ANESTHESIA FOR THORACIC SURGERY: PART I—DOUBLE-LUMEN TUBE INTUBATION

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INTRODUCTION

Double-lumen tube intubation is the method of choice of separating the two lungs to facilitate the performance of thoracic surgery in the vast majority of cases. Proper insertion and positioning of the double-lumen tube is often the most important determinant as to whether these cases [in particular one-lung ventilation (1LV) cases] proceed smoothly. If the double-lumen tube is in the right position, the nondependent lung will collapse completely and easily, the surgeon will be able to work efficiently without damaging the nondependent lung, and the dependent lung will be unobstructed and easy to ventilate. This lecture discusses the proper insertion and positioning of double-lumen tubes.

CORRECT POSITIONING OF DOUBLE-LUMEN TUBE: CONVENTIONAL AND FIBEROPTIC BRONCHOSCOPY TECHNIQUES (1)

When surgery is performed on the right lung a left-sided double-lumen tube (DLT) is used (Figure 1). When surgery of the left lung is performed (Figure 1), either a left- or right-sided DLT may be used. However, since the margin of safety in positioning a right-sided tube is much less than for a left-sided tube, use of a right-sided DLT for left lung surgery introduces the risk of inadequate ventilation of the right upper lobe (RUL) if the RUL ventilation slot is not closely opposed to the RUL orifice (Figure 2, middle and bottom panels).(2) To avoid this complication, I use a left-sided DLT for all cases requiring 1LV. If clamping of the left mainstem bronchus is necessary, the DLT can be withdrawn at that time (after deflating the cuffs) into the trachea and then used as a single-lumen tube (deflate only the left lumen cuff and use both of the lumens to ventilate the right lung) (Figure 1). A right-side DLT is indicated only when a left-sided DLT is contraindicated, such as when there is a large exophytic lesion in the left mainstem bronchus or there is a tight left mainstem bronchus stenosis. Clear, nontoxic plastic, low pressure cuff, disposable Robertshaw type DLT should be used.

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Right Lung Surgery and Left-Sided Double Lumen Tube

Left Lung Surgery and Right-Sided Double-Lumen Tube Pulled Back

**FIGURE 1.** Reproduced with permission from Reference #1.

![Diagram of double-lumen tubes for lung surgery](image)

Figure 9.8. Use of left-sided and right-sided double-lumen tubes for left and right lung surgery (as indicated by the clamps). When surgery is going to be performed on the right lung, a left-sided double-lumen tube should be used (A). When surgery is going to be performed on the left lung, a right-sided double-lumen tube can be used (B). However, because of uncertainty as to the alignment of the right upper lobe ventilation slot to the right upper lobe orifice, a left-sided double-lumen tube can also be used for left lung surgery (C). If the left lung surgery requires a clamp to be placed high on the left mainstem bronchus, the left endobronchial cuff should be deflated, the left-sided double-lumen tube pulled back into the trachea, and the right lung ventilated through both of the lumens (use the double-lumen tube as a single-lumen tube).

**FIGURE 2.** Reproduced with permission from Reference #2.

![Diagram of double-lumen tube positions](image)

*Fig. 1.* This schematic shows the definitions of most proximal and most distal acceptable positions of left- and right-sided double-lumen tubes and the margin of safety in positioning these double-lumen tubes. Top panel = all left-sided double-lumen tubes; middle panel = Mallinkrodt right-sided double-lumen tube; bottom panel = Rusch right-sided double-lumen tube; LMS = length left mainstem bronchus; RMS = length right mainstem bronchus; MS = margin of safety in positioning double-lumen tube; LUL = left upper lobe; RUL = right upper lobe.