

Fibreoptic bronchoscopy for tracheal and endobronchial intubation with a double-lumen tube

Mark S. Shulman MD, Jay B. Brodsky MD,
Paul R. Levesque MD

A 68-year-old patient was scheduled for a thoracotomy. A double-lumen endobronchial tube was requested by the surgeon to facilitate operating conditions. Initial attempts at intubation by conventional methods were unsuccessful. The proximal ends of a 37F double-lumen tube were then shortened and a 4-mm fibreoptic bronchoscope was passed through the bronchial lumen. The patient's larynx was easily visualized and the bronchoscope was passed into the trachea. The double lumen tube was then advanced over the bronchoscope and correctly positioned.

Shortening a double-lumen tube allows the use of a fibre-optic bronchoscope to aid in tracheal intubation in a patient whose larynx is difficult to visualize by conventional methods.

Key words

EQUIPMENT: fibreoptic bronchoscope; double-lumen tube; COMPLICATIONS: difficult intubation.

From the Departments of Anesthesia and Surgery, Stanford University School of Medicine, Stanford, California and the Department of Anesthesia, St. Elizabeth's Hospital, Boston, Massachusetts.

Address correspondence to: Dr. Mark Shulman, Department of Anesthesia, St. Elizabeth's Hospital, 736 Cambridge Street, Boston MA 02135.

Fibreoptic bronchoscopy has been used for tracheal intubation with conventional endotracheal tubes in instances when visualization of the glottis by direct laryngoscopy was not possible.¹ We report a case where this technique was modified to aid in the placement of a double-lumen tube.

Case report

A 68-year-old, 55 kg female was scheduled for left thoracotomy for excision of multiple pulmonary metastases. During two previous anaesthetics her glottis could not be visualized by direct laryngoscopy, and in each instance a "blind" intubation was successful after many failed attempts by direct laryngoscopy. During preoperative examination of her upper airway only the soft palate and the faucial pillars could be seen. Her uvula could not be visualized. Using the Mallampati tracheal intubation classification, she was judged to be in Class 2.² The remainder of her physical examination was unremarkable.

A double-lumen tube was considered essential for adequate operating conditions. In the operating room following preoxygenation, anaesthesia was induced with thiopentone, 300 mg IV. After demonstrating no difficulty in ventilating the patient by mask, succinylcholine, 80 mg IV was given. Tracheal intubation was unsuccessful using a variety of laryngoscope blades. At this point, seven centimetres were cut from the upper ends of a 37F polyvinylchloride (PVC) left double-lumen tube and a 4 mm outer diameter (OD) fibreoptic bronchoscope (Machida ENT 3L-60, Machida America Inc., Orangeburg, N.Y.) was placed through the bronchial lumen. After the larynx was visualized, the bronchoscope was passed into the trachea. Initially, there was difficulty in sliding the double-lumen tube over the bronchoscope, but after pressure was applied on the neck over the larynx, the tube advanced into the trachea. To insure the correct bronchial placement, the bronchoscope was then advanced into the left main-stem bronchus. The double-lumen tube was threaded over the bronchoscope until the bronchial lumen was in the left main-stem bronchus. The bronchoscope

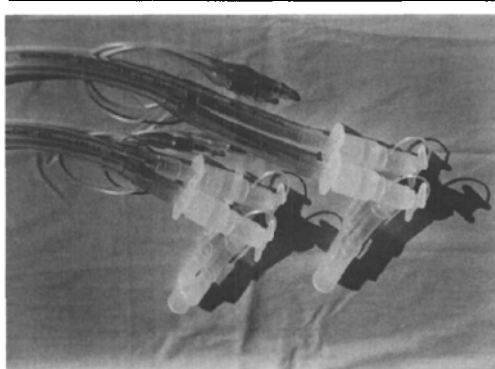


FIGURE Standard length and shortened double-lumen endobronchial tubes with the standard connectors attached.

was then withdrawn from the bronchial lumen and passed through the tracheal lumen. The upper surface of the endobronchial balloon was seen just below the carina, confirming that the tube was indeed in correct position.

The operation proceeded uneventfully and the patient was extubated at the end of the procedure, in the operating room.

Discussion

Many anaesthetists routinely use a fiberoptic bronchoscope to determine the position of double-lumen tubes. Fiberoptic bronchoscopy has also been used to guide a double-lumen tube into the appropriate main stem bronchus after successful conventional tracheal intubation.³ Our case demonstrates that a double-lumen tube can be used even in situations where tracheal intubation is difficult. The tube must be cut in length to accommodate the short bronchoscope. A 4 mm OD fiberoptic bronchoscope can fit down either the bronchial or tracheal lumen of a 35F or larger PVC double-lumen tube. Shortening the tube does not compromise its function or structural integrity and actually makes manipulation of the bronchoscope in the patient's oropharynx easier. The thin bronchoscope is very flexible and unintentional bending can make advancement of the double-lumen tube over the bronchoscope somewhat difficult, as we experienced with our patient. The standard connecting system is attached to the shortened double-lumen tube in the same manner as with uncut, conventional length tubes (Figure).

Although not an absolute requirement in most cases, there are many anaesthetic and surgical advantages for using a double-lumen tube during intrathoracic operations. Some authors consider anatomic features that contribute to difficulty with endotracheal intubation, such as

recessed jaw, prominent teeth, bull neck and/or anterior larynx, as factors that preclude the safe insertion of double-lumen tubes.⁴ By cutting the tube and then intubating the trachea and bronchus with the fiberoptic bronchoscope, the anaesthetist can still use a double-lumen tube in patients who are difficult to intubate by direct laryngoscopy.

References

- 1 Taylor PA, Towney RM. The broncho-fiberscope as an aid to endotracheal intubation. *Br J Anaesth* 1972; 44: 611-2.
- 2 Mallampati SR, Gatt SP, Gugino LD *et al.* A clinical sign to predict difficult tracheal intubation: a prospective study. *Can Anaesth Soc J* 1985; 32: 329-34.
- 3 Ovassapian A. Fiberoptic bronchoscope and double-lumen tracheal tubes. *Anaesthesia* 1983; 38: 1104.
- 4 Benumof JL, Alfery DD. Anesthesia for thoracic surgery. In: *Anesthesia*, Miller RD (Ed). New York, Churchill Livingstone, 1986. pp 1371-1462.

Résumé

Chez un malade cédulé pour thoracotomie, l'emploi d'un tube endotrachéal à double lumière fut jugé nécessaire par le chirurgien. A cause de certaines difficultés anatomiques l'intubation ne fut pas possible en employant les méthodes conventionnelles. Pour résoudre ce problème le bout proximal d'un tube à double lumière de calibre 37 fut raccourci permettant l'emploi du bronchoscope fibroptique de 4 mm de diamètre. Celui-ci fut introduit dans le larynx et le tube fut glissé et positionné correctement.

Le raccourcissement d'un tube à double lumière nous a permis d'employer un bronchoscope fibroptique afin de permettre l'intubation trachéale chez un malade dont le larynx était difficile à visualiser.