



Experience with Tritube and Flow-Controlled Ventilation During Airway Surgery

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To the Editor,

Tritube is a unique, newly developed endotracheal tube with an outer diameter of 4.4 mm and an inner diameter of 2.4 mm, through which ventilation could be managed by making expiration active. Expiratory ventilation assistance system enables active removal of gas and reduces the risk of barotrauma.^{1,2} We would like to share our experience of Tritube and flow-controlled ventilation (FCV) using Evone (Ventinova Medical, Eindhoven, The Netherlands) in three patients undergoing airway surgeries.

First patient was a 67-year-old male with a laryngeal mass obstructing the lumen severely. He was scheduled for an emergency debulking surgery and diagnostic biopsy. Following anaesthesia induction, his trachea was intubated with Tritube via acute-angled videolaryngoscopy. Laryngoscopic view was Cormack-Lehane Grade 2 with nearly 80% narrowed lumen through which the Tritube can only pass. FCV was successful during the operation which lasted 40 minutes. Second patient was a 21-year-old, 65 kg male who was referred to the emergency department with progressive dyspnea at the post-operative first month of his trachea resection and end-to-end anastomoses surgery secondary to post-intubation tracheal stenosis. An emergent diagnostic rigid bronchoscopy and if required tracheotomy were planned. Rigid bronchoscopy revealed grade-3 subglottic stenosis, and his trachea was intubated with Tritube at first attempt. Tritube was used not only for ventilation but also as the first tracheal dilatation tool by inflating the cuff. As dilatation and ventilation was successful with Tritube, there was no need for tracheotomy. He was operated for a second tracheal dilatation procedure 1 week later, and again Tritube was used successfully as the first dilatation tool ensuring simultaneous ventilation. Third patient was a 58-year-old, 100 kg male with a BMI of 34.6 kg m⁻² and with a severe obstructive sleep apnea (apnea-hypopnea index of 40 h⁻¹) undergoing uvulopalatoplasty. Oral intubation using Tritube was performed by acute-angled videolaryngoscopy; surgery was completed uneventfully after 1 hour, and the surgical team stated their satisfaction about the surgical view and having more space with a uniquely thin endotracheal tube. Anaesthesia maintenance was performed via intravenous propofol and remifentanyl infusions in all patients. FCV was the chosen method for all patients with set parameters such as an end-expiratory pressure of 5-7 mbar, a peak inspiratory pressure of 16-18 mbar, and an inspiration:expiration ratio of 1:1-1:1.4. The frequency and tidal volumes obtained were 12-14 min⁻¹ and 420-550 mL, respectively. SpO₂ and etCO₂ values remained within normal limits in all patients. During extubation, the cuff was deflated, the Evone was switched to jet ventilation mode with 100% oxygen, and a smooth, awake extubation was performed for all patients. There were no adverse events except a short-term obstruction of the tube with secretions in the third patient, which was overcome by flushing with 3-4 mL saline.

Advanced airway management devices could make visualisation of glottis easier. However, it might be still hard to introduce an endotracheal tube through a narrowed lumen due to tumors, infections, or edematous lesions. Dealing with increased airway pressures is usually another problem when small-sized endotracheal tubes are used. Tritube gives the advantage to provide sufficient ventilation through a continuously secured airway without an increased risk of barotrauma.³ Although the literature about Tritube and Evone is still so limited, using Tritube and FCV seems to be advantageous to facilitate airway management and ventilation in those patients.

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