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Use of ETView™ tracheoscopic ventilation tube for unilateral pulmonary ventilation

Tek taraflı akciğer ventilasyonunda ETView™ trakeoskopik ventilasyon tüpü kullanımı

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The ETView™ tracheoscopic ventilation tube is a standard endotracheal tube which reflects the view continuously to a portable monitor with a light source at the tip and a mini-video camera. In this article, we describe the use of ETView™ tracheoscopic ventilation tube for unilateral pulmonary ventilation in selected cases.

Keywords: Endotracheal tube; ETView™; unilateral pulmonary ventilation.

ETView™ trakeoskopik ventilasyon tüpü, ucundaki ışık kaynağı ve mini-video kamera ile görüntüyü taşınabilir bir monitöre yansıtan standart bir endotrakeal tüptür. Bu yazıda, seçilmiş olgularda tek taraflı akciğer ventilasyonu uygulamasında ETView™ trakeoskopik ventilasyon tüpü kullanımı tanımlanmıştır.

Anahtar sözcükler: Endotrakeal tüp; ETView™; tek taraflı akciğer ventilasyonu.

Lung isolation techniques to provide single-lung ventilation with double-lumen endotracheal tubes (DLTs) or bronchial blockers are commonly performed in a variety of intrathoracic surgical procedures. However, compared with standard endotracheal tubes, DLTs are larger in outer diameter, more complex in structure, and often difficult to insert. Furthermore, they can result in airway injury and bronchial rupture.[1] It has also been reported that there is a much longer time interval to deflate the operative lung when a bronchial blocker is used (19-26 minutes) rather than DLTs.[2] In addition, the lumen of bronchial blockers may become easily clogged by secretions and/or blood. The optimal position of DLTs and bronchial blockers is best achieved with the use of fiberoptic bronchoscopy after the placement and repositioning of the patient.[3] Furthermore, using DLTs sometimes causes the duration of anesthesia to be much longer than the operation time.

The ETView tracheoscopic ventilation tube (TVT)™ (ETView Ltd, Misgav, Israel) is a standard endotracheal tube with a light source at the tip and a mini-video camera which allows for continuous viewing via a portable monitor (Figure 1). It is often used for cases with difficult airway management because of its ability to provide continuous airway visualization for an early diagnosis of intraoperative tube displacement and can also be used successfully with bronchial blockers for lung isolation.[4,5]

In order to be less invasive, we have been using the ETView TVT™ device for lung separation in selected cases after obtaining written patient consent, especially for adult patients with an American Society of Anesthesiologists (ASA) classification of I or II who are scheduled for a video-assisted thoracoscopic sympathectomy (VATS). Our surgical team grades the collapse of the operative lung as either good (easy surgery), mild (slightly-to-moderately difficult surgery), or bad (difficult surgery). In case when lung collapse cannot be achieved, the surgical procedure is performed during apneic periods.

After anesthesia induction, we try to place a suction catheter into the bronchus of the operative lung or

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Figure 1. The ETView TVT™ with a portable monitor; **(a)** Front view from the tip of the ETView TVT™.

the trachea via laryngoscopy as well as intubate the trachea using the ETView TVT™, verify the placement of the catheter under direct vision, and manipulate it if necessary. Then we perform bronchial intubation for single-lung ventilation. We also attempt to place the tube 1-1.5 cm proximal to the upper lobe orifice to achieve ventilation in that region. The patient is positioned laterally when bronchially intubated, and the collapse of the operative lung is verified by lung auscultation before beginning the surgery. Under direct vision, the tube is repositioned in cases in which dislodgement has occurred, and the suction catheter is used to obtain the collapse of the operative lung and aspirate the secretions. Next, the tube is drawn back into the trachea for bilateral lung ventilation at the end of the procedure.

Using the ETView TVT™, we have performed 24 right and 29 left bronchial intubations, and the lung isolation success rate is shown in Table 1. The failure rate in the collapse of the operative lung was higher for right bronchial intubation ($p<0.05$). In addition to VATS, we have also used this device successfully in two patients who underwent pneumonectomies (right and left), one who previously had a total laryngectomy-tracheostomy, and in two others who underwent lobectomies with difficult intubation (Cormack and Lehane Grade III) in which DLT placement had failed.

It seems that bronchial intubation with the ETView TVT™ for lung isolation is preferable only for the patients with a good respiratory reserve and right-sided brief procedures due to problems involving the collapse of the operative lung and ventilation of the right (and sometimes left) upper lobe. Recruitment maneuvers are appropriate after the procedure. In case of dislodgement, performing bronchial intubation in

Table 1. Success rate of lung isolation with the ETView TVT™

	Collapse of the operative lung		
	Good	Mild	Bad
Right bronchial intubation (n=24)	5	6	13
Left bronchial intubation (n=29)	19	7	3

the lateral decubitus position requires more experience, but a guidewire might be an option when there is takes place. However, it should be noted that the length of the tube may not be long enough for taller patients.

Endobronchial intubation with a standard endotracheal tube (ETT) has been recommended for isolating the lungs in emergency situations or when other lung separation techniques have failed.[6] Anesthesiologists who do not specialize in thoracic anesthesia and have less experience with DLTs or bronchial blockers may sometimes have to perform lung isolation techniques. In these cases, when DLTs and bronchial blockers are not available, or for patients with difficult airways, the ETView TVT™ provides an good alternative for right-sided lung isolation.

Left bronchial intubation using this device could also be a practical option for single-lung ventilation in emergency situations or in selected elective cases because the continuous monitorization of the airway allows for the early diagnosis of dislodgement or obstructions in the secretions or blood. If ETView had a shorter cuff and shorter tip, it will be more appropriate for upper lobe ventilation during bronchial intubation.

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