ICU patients, and *REMS* when assessing mortality of ED patients, but no studies were found assessing mortality and/or risk of transfer to higher LOC regarding general floor patients – a population at higher risk of decompensation.

Recent literature has attempted to characterize those at risk of transfer from general medical floor (GMF: non ICU/ICR bed) to ICU [5,6], characterize external causes of upgrade in LOC such as triage errors [8], attempt to utilize the above data by altering and/or validating currently used prognostic tools [9,10,11], formulating novel decision-making tools [12,13,14], and/or discovering prognostic value of vital signs, labs and imaging results [15,16,17]. Another subset of studies has attempted to implement new team dynamics or quality improvement projects [18,19,20] to provide EMPs with data to improve LOC triaging and decrease LOS, hospitalization costs, and mortality.

Objective

- Assess the characteristics (including but not limited to age, gender, clinical condition, vital signs, presence of consult, time/day of admission) of patients admitted to the general medicine floor who require elevation of care within the first 24 hours.
- Create a smoother/safer admission process
- Decrease preventable adverse events and in-hospital clinical decompensation and mortality through expanding on current literature
- Identify differences between patient's admitted to the general medicine floor who require elevation of care within the first 24 hours compared to those admitted directly to the ICU/ICR.
- Assist physicians in decreasing preventable in-hospital clinical decompensation and mortality associated with patients requiring early upgrade in level of care from GMF to ICU.

Methods

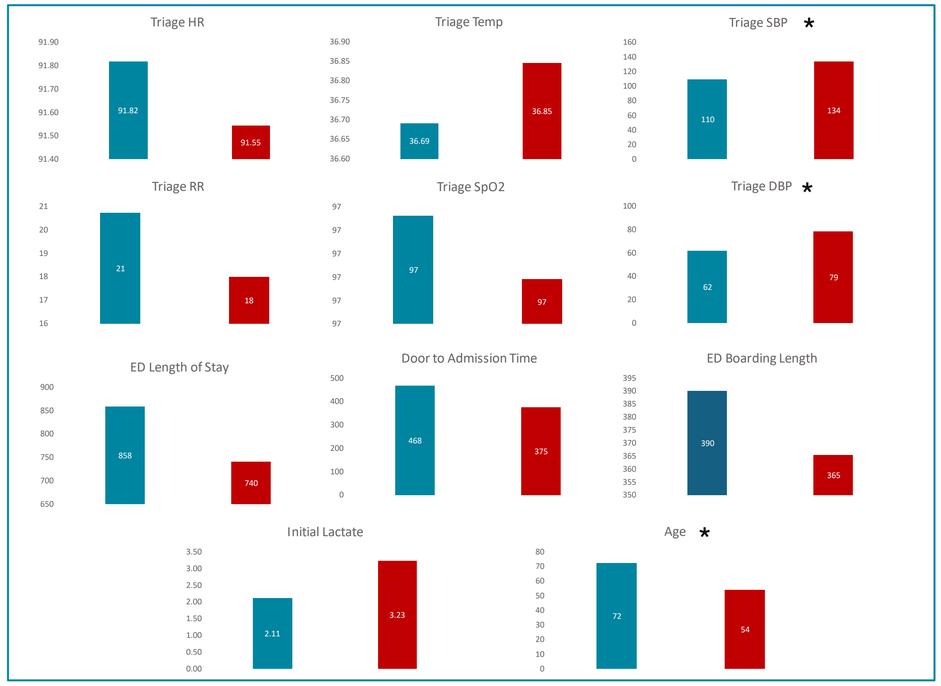
Study type: Single-site retrospective case series

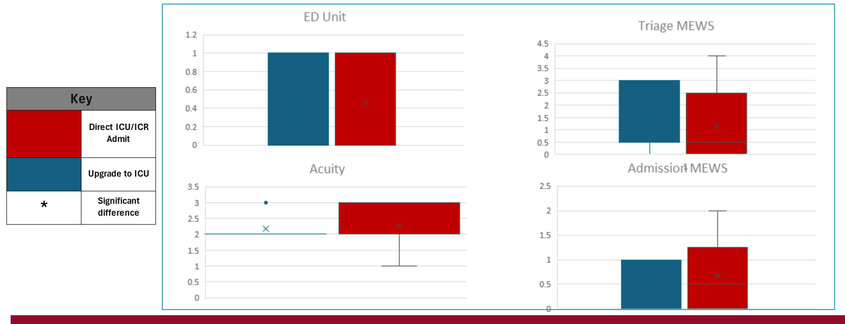
Population:
Upgrade Group: Adult patients upgraded to ICU within 24 hours after admission to GMF.
Direct Group: Adult ED patients admitted directly to higherl LOC (ICR or ICU floor)

Data Source:
Patients studied were taken from SB SAFE (Hospital wide system to report errors) on patients who decompensated shortly after admission from SBUH ED.

Data collection:
Patient information from 11 ICU upgrades and 11 direct higher LOC admissions was collected and analyzed to characterize the patient population at risk of early ICU upgrade.

Results





Results and Conclusion

Initial SBP, initial DBP, and Age were the three studied variables with a significant difference between patients admitted directly to higher LOC and those admitted to GMF who required upgrade in LOC within 24 hours. Patients directly admitted to ICU//ICR had statistically significant higher triage SBP and DBP when compared to those requiring upgrade to ICU within 24 hours of GMF admission (p values; SBP: 0.007, DBP: <0.001). Inversely, patients directly admitted to ICU/ICR had statistically significant lower average age when compared to those requiring upgrade to ICU within 24 hours (p value; 0.024).

Given the above results, triage SBP, triage DBP, and age appear to have statistically significant importance when assess for proper LOC on ED disposition. This suggest the importance of assessing the patient's initial vital signs and factoring in age when dispositioning a patient safely. Younger patients might be incorrectly presumed to have more reserve and ability to avoid clinical decompensation when compared to older patients. Furthermore, patients with lower initial blood pressures might be at an increased risk of future decompensation regardless of improved repeat or serial blood pressures.

Limitations and Future Work

Limitations:

- Patient population was collected from SB Safe responses introducing *Selection Bias* and *Convenience Bias*.
- Small sample size may result in failure to idenify factors which significantly discriminate between direct and upgrade to ICU/ICR admissions.

Future Work:

- Collect data from larger patient population including all ICUs as well as sub analysis of individual specialized ICU populations.
- Compare characteristics of: patients admitted directly to ICU, patients upgraded from floor to ICU within 24 hours of admission, and patients admitted to floor not requiring upgrade in LOC.
- Assess impact of in ED ICU consult on patient's hospital course
- Utilize results to create prognostic tools ED physicians can employ to determine safest disposition.
- Analyze the role of ICR admission in preventing early LOC upgrades.

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