

increased to 28 cm H₂O, and the surgeon complained that the left lung could not be completely deflated. The position of the DLT was checked again *via* the tracheal lumen. When the fiberoptic bronchoscope was subsequently introduced through the bronchial lumen, it showed the tip occluded by the medial wall of the left main stem bronchus. No attempt was made to reposition the tube. The left lung could be ventilated once the operation had been completed, but unfortunately bronchoscopy was not done after ventilation of the left lung was recommenced.

These two cases illustrate what we feel is a design fault of the left Broncho-cath® DLT in that the endobronchial portion has been cut such that the lumen faces the medial wall of the left main stem bronchus (fig. 1A). We have recently had three other cases similar to case 1 above, and the feature common to all four cases has been the left lateral position of each patient. We postulate that in this position the weight of the right lung and mediastinum exacerbates the problem by pressing the medial wall of the left main stem bronchus against the endobronchial lumen. However, case 2 above demonstrated a similar occlusion when the patient was in the right lateral position.

We would like to suggest to the manufacturer that in the future, tubes should be altered so that the endobronchial lumen faces laterally,

as in the Robertshaw tube (fig. 1B). This design will have additional advantages, in that fiberoptic visualization of the left upper lobe bronchus will be easier and the margin of safety for obstruction of the same bronchus will be increased slightly. The only disadvantage that we can think of is that insertion of a redesigned tube could be slightly more difficult, with the possibility of bronchial wall trauma from the leading edge of the endobronchial tube.

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In Reply:—In a 1983 clinical trial, Burton *et al.* reported a six-fold reduction in frequency of complications when the Mallinckrodt Broncho-Cath® tube was compared with the Robertshaw tube.¹ The tip design of the Robertshaw tube includes a 45° taper, which may account for a number of complications reported by Read *et al.* in 1983,² and by Heiser *et al.* in 1979.³ Indeed, Robertshaw himself notes that "if the tube is pushed too far down, the left upper lobe may become obstructed." And further, that "such obstruction is possible owing to anatomical variations."⁴

The tip of the Mallinckrodt Broncho-Cath® tube has a flatter 63° taper to minimize the risks identified by earlier designs, and faces medially to facilitate bronchial intubation. Over 500,000 successful procedures have been completed with the Mallinckrodt Broncho-Cath® tube over the past 10 yr, and we have received no product complaint reports or related FDA Medical Device Reports during this period regarding occlusion of the tip by the wall of the left main stem bronchus.

Clinical evaluations of new Mallinckrodt designs have been in progress over the past 6 months to test a yet flatter 90° taper, which may be more appropriate for use with fiberoptic guided bronchial intubations. These evaluations contain some of the recommendations identified by Benumof in 1988⁵ to increase the positioning margin of safety and to facilitate entry into the left main stem bronchus. Similar recommendations were raised also by Klippe *et al.* in 1989.⁶

Even these new designs have raised issues such as the potential of bronchial wall trauma caused by the leading edge of the tube. Much work is still required to prove the safety and efficacy of these modifications.

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Markers Other Than Epinephrine To Avoid Intravascular Injection of Local Anesthetic in the Obstetric Patient Require More Study

To the Editor:—The studies of Leighton *et al.* on the epinephrine test dose deserve careful appraisal.¹⁻³ Stating that "epinephrine injection lacked specificity"¹ and citing Cartwright *et al.*⁴ for support is ques-

tionable.⁵ Furthermore, when the 15-μg epinephrine test dose described for a surgical patient⁶ is used in a parturient, the following alterations must be made. When a contraction and the maternal heart rate peak