Reviewer’s report

Title: Use of esophageal balloon pressure-volume curve analysis to determine esophageal wall elastance and calibrate raw esophageal pressure: a bench experiment and clinical study

Version: 0 Date: 18 Dec 2017

Reviewer: Savino Spadaro

Reviewer’s report:

The authors in this study evaluate the relationship of the slope of the intermediate linear section on the balloon P-V curve with the balloon-surrounding elastance (in vitro) and Ees (in vivo) using a balloon with a small volume. The authors reproduced the experiment conducted by Mojoli and coworkers (Critical Care 2016) in vitro and verify the results in a clinical context. In my opinion, the aim of this study is not original and the readers could be not interested in these technical aspects. In several parts of the work, the authors reproduce methods known in literature. (See reference 10 and 13) Furthermore, the paper suffers from several methodological limitation.

Major comments

The authors investigated the calibration of a single balloon with a small volume; so reported in the introduction that there are no data about the calibration with large geometric volume. Please explain the rationale of this choice. Is it clinical relevant? What is the differences that could be influence the measurements?

Please give information about the pre-calibration using water column. Page 6 line 115. The description is not accurate.

Please explain in which way do you check the systematic leaks (page 7 line 140)

In the clinical study were enrolled postoperative patients with delayed emergency from general anesthesia.

Please explain this inclusion criteria. What is the reason of admission in ICU? What is the comorbidities of these patients? This setting of patients is not accurate to interpret adequately the results of the use of esophageal pressure. I would underline that it is not indication for use of PES in this context. The data reported in table 3 are not accurate to describe the patients population.

In the section methods, page 9 lines 183-186 "continuous infusion of midazolam, fentanyl and bolus of vecuronium were administers…” do you evaluate the RASS score? There is not reported if the patients were assessed using neuro-muscolar monitoring during the experiment.
The patients were studied only in controlled mechanical ventilation. The evaluation of calibration procedure in active patients is an other relevant aspect to verify in this field. This could be an other relevant limitation that limited the interest for this paper.

In discussion, the authors proposed that it is possible to test other balloons using three volumes … (page 17 line 344. Taking into account the methodology of this study and the results, it is very strong to support this statement.

Minor comments:

The title of manuscript did not reflect the contents. I suggest to modify the title accordingly.

Page 12 lines 242: "in accordance with our anticipation" --- please change with " in according with previous .."

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.

I recommend additional statistical review

Quality of written English
Please indicate the quality of language in the manuscript:

Not suitable for publication unless extensively edited

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