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A comment on- 'positive end-expiratory pressure as a novel method to thwart CO₂ leakage from capnothorax in robotic-assisted thoracoscopic surgery'

Sir,

I read, with great interest the case report— 'positive end-expiratory pressure as a novel method to thwart CO₂ leakage from capnothorax in robotic-assisted thoracoscopic surgery' by Ravi R *et al.*^[1] According to authors, reported events occurred due to leakage of carbon dioxide (CO₂) gas from the pleural cavity into the trachea through a rent in the left lower lobe bronchus. However, this is unlikely if Arndt endobronchial blocker (Cook® Medical) was placed in the left main bronchus and was adequately inflated. In the case, Ravi *et al.* had not mentioned the volume with which the bronchial cuff of the blocker was inflated. The bronchial cuff of 7 F Arndt blocker takes 2-6 cc of air for adequate inflation.^[2] If not inflated properly, there is a possibility of the leak by the side of the cuff and this could have been the reason for CO₂ gas to reach the endotracheal tube in the reported case. At the same time, over inflation of the bronchial cuff beyond the recommended volume results in pressure-related ischemic injury to the bronchial mucosa. In such a case, choosing one size larger version of the blocker (i.e., 9F) is a better alternative. Figure 1 in the case report shows that there was a significant difference between the set (300 ml) and the exhaled tidal volume (237 ml), denoting that bronchial cuff might not be inflated adequately.^[1] A leak is more likely with the spherical shape and wrinkled surface of the bronchial cuff.^[2] Hence, I suggest that, along with the confirmation of the position of blocker by fiberoptic bronchoscope, authors could have inflated the bronchial cuff to achieve an 'airtight seal'. Airtight seal can be confirmed by eliminating any leak in the tidal volume or by underwater check or by loss of capnography trace from the isolated lung.^[3] In robotic thoracic surgery, a sudden jump in end-tidal CO₂ can happen

if the mainstem bronchus is injured proximal to the inflated bronchial cuff. It would result in loss of tidal volume during inspiration and entry of CO₂ from the pleural cavity during the late expiratory phase, depending upon the relationship between airway pressure and pleural pressure. In such a scenario, increasing the end-expiratory pressure more than the capnothorax pressure (as did by the authors in reported case) would prevent CO₂ from entering the airway from the pleural cavity. Here, reducing capnothorax pressure should be done as a first step. It should be remembered that excess positive end expiratory pressure (PEEP) can be detrimental to the ventilated lung and can also result in hypotension.

Hence, to conclude, it is very important to confirm the airtight nature of the seal while inflating the bronchial cuff. Understanding the pressure dynamics between the pleural cavity and airway is essential in the management of intraoperative inadvertent bronchial injury.

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Conflicts of interest

There are no conflicts of interest.

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