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ICU Readmissions: Good for Reflection on Performance, but not a Reflection of Quality

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As the population ages, the need for critical care beds continues to rise, and the emphasis on “faster and better” care for shorter length of stay and improved quality of care creates increased stress for the intensivist.(1) One potential target suggested for hospital performance is rate of readmission to the ICU.(2, 3) Typical reported rates of ICU readmission range from 1.2 to 14.5% of ICU discharges, and readmissions are associated with increased mortality and lengths of stay (LOS).(4-6) This wide variation in readmission rate suggests there may be room for standardization and improvement in the process of ICU discharge. However, a better understanding of the etiology and potentially preventable factors in ICU readmissions is needed.

In the current issue of *Critical Care Medicine*, Al-Jaghbeer et al describe a study of potentially preventable ICU readmissions.(7) The study was performed at a single urban academic medical center with 8 ICUs and 85 ICU beds staffed 24-hours a day by attending intensivists. No step-down units were available for ICU transfer. Using a standardized reporting form, two reviewers categorized readmissions as preventable or non-preventable and causal or non-causal (i.e. no obvious precipitating cause). Of over 11,483 admissions, 9,534 (83%) were discharged alive from the ICU; excluding repeat readmissions, 357 (3.7%) unique patients were readmitted. Approximately 160 charts were reviewed at random to include 136 patients in the analysis. Of these, 27 (19.9%) readmissions were deemed causal, and 16 (11.8%) were deemed potentially preventable. Non-preventable readmissions were divided between new problems (56%) and clinical deterioration or exacerbation of an earlier problem (44%). Preventable readmissions were predominantly caused by system errors, such as failure to communicate positive culture results, and management errors, such as failing to resume home medications for hypertension or atrial fibrillation, with a small number of procedure events, diagnostic errors, and medication errors. Preventable readmissions had shorter ICU lengths of stay and were readmitted in a shorter time frame than non-preventable readmissions.

This retrospective analysis of readmissions to the ICU addresses an important question in a time of rapid development of hospital quality measures. It expands on previous work evaluating ICU readmissions as potential quality markers – a concept that has strong face validity. To my knowledge, this is the first study that examines whether ICU readmissions are preventable. Less than 0.2% of all ICU discharges experienced preventable readmissions. Large, system-based, interventions are unlikely to effectively target these minority of cases; these cases are likely better evaluated on a case by case basis. Identification of system issues, such as those elucidated in the supplemental index, provide opportunities to improve care and prevent future events. For example, a system to provide consistent communication or identification of home medications that have been appropriately held during the ICU stay would have potentially avoided several cases in this study – and likely in all hospitals. Hospital-wide interventions, however, could be costly and impose an excessive burden not only on providers but also on patients that may not benefit from them.

The study does have some limitations. Conducted in an academic center with 24-hour intensivist staffing and no step-down units limits the generalizability to other types of centers. However, after reviewing the cases listed in the supplemental index, it is clear that many of these conditions or situations could occur in any hospital – for example, a patient who lacks capacity refusing medications, or lack of recognition of alcohol withdrawal. Another limitation to generalizability, is that the investigators found a relatively low readmission rate, and it is possible that this reflects the necessary stability of the patients at ICU discharge, given the lack of step-down units. Patients discharged to step-down units would likely be less stable than those discharged to the floor. Finally, in the analysis of the preventability and causality, there was only fair agreement between reviewers; however, consensus was ultimately reached by group adjudication, increasing the reliability of measurement.

Previous studies have suggested potential risk factors for readmission to the ICU. Several ICU discharge prediction scores have been evaluated to predict future readmissions.(8) Many of these have modest predictive ability and could be implemented as a potential route for reduction of ICU readmissions. However, one study compared these scores for accuracy in predicting readmissions and found that not only was there no difference between scores, but each score had only moderate accuracy.(9) In addition, another study found implementation of a discharge checklist was challenging and yielded little result.(10) These results highlight the difficulty with prediction and the problems that arise from extrapolation of results from retrospective studies.

In addition to difficulty with prediction, there are questionable benefits of an efferent arm of the ICU team. Rapid response and medical emergency teams have been implemented in many hospitals seeking to improve safety on the wards. If these teams can react to emergency situations, why not have them proactively evaluate all ICU discharges? Multiple studies have evaluated this in a before-and-after fashion, and none have found a benefit. The most recent prospective study found an ICU readmission rate of 6.7% before the intervention and 7.3% after, with no change in ICU length of stay or hospital mortality.(11)

So, we have difficulty predicting who will be readmitted and we cannot prevent readmission if we proactively look for it. As the authors of the current study point out, quality measures should be modifiable and actionable. So where does that leave us with ICU readmissions? Previous editorials had similar opinions about catheter-associated bloodstream infections and ventilator associated pneumonia – “These are not preventable events.” Yet we now know they are, and likely we all have systematic approaches to reducing their occurrence. Like many other findings in medicine and research, results should be taken in context. It is challenging to compare a small community ICU with 6 beds to an 85-bed ICU behemoth with respect to mortality, readmission, and complications.

Rather than throwing the baby out with the bathwater, how could ICU readmission rates remain a useful data point? A recent meta-analysis examined over 2 million ICU admissions from various levels of ICU in order to develop a benchmark for ICU quality measures.⁽¹²⁾ They found that approximately 4-6% of ICU discharges were readmitted (range based on fixed effects vs. random effects modeling). Rather than using this data for penalizing or rewarding ICUs, we could aim to use it in evaluating performance for improvement or modification. If an ICU has a readmission rate of 8% (adjusted for various complicating factors) then the ICU may be discharging patients too early. If another ICU has an adjusted readmission rate of 2%, then they are likely keeping patients in the ICU too long.

The current study highlights the importance of practice evaluation. Knowledge about appropriate ICU readmission rates is reasonable. But before we mandate this – or any other – quality measure, we should first perform more studies like this to identify appropriate measures that are truly modifiable and preventable.

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