Reviewer’s report

Title: Lung Ultrasound Guided Fluid Management Protocol for the Critically Ill Patient: study protocol for a multi-centre randomized controlled trial

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Reviewer: Jesse Wenger

Reviewer’s report:

Rusu et.al. propose to perform a clinical trial where critically ill patients are randomized to a fluid management strategy where patients either receive standard ICU care for fluid management or lung ultrasound guided fluid management with the administration of diuretics. Rusu et. al. nicely state that fluid overload or inappropriately given fluids are associated with worse patient outcomes. They also highlight that lung ultrasound provides a fast easy and reliable way to assess extravascular lung water. Point of care ultrasound is frequently used in the ICU by clinicians to help direct patient care but more clinical data is needed to help clinicians determine how best to apply this technology to the critically ill patient. Since it is often a struggle to assess fluid balance in the ICU, I think the essential question of this study protocol - can I improve assessment and management of fluid overload with lung ultrasound - to be an important one. However, I have a few reservations with the protocol as written.

1) I am concerned that with the control group, this study will not effectively test whether lung ultrasound can help with fluid balance and improve patient outcomes, but rather the study will assess if a group where there is an elevated awareness of fluid overload with a diuretic protocol will do better than a group where there is less awareness of fluid overload and no diuretic protocol. It would seem that in addition to daily fluid balance, other measurements of fluid overload (chest xray, weight) would be helpful to assess in both groups and understand how each group compares with usual measurements of fluid overload. Perhaps both groups should have lung ultrasound performed and BLS assessed but only one group be given diuretics dictated by BLS?

2) Since the intervention group will potentially be more likely to receive RRT, there is the potential for more complications in this group. I did not read in the protocol a way to track or account for these potential complications (increased risk of infection, more hypotension, need for transfusion, etc).

3) Would you allow the addition of low dose pressors to achieve fluid goals in the intervention group? I was not able to tell from the current protocol.

4) It may be helpful to have a "quality" check or inter-rater reliability on lung ultrasound scoring with scans being read by another provider to verify the lung ultrasound score.

These concerns will likely need to be explored in the final manuscript after the data is collected and analyzed.
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