Reviewer's report

Title: New generation continuous cardiac output monitoring from carbon dioxide elimination

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Reviewer: Kevin Hatton

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BMC Anesthesiology Review
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This well-written manuscript is fundamentally a review of the historical development of 2 new non-invasive cardiac output monitoring methods, Capnotracking and Capnodynamics, based on advanced methods of measuring exhaled carbon dioxide using anesthesia and ICU ventilators. Personally, I am very interested in the topic and the authors should be commended for making a very complex and mathematically-heavy concept understandable to interested clinicians and researchers. Unfortunately, this manuscript is formatted as a review article and presents no new information or data but was submitted to BMC Anesthesiology as a "technical advance" type of article. This manuscript does not appear to conform to the aims of this type of article submission. I suggest the authors resubmit this article as a review article or the Editor of this journal consider the manuscript as a review article.

Topics for additional consideration for the authors:

1. The abstract format does not fit with the structure of the manuscript. The "methods" describe what was done in previous research work rather than what was done in this work. Perhaps, a better approach is a different abstract format (if allowed by the editors) or a description of the specific review question asked and how the literature reviewed was chosen (a systematic review). Personally, I prefer the first approach rather the second approach for this manuscript.

2. Are there patient populations or surgical procedures where this type of monitoring may be inaccurate or should be used with caution? For example, are these monitoring techniques accurate in pulmonary embolism or severe COPD, conditions effecting dead space ventilation. I understand that this data may not, yet, exist; however, a discussion of hypothetical effect could be helpful to the reader in understanding the potential limitations to this type of monitoring.
3. Likewise, are hypodynamic conditions and hyperdynamic conditions accurate to the same conditions? As I understand the physiologic consequences of hypodynamic conditions and severe hypovolemia, there are increases in dead space ventilation that may interfere with either Capnotracking or Capnodynamic monitoring?

4. Volume responsiveness is a fundamental clinical target and is described in the introduction; however, there is no clear description of the use or effectiveness of either Capnotracking or Capnodynamics for predicting volume responsiveness. This may be particularly difficult given the way that volume responsiveness is measured and the way that carbon dioxide is measured. Please include description or discussion of the possibility or limitations to measuring this clinical target.

5. What are the next steps and the major hurdles that need to be overcome by researchers prior to widespread adoption of these techniques? This could be important to add to the conclusion/discussions.

6. The figures appear to be reproductions of previously published figures. Rights to these figures should be secured by the authors.

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

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If not, please specify which controls are required in your comments to the authors.

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