

Routine POCUS use in ICU shortened mechanical ventilation days in one Chinese hospital

Source Citation

Citation

Chen Z, Hong Y, Dai J, Xing L. Incorporation of point-of-care ultrasound into morning round is associated with improvement in clinical outcomes in critically ill patients with sepsis. *J Clin Anesth.* 2018 Aug;48:62-66. doi: 10.1016/j.jclinane.2018.05.010. Epub 2018 May 12.

Abstract

Objective

Point-of-care ultrasound (POCUS) has been widely used in the intensive care unit (ICU). However, it is largely unknown whether the use of POCUS is associated with improved patient-important outcomes. The study aimed to investigate whether incorporation of POCUS during morning round on a routine basis was able to improve clinical outcomes in critically ill patients with sepsis.

Design

It was a prospective case-control study.

Setting

Single site, tertiary care emergency intensive care unit in China.

Patients

All patients admitted to the emergency ICU from January 2016 to December 2017 were screened for potential eligibility. Sepsis was defined as infection plus signs of organ dysfunction. Exclusion criteria included: pregnancy, advanced malignancy, age under 18, mortality data missing, DNR status.

Intervention

There were three ICU physician teams working during the study period. One team was the intervention group and incorporated POCUS daily during morning rounds on a routine basis, and a checklist was developed to improve the compliance. The other two ICU teams were considered the control group - they did not have the mandates to perform POCUS during morning rounds, but could use POCUS when necessary.

Main outcome measures

Clinical outcomes of mortality at hospital discharge, total length of stay in ICU, durations of vasopressors and mechanical ventilation were compared between the intervention and control groups. Univariable analysis was performed followed by development of a multivariable regression model to adjust for confounding factors.

Main results

A total of 159 subjects were screened with 30 excluded. A total of 129 subjects, including 88 in the control group and 41 in the intervention group, were included for analysis. Univariate analysis showed that the intervention group had shorter durations of mechanical ventilation (MV) (4.5 ± 1.2 vs. 5.7 ± 1.0 days; $p = 0.034$) and more negative fluid balance (-143 vs. 48 ml/24 h; $p = 0.003$) on day 3. In multivariable model, routine incorporation of POCUS was associated with lower risk of prolonged (>7 days) ICU stay (OR: 0.39, 95% CI: 0.29-0.88; $p = 0.029$).

Conclusions

The study showed that incorporation of POCUS during morning rounds on a routine basis showed a trend towards lower mortality in the intervention group however this was not a statistically significant association. Daily POCUS was associated with shortened duration of MV and length of stay in ICU. The possible mechanism underlying the relationship may be via reduced fluid administration. Future randomized controlled trials are needed to validate current findings.

Commentary

This study was one of few studies looking at clinical outcomes from the routine use of POCUS in an ICU setting. This article describes the study design as a prospective case-control study, however it appears to be more in-line with a prospective non-blinded randomized control study, with randomization occurring by ICU team assignment. The study was not powered to look for specific outcome differences, and as such, appears to be more of an exploratory study than a definitive study. While showing a mortality benefit for using POCUS would be a powerful finding, we wondered if a negative study (such as this one) would change our views on the importance of using POCUS in our clinical practice. We drew analogies that we perform many studies and tests that do not have a mortality benefit – such as chest x-rays or heart auscultation – and yet, they are part of standard of care, as they are believed to offer important data points that can help support or debunk hypotheses. This study highlights the fact that

POCUS appears to be held at a higher standard than other diagnostic measures to be deemed legitimate or necessary, which is disappointing. In an ideal world, a study like this would not be needed to convince practitioners of the value of POCUS.

The authors reported several different data analyses, including the rate of changes in clinical decision making based on routine POCUS in the intervention group. We recognized that morning rounds is an occasion to make management changes regardless of POCUS use, and as such, it would have been interesting to note how the rate of changes differed between the control and intervention group – this would have better highlighted the role that POCUS played in affecting clinical decision making.

There were some additional limitations of this study due to the study design. This study reports it was prospective, so it is unclear why patients were *a priori* excluded for having missing data regarding hospital mortality. Additionally, as the authors mention, this study was not true randomization between the intervention and control group. Despite standardization in other aspects of care, it is not unlikely that different provider groups may have a different style of practice as well as different mortality outcomes.

We also acknowledged the importance of increasing the volume of literature around POCUS in internal medicine, as these authors did, because it is an area that is still relatively devoid of POCUS research.

Reviewer

Calvin Huang, MD, Massachusetts General Hospital
Kay Negishi, MD, Massachusetts General Hospital

September 26, 2018
