Reviewer’s report

Title: Distribution of pulmonary blood flow 2 hours after acid aspiration measured by positron emission tomography

Version: Date: 24 December 2014

Reviewer: Paolo Pelosi

Reviewer’s report:

The Authors investigated the PBF patterns after acid aspiration to obtain new information to better targeting intravenous treatments. They examined PBF in an experimental model at a later stage (2 hours after injury) in 5 rats compared with normal ones. They found that PBF pattern 2 hours after aspiration-induced lung injury showed a redistribution of PBF away from injured regions that was likely responsible for the partial recovery from hypoxemia over time. They concluded that treatments given intravenously 2 hours after 48 acid-induced lung injury may not preferentially reach the injured lung regions, contrary to what occurs during the first hour of inflammation.

The study is methodologically well conducted and provides new interesting physiological information about the possible role of intravenous treatments, including antibiotics, during lung injury.

The Reviewer suggests to improve further the manuscript:

- The introduction should be partially revised, better focusing on the possible role of intravenous treatments in lung injury (not only specifically for acid aspiration (i.e. antibiotics, antiinflammatory drugs, etc.) and the role of timing of administration (as early as possible). Furthermore, the Authors should better clarify the main hypothesis and aim of the present study.

- The Authors should better discuss the possible changes in the redistribution of blood flow during assisted ventilation, at different inspiratory efforts, as well as possible effects of the ventilatory setting. In case add a sentence in the limitation section on this.

- The Authors should better describe the ventilatory pattern (mechanical ventilation setting) used in the present experiments in inured and normal groups of animals and add this information in the abstract. In case add a sentence in the limitation section.

- One major concern of the present study is the sample size calculation. The Authors did not provided this a priori. But they should calculate a posteriori the power of the study based on previous findings. This is essential for a better interpretation and discussion of the results. In any case they must better discuss that specifically in the limitation section.
In the discussion the possible clinical implications of these findings should be better discussed not only related to an aspiration model but also to other types of injury and the possible influence of different ventilation settings (see also Prof de Abreu MG group papers) on this information.

In conclusion the paper is interesting and gives new relevant physiologic information on the possible role of redistribution of perfusion and clinical management (drug delivery). However, some parts, as suggested, should be further improved.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

None