Reviewer's report

Title: A Prospective Study To Evaluate The Accuracy Of Pulse Power Analysis To Monitor Cardiac Output In Critically Ill Patients.

Version: 4 Date: 12 October 2007

Reviewer: Mervyn Singer

Reviewer's report:

General

The similar concerns expressed by both Dr Linton (Reviewer 2) and myself have been partly but not yet fully erased. The study design is satisfactory and the content is, I believe, important.

However, as I stated previously, the use of highly significant r squared values is misleading when 1-2 outliers exist, as in this case. This will automatically generate an impressive r squared value that the unwary reader will misunderstand, especially with statements such as on page 9: "In this study there were significant agreements between the two techniques of detecting changes in cardiac output for the first four hours following calibration. This is evidenced from the significant correlation between percentage changes in the cardiac output from the preceding time point as measured by the PulseCO when compared to changes as measured by the LiDCO method (r² 0.46-0.76, p<0.006). Statistically true, albeit misleading when the scatter is scrutinised.

My second issue is a continuation of the above. The authors have made some attempt to modify the text, yet the wording in many places still paints an overly rosy hue that cannot be justified from careful examination of the results.

For example, the abstract conclusion simply states: "The agreement between lithium dilution cardiac output and the pulse power algorithm in the PulseCO monitor remains acceptable for up to four hours in critically ill patients." Yet the abstract (and a similar 1st paragraph of the discussion) does not indicate that these critically ill patients were predominantly stable (8/14 had changes in CO <15% over the 8-hr period and the biggest absolute change was just over 3 litres/minute). Even in this relatively stable situation the bias just fell within the generously defined acceptable limits of agreement of 30% (29%, 22%, 28% at 1, 2 and 4 hrs). Although the immediate response to, e.g., a fluid challenge was not tested, a recorded 25% change in output as measured by pulse contour over a one hour period (e.g. from 6 l/min to 4.5 l/min) may potentially trigger an unnecessary therapeutic intervention. I would suggest the authors can make simple revisions throughout the text to qualify/temper some of the conclusions.

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Major Compulsory Revisions (that the author must respond to before a decision
on publication can be reached)

They state on page 8 the range of CO at baseline is 2.8-18.3 l/min yet the highest baseline CO shown in Table 2 is 14.8 (patient 6). Please could they clarify

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

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