Letters to the Editor

Undersizing Left Double-Lumen Tubes

To the Editor:

Amar et al.[1] prospectively studied the impact of left double-lumen tube (DLT) size for patients undergoing thoracic surgery. The occurrence of hypoxemia during one-lung ventilation (defined as Spo_2 <88%), failure to isolate the operative lung (attributed to DLT malposition), and/or the need for intraoperative DLT repositioning were the same whether a small or larger DLT was used. Based on these findings, the authors' question a current practice of selecting the largest DLT that will safely fit that patient's bronchus.

Half of the investigators in this study routinely select a small DLT for all patients, however many of the small DLTs may have actually been indicated had the patient's tracheal diameter been measured. Additionally, the authors cannot evaluate how a truly undersized DLT would have performed because patients with "undersized" DLTs and those with anatomically sized DLTs were analyzed together in groups according to height. What can be concluded, however, is that the composite end points occurred with equal frequency for all height groups (approximately 15%–20%). This is not surprising, considering that previous studies have demonstrated a poor correlation of left mainstem bronchial diameter with patient height and gender. Selection based only on height and gender results in an inappropriate sized DLT (either too large or too small) in the majority of patients.[2]

Even with a similar incidence of measured endpoints between groups, the claim that tube size is unimportant is not resolved by the results of this study.

Airway injury from a DLT is devastating, but fortunately very rare. Almost all reports of airway rupture have been associated with small DLTs. A review of this complication found no published instances of tracheo-bronchial injury associated with larger (size 41 Fr) DLTs.[3] Although the higher incidence of major complications with smaller DLTs may be due to their greater popularity, it could also relate to the need for relative cuff hyperinflation necessary with an undersized tube, or even to the natural angulation of the bronchial lumen.[4]

One of the end points of the present study, failure to isolate the lung, could have been due to tube size and not as attributed, to malposition. Even with an ideally positioned tube, which presumably was the norm because all DLTs were positioned with fiberoptic bronchoscopy, 4 mL of air in the bronchial cuff of an undersized DLT in a large bronchus may be insufficient to adequately seal the bronchus.

This could result in "failure to isolate" and collapse the operated lung. It would have been useful had the authors compared the difference in bronchial cuff volume and pressure between undersized and anatomically sized DLTs.

Finally, one very important potential disadvantage of an undersized DLT, not considered in this study, is the issue of airflow resistance. Because of their reduced internal luminal diameters and higher airflow resistance, small DLTs (35 and 37 Fr) are associated with significantly more auto-positive end-expiratory pressure (PEEP) than larger DLTs.[5,6] Many patients undergoing thoracic procedures have obstructive lung disease and selection of a small DLT in these individuals can result in dangerously high levels of auto-PEEP and dynamic pulmonary hyperinflation.[7]

We continue to believe that anesthesiologists should always examine their patients' preoperative chest radiographs or chest computed tomography scans before placing DLTs. Not only will this provide a measure of airway size, it will also alert the physician to distortion or obstruction of the airway that could present a problem with placement of a DLT of any size.

Jens Lohser, MD, FRCPC
Department of Anesthesia
University of British Columbia
Vancouver, British Columbia, Canada
jens.lohser@vch.ca

Jay B. Brodsky, MD
Department of Anesthesia
Stanford University School of Medicine
Stanford, California

Dr. Amar does not wish to reply.

REFERENCES

1. Amar D, Desiderio DP, Heerdt PM, Kolker AC, Thang H, Thaler HT. Practice patterns in choice of left double-lumen tube size for thoracic surgery. Anesth Analg 2008;106:379–83
2. Brodsky JB, Lemmens HJ. Tracheal width and left double-lumen tube size: a formula to estimate left-bronchial width. J Clin Anesth 2005;17:267–70
3. Fitzmaurice BG, Brodsky JB. Airway rupture from double-lumen tubes. J Cardiothorac Vasc Anesth 1999;13:322–9
4. Lohser J, Brodsky JB. Tracheal perforation from double-lumen tubes: size may be important. Anesth Analg 2005;101:1243–4
5. Slinger PD, Lesiuk L. Flow resistances of disposable double-lumen, singlelumen, and univent tubes. J Cardiothorac Vasc Anesth 1998;12:142–4
6. Bardoczky G, d'Hollander A, Yernault JC, Van Meuylem A, Moures JM, Rocmans P. On-line expiratory flow-volume curves during thoracic surgery: occurrence of auto-PEEP. Br J Anaesth 1994;72:25–8
7. Ducros L, Moutafis M, Castelain MH, Liu N, Fischler M. Pulmonary air trapping during two-lung and one-lung ventilation. J Cardiothorac Vasc Anesth 1999;13:35–9

DOI: 10.1213/ane.0b013e318173e788

What Is the Best Choice for Size of Double Lumen Tube?

To the Editor:

Amar et al.[1] successfully demonstrated no difference in either the incidence of hypoxemia, or malposition of double lumen tube (DLT), by routinely using a 35 Fr left DLT, compared with sizing the DLT according to patient height.

Using a larger size DLT will lessen the chance of a distal migration, resulting in a malposition and possible hypoxemia. However, if FOB is used, both of these problems can easily be