Reviewers report

Title: Comparison of volume-controlled ventilation mode and pressure-controlled ventilation with volume-guaranteed mode in the prone position during lumbar spine surgery

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Reviewer: Thomas Hachenberg

Reviewers report:

Different surgical procedures require positioning of the patient in the prone position which may have significant cardiopulmonary effects. In particular alterations of cardiac output, ventilation-perfusion relationships and pulmonary and thoracic compliance have been described. The authors conducted a prospective clinical study comparing volume-controlled ventilation mode (VCV) and pressure controlled ventilation with volume guaranteed mode (PCV-VG). Hemodynamic and pulmonary variables were assessed in the prone position during lumbar spine surgery. The authors found no differences for systemic hemodynamic variables and gas exchange, but lower peak airway pressure (Ppeak) and higher dynamic compliance (Cdyn) of the respiratory system during PCV-VG. The authors conclude that PCV-VG may be a favorable alternative mode of mechanical ventilation for patients in the prone position during lumbar spine surgery.

The authors are commended for providing excellent anesthesia for their patients, however, I have a couple of comments.

1. The idea of comparing VCV and PCV-VG in anesthetized patients is not new. For example in patients undergoing urologic surgery in the prone position an almost identical study has shown very similar results (Sen O et al. Springerplus. 2016 Oct 10;5(1):1761. eCollection 2016.). Considering these data and others studies on mechanical ventilation in prone patients during anesthesia and surgery what is the novel concept you wish to demonstrate?

2. No clear null hypothesis is presented.

3. 36 patients scheduled for lumbar spine surgery in the prone position were enrolled. Did you perform biometrical analysis to assess the sample size and if so, why didn’t you present this information in the section methods?
4. You state that primary outcome variable is Ppeak. However, this variable per se has little importance for clinical anesthesiologists unless unphysiologically high limits are surpassed. Did you expect excessive Ppeak (e.g. > 30 cmH2O) with conventional VCV in your patients?

5. Hemodynamic and respiratory variables including arterial blood gases were assessed in the supine position 15 min after the induction of anesthesia (T0), 15 min (T1) and 30 min after prone positioning (T2), and 15 min after supine positioning at the end of anesthesia (T3). Why didn’t you measure these variables in the postoperative course?

6. The statistical analysis is not clear. You state that analysis of variance and two-sample t-test were used. Have you analyzed your data for normal distribution?

7. A presentation of median and confidence intervals would be more appropriate for your clinical data.

8. The patients were fairly healthy according to your inclusion and exclusion criteria. However in patients with unimpaired cardiopulmonary function relatively short periods of VCV or PCV have little impact on outcome. Why didn’t you study patients with pre-existing lung disease to see whether VCV or PCV-VG has clear advantages? Please comment.

9. The uncalibrated pulse contour analysis is no good choice to measure hemodynamic variables during different conditions of mechanical ventilation. You discuss this point in the section "Limitations" but provide no explanation why this device was used at all for a scientific study.

10. Your data on arterial pCO2 show that your patients were slightly hyperventilated. Would you expect different results between the groups during normocapnia? Please comment.

11. The differences for Ppeak are quite small. What is the clinical impact of ▬Ppeak of 2 to 3 cmH2O between both groups of patients?

12. Likewise the differences for Cdyn are small. I have the impression you present statistical differences which have little importance for management of anesthesia and mechanical ventilation in prone patients.

13. It is no use to present 2 decimal places in your tables.
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.

Unable to assess

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

No

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I am able to assess the statistics

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