



ARTICLE OF THE MONTH

Effect of Mechanical Ventilation Mode Type on Intra- and Postoperative Blood Loss in Patients Undergoing Posterior Lumbar Interbody Fusion Surgery: A Randomized Controlled Trial

Kang WS, Oh CS, Kwon WK, Rhee KY, Lee YG, Kim TH, *et al.* Effect of Mechanical Ventilation Mode Type on Intra- and Postoperative Blood Loss in Patients Undergoing Posterior Lumbar Interbody Fusion Surgery: A Randomized Controlled Trial. *Anesthesiology*. 2016;125(1):115-23

Welcome to the February 2016 installment of the SNACC Article of the Month! The study by Kang *et al* discussed here is looking at the impact of the mode of ventilation on the perioperative blood loss in patients undergoing posterior lumbar interbody fusion. This month we asked Dr. Alana Flexman to share her thoughts with us on this article. Dr. Alana Flexman (MD, FRCPC) is a Clinical Assistant Professor and Head, Division of Neuroanesthesia, in the Department of Anesthesiology, Pharmacology and Therapeutics at the University of British Columbia (UBC). She is a staff anesthesiologist at Vancouver General Hospital with a focus on anesthesia for neurosurgical and spine procedures. Dr. Flexman's research focuses on outcomes after neurosurgical and spine surgery procedures.

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~ Oana Maties, MD; Adrian Pichurko, MD and Nina Schloemerkerper, MD

Commentary

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This study was a prospective, randomized controlled trial designed to determine the effect of mode of mechanical ventilation on perioperative bleeding in patients undergoing posterior lumbar interbody fusion surgery. Fifty six patients were randomized to either volume control (VCV) or pressure control (PCV) ventilation during their surgery and the rest of the anesthetic was managed by study protocol. Although the surgeon and nursing team were blinded to the study group allocation, the anesthesiologist was not. An unblinded observer recorded the

outcome data. The primary outcome was intraoperative surgical bleeding and secondary outcomes were total amount of bleeding until 24 and 72 hour postoperatively.

The two groups were well-matched in terms of demographics, type of procedure, intraoperative fluids, vasopressors and duration of surgery. The main finding was that intraoperative bleeding was significantly reduced in the PCV group as compared to the VCV group (difference 168.7 [95% CI 94.7 to 243.2] ml, $p < 0.001$) although. Postoperative bleeding was similar between the groups (difference 101.4 [95% CI -32 to 235] ml, $p = 0.14$). Postoperative hemoglobin was higher in the PCV group (difference 0.5 [95% CI -0.1 to 1.1] g/dl, $p = 0.04$). Although the overall incidence of transfusion was similar, the authors found a lower incidence in the PCV in the first 24 hours postoperatively (21% vs 46%, $p = 0.048$). The higher peak inspiratory pressures (PIPs) in the VCV group as compared to the PCV group may explain the difference in bleeding as higher PIP may increase spinal venous engorgement.

This study represents a well-designed RCT to examine the effect of two difference ventilation strategies for prone spine surgery that demonstrated that PCV results in lower intraoperative blood loss. This finding describes a clinically relevant benefit from a simple intervention that does not require resources and has few risks to the patient. However, the results must be interpreted with their inherent limitations: although PIP was elevated in the VCV group, this study was not designed to determine the etiology of difference in bleeding; the anesthesiologist was not blinded to study group allocation; although a difference in intraoperative bleeding was demonstrated, an overall difference in transfusion was not seen. In addition, some details of the clinical protocol limit generalizability somewhat (e.g. no PEEP applied; Wilson frame used for all cases).