Reviewer’s report

Title: The effects of ventilation on left-to-right shunt and regional cerebral oxygen saturation: a self-controlled trial

Version: 0 Date: 28 May 2019

Reviewer: Ehrenfried Schindler

Reviewer's report:

The enclosed study „The effects of ventilation on Left to Right shunting and regional cerebral oxygen saturation: a self-controlled trial“ is evaluating the effects of two ventilation modes on L-R shunting in patients undergoing congenital heart defect repair. As a main result the authors found that normo- to slight hypoventilation might prevent excessive L-R shunting.

General remarks: The study follows a prospective, cross-over, cohort interventional study design. Ethical approval was obtained and the study was registered. Figure 1a and 1b is not adding any information to the results and is showing a well-known and documented method. Figure 2, 3 and 4 is redundant because the information was already given by the tables.

Please check for English spelling and grammar. I am also not a native speaker therefore I would recommend to use one of these online scientific English editorial services.

Overall the effects of different ventilation modes on L-R shunting are well described. I am not sure what exactly was a new information coming out of your study.

Specific remarks: The citation on page 4 L 12 is about a case report of 2 cases and can therefore not proof general observations on the effect of PaCO2 modulating the QpQs.

If one is letting to increase the PaCO2 to modulate i.e. the cerebral or peripheral circulation one automatically might decrease the blood PH. This will generate a pulmonary vasoconstriction (at least theoretically). This might influence the result of measuring QpQs. Bradley and co-workers were able to show these effects in children undergoing bidirectional superior cavopulmonary connection (DOI: 10.1016).

Moreover the investigated cohort of patients is very heterogeneous regarding the underlying disease. Large VSDs with indication for operation may present in so many different hemodynamic variations regarding the pulmonary vascular system and reactivity. As the pulmonary arterioles involute, PVR falls with resultant increase in left-to-right shunt. The right ventricle (RV) and main and branch pulmonary arteries may also be dilated in moderate to large defects. Whereas pulmonary vascular obstructive disease (PVOD) does not manifest until adulthood in patients with ASD, patients with VSD are likely to develop PVOD as early
as 18 months to 2 years of age if a large VSD is left unrepaired. That means that the effect of moderate increase or decrease of pACO2 might will have less to no effect on L-R Shunting.

In the "Discussion" on P9L7 the described effects of the citation were related to children with pHt and cannot be compared with those in this investigation although there might be some in this cohort with flow related pHt.

Please review the sentence on P11L 15ff "As shown in the results, pediatrics with defect>10mm had a larger flow of PA and 16 lower rSCO2 which may due to the relatively insufficient of cerebral blood flow" it's difficult to understand what you exactly want to say with it.

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.

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

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Needs some language corrections before being published

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