EDITORIAL

ONE-LUNG VENTILATION IN CHILDREN USING THE SINGLE-LUMEN TRACHEAL TUBE

In adult patients, one-lung ventilation (OLV) is usually achieved by the double-lumen tubes, the Univent tubes, or by using bronchial blocker combined with a single-lumen tracheal tube. Fiberoptic bronchoscopy is usually used to confirm the proper positioning of the tube or the blocker.

In infants and young children, the available sizes of the double lumen tubes or the Univent tubes do not match the anatomy of this age group. A bronchial blocker combined with a single-lumen tracheal tube may be used. Fiberoptic bronchoscopy is needed to confirm the proper position of the blocker.

In children, it has been shown that the angles of the tracheobronchial bifurcation total approximately 80 degrees; the overall mean of the right bronchial angle is about 30º, while the left bronchial angle is about 50º. This tracheobronchial relationship may explain why the tracheal tube is more likely to enter the more vertical and wider right main stem bronchus than the more obliquely placed and narrower left main stem bronchus[1]. However, Block challenged this conclusion, suggesting that the tracheal tube invariably enters the right bronchus because the bevel of the tube faces the left following insertion, and its tip, therefore, lies to the right of the midline of the trachea[2]. This postulation has been confirmed by Baraka et al in children, who showed that the available left-bevelled tube enters the right main bronchus, while a right-bevelled tube whose tip lies to the left of the midline of the trachea enters the left main stem bronchus. Each child served as his own control, suggesting that the bevel of the tracheal tube, and not the tracheobronchial angle is the principal factor determining the side of bronchial intubation[3].

The simplest technique for one-lung ventilation in infants and young children is to intubate the main stem bronchus of the non-operated lung by the conventional single-lumen tracheal tube. The main stem right bronchus can be readily intubated by the available left beveled tracheal tube. However, it will be difficult to achieve left bronchial intubation without the help of fiberoptic bronchoscopy(deleted). In order to achieve blind left bronchial intubation, many techniques have been suggested such as using a metal stylet to curve the distal end of the tracheal tube to the left[4], or by using a distally curved rubber bougie which is directed blindly to the left bronchus, followed by railroading the tube over the bougie[5].

Other simple techniques have been suggested to align the trachea with the left main stem bronchus. The first suggested technique is to position the child with his left side up, and his head turned to the right[6], so that the mediastinum and gravity may push the left bronchus down to align with the trachea.

A second technique is to rotate the bevel of the tube 180º and the head turn to the right so that the bevel of the tube will shift to the right, while its tip will be on the left of the midline which favors left bronchial intubation[7]. A third simpler technique is to rotate the tube within the trachea

90 degrees counter clock wise so that the curvature of the tube becomes concave to the left side towards the left main stem bronchus[8].

A fourth technique is to manufacture special right-bevelled tubes for left bronchial intubation; the tip of the tube will lie to the left of the midline of the trachea which favors left bronchial intubation[3,9].

In all these techniques, the head and neck of the child are turned to the right which optimizes the alignment of the trachea with the left main stem bronchus. The endotracheal tube is blindly advanced into the bronchus until the breath sounds on the operative side disappear confirming main stem bronchial intubation of the left lung.

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