Reviewer's report

Title: Effect of transient steep Trendelenburg position on optic nerve sheath diameter as a surrogate for intracranial pressure under general anesthesia: a prospective observational study

Version: 6 Date: 18 December 2014

Reviewer: Kevin Blaine

Reviewer's report:

Major Compulsory Revisions

1) Page 4, Paragraph 1 (lines 2-9): Please describe the difference between the head-down position mentioned by references 1 and 2 and the Trendelenburg position. Also, the authors state that the effect of the Trendelenburg position on ICP has not been evaluated, although this topic was addressed in several papers including references 20 (Kim et al 2014), 21 (Kalmar et al, 2010), and 24 (Park et al 2009). A quick literature review returned many more reports on patient positioning and ICP that should be acknowledged.

2) Page 5, Lines 14-16: Why was an inspired sevoflurane concentration of 2-4% chosen as your standard anesthetic? Why not use a concentration closer to 1 minimum alveolar concentration? Is there a risk that such high dose of volatile anesthetic would increase ICP? Also, was the intended remifentanil dose “2-5 ng/mL” or some other dose?

3) Page 6, Line 26: Please clarify which comparisons were performed using an ‘ANOVA with rank’? The data presented in table 2 are all continuous variables and it’s not clear where or why a nonparametric analysis would be required. (major compulsory revision)

4) Page 9, Lines 4-11: The currently worded sentence suggests that the link between ONSD and ICP is fully described and validated, but the evidence supporting that statement has not yet been established in your manuscript. Please describe in some detail how to extrapolate the ICP from the ONSD, including a critical review of the strength of the evidence. At this point in the manuscript, it would be helpful to mention that an ONSD of 5 mm approximates an ICP of 20 cm H2O, as discussed at Page 9, lines 24-26, and please be very thorough to explain how that assumption is determined. Because the relationship between ONSD and ICP is a critical assumption for this work, the data supporting the association needs to be thoroughly reviewed. (major compulsory revision)

5) Page 10, Lines 10-15: This section ends with a recommendation for caution against prolonged steep Trendelenburg due to ICP concerns. This report does not offer evidence to suggest an association between Trendelenburg position and pathologic ICP, and so it is premature to warn strongly against positioning. If may be appropriate to comment that steep Trendelenburg positioning might be
harmful, however the language should reflect the uncertainty of the association and the lack of clinical endpoints. (major compulsory revision)

6) Page 11, Lines 5-7: Only one study limitation is mentioned. Please account for additional sources of error. For example, could the induction agent or maintenance anesthetic affect ONSD separately from Trendelenburg position? How variable were the surgical conditions and intraoperative findings? Does blood loss or fluid management affect ONSD? Does surgical positioning complicate the measurement? It will be very important to address the uncertainty concerning how well ONSD approximates ICP. (major compulsory revision)

7) Page 12, Lines 2-6: Please re-visit the conclusion. Given that there is still uncertainty about how well ONSD approximates ICP, please temper your recommendation for caution against the Trendelenburg position until it is known that a clinically meaningful change in ICP does occur, and that ONSD can detect the change. (major compulsory revision)

8) Finally, please address similar findings published by other groups. A literature review finds 3 prior studies that compare ONSD during robotic laparoscopic prostatectomy. Verdonck et al (PLoS One. 2014 Nov 4;9(11):e111916) report no difference in ONSD diameter, while Whiteley et al (J Neurosurg Anesthesiol. 2014 Aug 7. [Epub ahead of print]) and Kim et al (J Endourol. 2014 Jul;28(7):801-6) (an article that was cited in the References) would seem to confirm the findings presented here. Please be sure to explain the similarities and differences between this study and these others. (major compulsory revision)

Minor Essential Revisions

9) The title, “Effect of transient steep Trendelenburg position on optic nerve sheath diameter as a surrogate for intracranial pressure under general anesthesia: a prospective observational study”, does not describe the use of ultrasonography, nor succinctly describe the research thesis. As a substitution, the authors may consider the title, “Sonographic optic nerve sheath diameter as a surrogate measure for intracranial pressure in anesthetized patients in the Trendelenburg position”. (minor essential revision)

10) Page 5, Lines 11-13: The standardized ventilator protocol used tidal volumes of 8 mL/kg. Please comment on whether this is per kg of ideal body weight or actual body weight, as actual body weight may have delivered a higher tidal volume than intended. (minor essential revision)

11) Page 8, Lines 2-3: Table 1 mentions that 12 of 21 patients experienced baseline hypertension. Untreated hypertension can impact cerebral vascular autoregulation and therefore ICP. Please comment on the range of perioperative blood pressure control. Does this subgroup of patients behave differently than those without hypertension? Also, because intrathoracic pressure and lung compliance may have an effect on venous return from the head and therefore ICP, please add the number of patients presenting with chronic obstructive pulmonary disease. (minor essential revision)
12) Page 8, Lines 4-11: Table 2 summarizes this information very well. For simplicity, please consider omitting this paragraph and simply referring to the table. However, Table 2 does show that the peak and plateau airway pressures are elevated in Trendelenburg position (with and without pneumoperitoneum), which might be expected. What is the association between airway pressure and ONSD? (minor essential revision)

13) Page 9, Lines 2-3: The results report that there was a detectable change after 3 minutes of Trendelenburg position, not “immediately” as currently worded. Please correct this statement. (minor essential revision)

14) Page 9, Line 26 to Page 10, Line 5: Thank you for addressing the relationship between ventilatory mechanics, venous return, and ICP. Please separate this topic into its own paragraph, which can include your discussion of ETCO2. Please also address the relationship between airway pressures and ONSD in your discussion. (minor essential revision)

Discretionary Revisions

15) Page 5, Lines 5-6: Please move the sentence “Twenty-one patients scheduled for robot-assisted laparoscopic radical prostatectomy were enrolled and evaluated” to the Results section. (discretionary revision)

16) Page 9, Lines 13-23: Please provide some range on ICP values that might be clinically significant for these otherwise healthy patients. By how much should ICP change when the patient is placed in Trendelenburg? What is the association between the angle of inversion and ICP? Is this change clinically relevant in most patients? How about patients with impaired cerebrovascular autoregulation? (discretionary revision)

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests.