Reviewer’s report

Title: Pleth Variability Index versus Pulse Pressure Variation for Intraoperative Goal-Directed Fluid Therapy in Patients Undergoing Low-to-Moderate Risk Abdominal Surgery: a Randomized Controlled Trial

Version: 2 Date: 27 Dec 2018

Reviewer: Jochen Renner

Reviewer's report:

The authors present the data of their study entitled "Pleth Variability Index versus Pulse Pressure Variation for Intraoperative Goal-Directed Fluid Therapy in Patients Undergoing Low-to-Moderate Risk Abdominal Surgery: a Randomized Controlled Trial"

After a power analysis they included a total of 76 patients (ASA I and II patients), randomized into two groups of 38 patients (receiving low risk surgery - mainly laparoscopic), receiving either a GDFT-protocol mainly based on pulse pressure variation (as an invasive variable) or pleth variability index (as a non-invasive variable). Primary outcome was defined as length of stay (LOS) in hospital, which was defined as the number of days from surgery up to the day the surgeon authorized hospital discharge. "Other" outcome variables were defined as total infused colloid, total infused crystalloid, estimated blood loss, diuresis, intraoperative use of phenylephrine, post-anesthesia care unit (PACU) LOS, number of anti-emetics administered at the PACU, post-operative complications, time to first ambulation, and postoperative day 1 pain evaluation using visual analogue scale score. The main finding of this RCT is that both PVI and PPV guided GDFT strategies were equivalent for the primary outcome and kind of secondary outcome variables.

I have some major concerns regarding the importance for the clinical application of the results. To my best knowledge there is no RCT available showing that any GDFT protocol is able to reduce LOS in the hospital and reducing postoperative complications, compared to standard of care in low risk patients undergoing low risk surgery. From this point of view the clinical implementation of any GDFT protocol for this combination must be questioned at all. Presumably, any institutional standard of care protocol might have made no difference - however, this is hypothetic. Estimated blood loss was 100 ml in both groups, totally administered fluids 1000 ml vs 750 ml, indicating that hypovolemia was not a problem at all. Consequently, there were no differences found between the groups, independent of the GDFT protocol. For me, the leading question is not wether a non-invasive variable like PVI can be used interchangeably to an invasive variable like PPV, but rather do we need any GDFT for low risk patients
undergoing low risk surgery. Please comment on that and try to incorporate a little more strength to the hypothesis regarding the importance for daily clinical routine.

Please provide references for the threshold values defined - PPV >13% and PVI >15%

How to deal with these threshold values during pneumoperitoneum - discuss the changes in threshold values in the presence of pneumoperitoneum - differences between laparotomy and laparoscopic surgery

Please show the GDFT protocol as a figure

Please mention possible limitations of PVI with respect to changes in perfusion index, especially in low perfusion situation, i.e. low perfusion indices

Is there any interference to be considered with a radial artery cannulation and the perfusion index and the PVI on the same side?

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

Yes

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

No

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

No

**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.

Not relevant to this manuscript
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