Reviewer’s report

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

Version: 0 Date: 23 Jan 2019

Reviewer: Melanie Meersch

Reviewer’s report:

Thank you for the opportunity to review this manuscript reporting the protocol of a multicenter randomized controlled trial, assessing the effectiveness of a lung-ultrasound guided fluid management in critical care with regard to patient outcomes.

I consider your research question highly interesting and very topical. Your study design seems to be appropriate, well-conceived and comprehensive.

The authors may consider the following proposals:

1) You considered the dependency of ultrasound data with the investigator in the list of strengths and limitations of the study protocol. To provide a quantification of interrater reliability of your investigators, did the authors run a pilot phase with ultrasound examinations of several patients carried out by all investigators to compare the consistency of same-patient-results?

2) The protocol needs more explanation in the text: What diuretics are used? What exactly means negative fluid balance (-10, -500, -1000)? What if negative fluid balance is not reached through the use of diuretics? What is the maximum dose of diuretics? This might have an influence on the occurrence of AKI consequently affecting patients' outcome. What modality of RRT will be used if negative fluid balance is not achieved?

3) As fluid management includes the prevention of hypervolemia as well as the avoidance of a hypovolemic state, both ends of the scale should be displayed equally well. Nevertheless, the intervention of lung ultrasound is an appropriate tool to detect signs of hypervolemia, but does not allow a differentiation of a normal or a hypovolemic condition. According to the protocol, for identification of hypovolemia a fall in blood pressure or an increase in creatinine blood level being felt to be associated with intravascular fluid depletion is intended. These criteria seem to have a rather low level of discrimination, so why not also use ultrasound (measurement of inferior vena cava, 4-chamber view) to detect or exclude hypovolemia?

4) Why did the authors decide to use APACHE ≥10 or SOFA≥6 as inclusion criteria?

5) How did the authors decide to perform a safety interim analysis after 100 patients? Is only 1 safety interim analysis planned?
6) Power calculation: please explain in more detail the expected 10% mortality reduction.

7) Cardiac assist devices may interfere or hamper the diagnostic utility of LUS. This is not an exclusion criterion right? If not, please include this as limitation.

Minor points

* Please explain the abbreviations at first mentioning starting in the background section.

* Please revise for spelling errors.

* Figure 1: please add more details to the table.

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None.

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