Anesthesiology
1999; 91:327

How To Perform Differential Lung Ventilation in Pediatric Cases?

To the Editor:—Although the differential lung ventilation or one lung ventilation is sometimes required in pediatric cases, a double-lumen tube size less than 28 French is not commercially available. An alternative is the placement of bronchial blockers using a variety of catheters or selective endobronchial intubation of a single-lumen tracheal tube. However, several disadvantages are known, such as expensive catheters, complicated technique, and difficulty of collapse of the nonventilated lung.

Here we report a method of differential lung ventilation using the laryngeal mask airway,[1,2] through which a lengthened single-lumen tracheal tube is intubated to the main bronchus. A 17-yr-old girl (height, 140 cm; weight, 40 kg) with Arnold-Chiari malformation for idiopathic scoliosis was scheduled to undergo anterior release operation of thoracic vertebrae *via* right thoracotomy. Left-sided one-lung ventilation was planned. After a rapid induction, an intubating laryngeal mask airway[3] (Fastrack, size #3; The Laryngeal Mask Company Limited, Nicosia, Cyprus) that connected with a swivel connector was inserted. A lengthened cuffed tracheal tube (ID 5 mm; overall length, 47 cm) was prepared by jointing an MLT tube (Mallinckrodt Medical, Athlone, Ireland) to the 10-cm proximal part of the other tube and by lengthening a pilot cuff tube. This handmade tube was blindly passed through the laryngeal mask airway into the trachea. Using a fiberscope (LF-2; Olympus, Tokyo, Japan), an appropriate positioning of the tube bevel in the trachea was checked. Thereafter, the tube was advanced into the left main bronchus under fiberoptic guidance. A nasogastric tube (14-French) was also inserted into the stomach without difficulty. Bilateral lung ventilation was performed through a connector for the double-lumen tube (fig. 1). The right lung was easily deflated during one lung ventilation. The values of arterial blood gas (FI_{O_2} = 1.0) were *p*H 7.382, Pa_{CO_2} 45.5 mmHg, and Pa_{O_2} 362 mmHg during bilateral lung ventilation (peak inspiratory pressure < 20 cm H_2O), and *p*H 7.344, Pa_{CO_2} 45.9 mmHg, and Pa_{O_2} 287.5 mmHg during one lung ventilation (peak inspiratory pressure, < 28 cm H_2O), respectively.

The advantages of this method are as follows: (1) the technique is relatively easy; (2) laryngeal mask airway is fixed at its original position after the patient's position change because of the support of the bronchial tube; (3) the bronchial tube can be inserted into either lung; and (4) deflation of the operative lung can be performed easily. Because gastric distention is possible, the risk of aspiration may be increased, although neither gas nor fluid was aspirated *via* a nasogastric tube in our patient. The bronchial tube also must be pulled back into the trachea if suctioning of the nonventilated lung is needed. The cuffed bronchial tube must be long enough to reach the bronchus and should be 1.0–1.5 mm smaller in ID than an appropriate-sized tracheal tube. This smaller diameter acts in ventilation *via* the trachea. This technique may be useful in pediatric patients who require differential lung ventilation, particularly in thoracic endoscopic surgery.

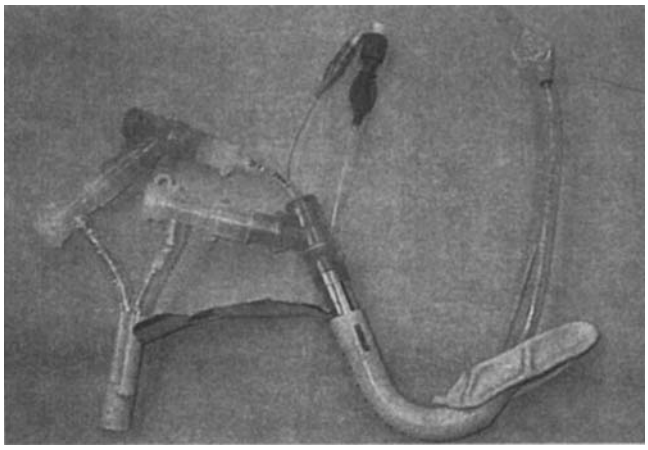

Fig. 1. A handmade lengthened cuffed tracheal MLT tube was inserted through an intubating LMA (Fastrack) connected with a swivel connector. Bilateral lung ventilation was performed through a connector for the double-lumen tube.

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(Accepted for publication February 15, 1999)