respect to the lower limit of hypesthesia (Wilcoxon test; fig. 1). According to the radioisotope images, radioisotope distributed to the whole of the pleural space through the apical catheter but did not distribute to the upper level of the pleural space through the basal catheter.

The current study suggests that the spread of intrapleural regional anesthesia is affected both by catheter location in the pleural space and by body position at the time of injection of local anesthetic. Catheters should be inserted toward the apex of the pleural space and local anesthetics should be administered with the patients supine to obtain the best pain relief in the chest.

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Endobronchial Intubation by a Nonbeveled Endotracheal Tube in Infants and Small Children

To the Editor:—Two major opinions exist regarding the primary factor that determines the side of endobronchial intubation, the anatomy of the carina and the tracheal bifurcation, or the side of bevel of the endotracheal tube.

Recently, it was suggested, based on a single case, that a laryngectomy tube with no lateral bevel has an equal chance of advancement to the right or to the left main bronchus. Furthermore, it was claimed that the bevel of the endotracheal tube, and not the tracheobronchial angle, is the important factor determining the side of inadvertent bronchial intubation. However, because I have failed to find prospective studies that investigated the side to which the tip of a nonbeveled endotracheal tube would pass, I have performed such a study.

After institutional and parental approval had been obtained, the investigation was carried out on 60 children, aged 1 month to 3 yr, undergoing inguinal herniorrhaphy during general anesthesia. The distal end of an ordinary Portex endotracheal tube was cut off 90° to the longitudinal axis. The edge was then polished and the tube resterilized. Anesthesia was induced with an inhalational agent, suxamethonium 2.0 mg·kg⁻¹ was given; and the lungs were ventilated using 100% oxygen. While the child was supine with the head and neck in the midline, direct laryngoscopy was performed and orotracheal intubation using the nonbeveled tube was performed. The tracheal position of the tube was verified by chest auscultation. The tube was then blindly pushed down beyond the carina. After the bronchial location of the tip of the tube was verified by chest auscultation, the tube was withdrawn into the trachea. Attention was paid not to rotate the tube during the procedure. In 52 subjects, the tube entered the right main bronchus. In the remaining 8 subjects, the tube entered the left (P < 0.001, chi-square test).

These results suggest that when a nonbeveled endotracheal tube is used, right bronchial intubation is more likely than left. This finding is clinically relevant, because currently a nonbeveled endotracheal tube (Linder Nasotracheal Airway with AIRGUIDE inflatable introducer, Polamedco, Inc., Inglewood, CA) is commercially available.

In conclusion, when the side of the bevel of the endotracheal tube is not a factor, the anatomic feature of the tracheobronchial tree including the angle of the bifurcation determines the side of endobronchial intubation.

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