Reviewer’s report

Title: Tissue oxygen saturation as an early indicator of delayed lactate clearance after cardiac surgery: A prospective observational study

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Reviewer: Daniele Biasucci

Reviewer's report:

I've read with special interest this paper from Kopp and coll. assessing the potential of near-infrared spectroscopy as a direct and early indicator of impaired tissue oxygenation after cardiac surgery.

The paper is very interesting and clinically relevant. However, I have some remarks to the study.

Major Issues

- This is a prospective observational study: the authors should have followed the STROBE checklist for observational studies. Please, revise the paper accordingly.

- There is no sample size calculation.

- My main concern is that on-pump and off-pump surgery were included in the same analysis. In fact, on-pump and off-pump cardiac surgery are associated with distinct alterations in microcirculatory perfusion. Microcirculatory perfusion seems to remain unaltered throughout off-pump surgery. In contrast, microvascular perfusion declined after initiation of cardiopulmonary bypass and did not recover in the early postoperative phase. The authors should comment on that. I suggest to compare on-pump and off-pump aorto-coronary bypass in a separate subgroup analysis.

- Another concern is the lack of very important outcome variables such as aortic cross-clamping time and cardiopulmonary bypass time which have been demonstrated to be predictors of immediate postoperative morbidity and mortality.

Minor issues

- In the discussion section on page 7, the authors state: "Although recovery of StO2 occurred at day 1, increased lactate concentration and base deficit persisted probably due to delayed metabolism/wash-out of accumulated acid metabolites" This sentence sounds like an authors'
assumption. I agree with the authors but this statement needs experimental supporting data or more references.

- Discussion section, page 8: "Only StO2 combines advantages..." I suggest to modify this sentence as follows: "Our study demonstrates that StO2 combines..."

- Other missing data regards long-term outcomes, e.g., length of intubation, length of ICU stay, or ICU mortality.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

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