



## The need to better understand the physiology of lung collapse during one-lung ventilation

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### To the Editor,

In their challenging study conducted on 39 patients undergoing one-lung ventilation (OLV), Moreault *et al.* have succeeded in “highlighting the need to better understand the physiology of lung collapse during OLV”.<sup>1</sup> My letter addresses but one of the many thought-provoking volume and airway pressure findings: following the initiation of OLV and before pleural opening, the volume of “gaseous influx” into the non-ventilated lung from a measuring ambient air reservoir was greater when it occurred via the narrow-bore internal channel of a bronchial blocker (BB) than via the wide lumen of a double lumen endotracheal tube (DL-ETT) (contrary to one of the researchers’ two hypotheses).<sup>1</sup> This totally unexpected finding could conceivably be a consequence of the “tidal gas movement” that will have been occurring via the DL-ETT lumen,<sup>2</sup> but not to any meaningful degree via the long narrow-bore internal channel of the BB. “Paradoxical ventilation” occurs in association with the “tidal gas movement” and has been shown (as a single picture “saying a thousand words”) to be necessarily associated with an influx of ambient nitrogen into the non-ventilated lung.<sup>3</sup> This could well have resulted in an earlier initiation of hypoxic pulmonary vasoconstriction in the non-ventilated lung in the studies with the wide-bore DL-ETT, with a consequent reduction in pulmonary blood flow

that resulted in a lesser ongoing “gaseous influx” than might otherwise have occurred.

Whether or not this particular explanation is correct, one important message should be clear from the Moreault *et al.* study: after OLV is initiated and until the pleura is opened, ambient air (with slowly diffusing nitrogen) will certainly enter the non-ventilated lung if its airway is left non-occluded (open to air), regardless of whether the non-occluded airway is the lumen of a DL-ETT or the narrow-bore internal channel of a BB. Thus, if prompt lung collapse is desired, the open airway should either be connected to an ambient pressure oxygen source<sup>2,3</sup> or, as has previously been described,<sup>4,5</sup> occluded as soon as the patient is placed in the lateral position and OLV is initiated.<sup>4,5</sup>

With regard to the latter option, further studies will determine whether the appreciable reduction in airway pressure that occurs with intentional unilateral airway occlusion<sup>1</sup> might prove to be, in some patients at least, an added risk of OLV. Further studies will also determine which of the two above-mentioned options will be the more efficient at facilitating the non-ventilated lung’s prompt collapse.

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This letter is accompanied by a reply. Please see Can J Anesth 2021; this issue.

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