

Modified and Newly Designed Right-sided Double-lumen Endobronchial Tubes Are Complementary

To the Editor:—We read with great interest the case report¹ on the application of a newly designed right-sided, double-lumen endobronchial tube (R-DLT) in patients with a very short right mainstem bronchus.

However, in citing our work² on the improvement of the endobronchial positioning of the R-DLT, Hagihira *et al.* stated that we modified the design of the bronchial cuff and that these changes seem to offer little improvement. This statement is inconsistent with our published manuscript which demonstrates, on a randomized series of 80 patients, that the modified enlarged area of the lateral orifice (and not the bronchial cuff as stated by Hagihira *et al.*) improve the success rate of final positioning from 74 to 97% with a $P < 0.0109$. These two new versions of the R-DLT are not intended to solve the same problem, but the final objective, improvement of the use of R-DLT, is similar.

The reported modification of a right-sided double lumen tube is the object of patent applications 11/950,832 in the United States, 2,610,933 in Canada, and 06761048.5 in Europe, filed by University Laval on behalf of Jean Bussi eres, M.D.

In Reply:—We appreciate the comments by Fishler and Lalo e regarding our article.¹ Their remarks are important to evaluate the dimensions of the tracheobronchial tree. To choose the double-lumen tube (DLT) size, the diameter of the mainstem bronchus and the diameter of the trachea are important. Usually, the ratio of occipito-frontal diameter and transverse diameter is within 0.9 to 1.1. However, in some patients, its ratio is beyond this range. In such cases, measurement using three-dimensional reconstructed images would be ideal, but it would not always be available. In that case occipitofrontal diameter in computed tomographic images would be the next choice. Brodsky *et al.*² reported that the width of the trachea and the width of the left mainstem bronchus were closely correlated. Considering this, selecting the DLT size by the diameter of the trachea would be the third choice.

In our article we discussed the availability of a right-sided DLT. From this point of view, the length rather than the diameter of the right mainstem bronchus was important. As compared with the diameter, the length of right mainstem bronchus could be accurately measured from an x-ray image. The ratio of magnification can be calculated by the width of the endotracheal tube on the x-ray image and real tube width. Thus, our method was adequate for our purpose.

In our routine practice, we carefully examine the computed tomographic image as well as the x-ray image, and then we decide the type and the size of DLT in each patient, considering the side and the type of operation. Careful preoperative image examination is essential for thoracic anesthesia.

We thank Dr. Bussi eres *et al.* for having an interest in our article¹ and for providing comments on the modification of the bronchial tip of the right-sided DLT.³

Some anesthesiologists seemed to consider that fiberoptic bronchoscopy (FOB) was best for examining the adequacy of the DLT's positioning. Of course, FOB is most useful in positioning the DLT; however, we thought that the adequacy of the DLT's positioning should be confirmed by quality of ventilation. If we could adequately ventilate the lung (each lobe), the tube's position should be considered to be adequate. Here we illustrate the most distal acceptable position (fig. 1A) and the most proximal

We thank Dr. Hagihira for this interesting case report. While this new R-DLT may become a useful tool for thoracic anesthesiologists, we would first encourage them to validate its use with a randomized study.

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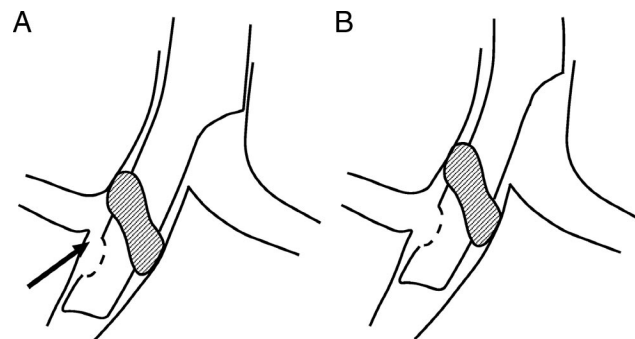


Fig. 1. Scheme for the most distal acceptable position (A) and the most proximal acceptable position (B) of a right-sided double-lumen tube, as defined by Benumof *et al.*³ The arrow indicates the space between the wall of the bronchial tip and the bronchial wall.

imal acceptable position (fig. 1B) of the right-sided DLT as defined by Benumof *et al.*⁴ In figure 1A, the ventilation slot seemed to be blocked by the bronchial wall. However, when we selected an adequate size of DLT, namely the diameter of the bronchial tip was smaller than the diameter of the bronchus in some extent, air could flow from/to the right upper lobe through the space between the bronchial wall and the bronchial tip of DLT (indicated by the arrow). As a result, we could probably ventilate the right upper lobe through this space. Of course the modification of the bronchial tip by Bussi eres *et al.*³ could increase the visibility of the orifice of the right upper bronchus through FOB, which would have an advantage for anesthesiologists. But their modification would not alter the most distal acceptable position of the right-sided DLT. Similarly, it would not alter the most proximal acceptable position either. The positions are only determined by the length of the right mainstem bronchus and the length of the bronchial cuff, with the conventional concept of definition for positioning the DLT by Benumof *et al.*⁴ Finally, we stated that their modification seems to offer little improvement in positioning and applicability of a right-sided DLT.