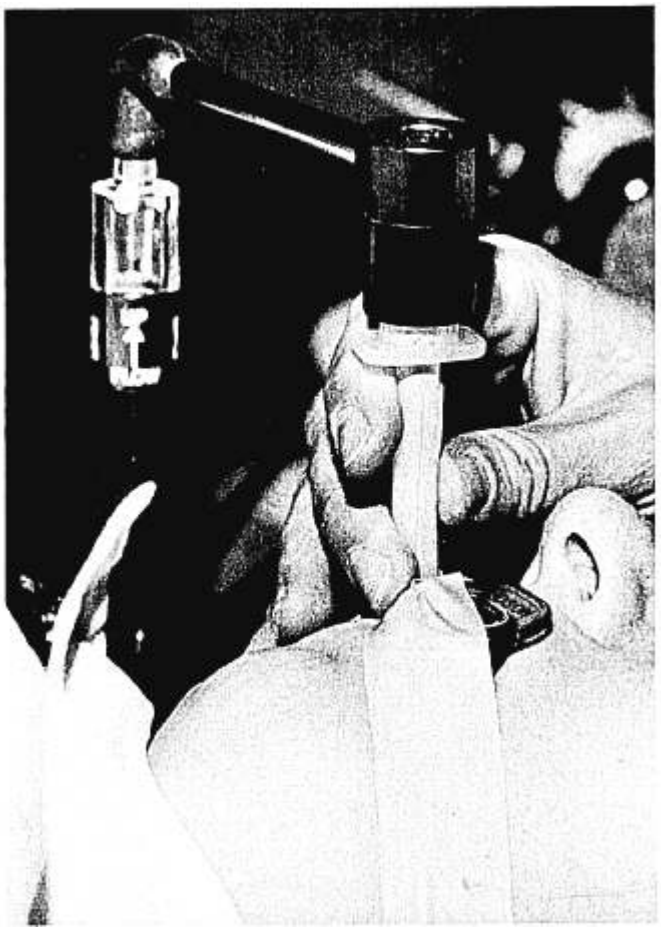

FIG. 1. The inspiratory force indicator attached on endotracheal tube.

A/S, Denmark. It consists of an open airway connector, a tubular resistor, an elbow connector, and a transparent chamber containing an indicator-ball (fig. 1). The tubular resistor and ball were calibrated to result in upward movement of the ball at a pressure of -18 cmH_2O or lower, when the airway connector is attached on the endotracheal tube and occluded at the end of expiration. The calibration was performed at an airflow of 15 l/min.

The inspiratory force indicator does not measure the inspiratory pressure but only indicates whether the patient is able to generate an inspiratory pressure below -18 cmH_2O or not. The value of -18 cmH_2O was chosen arbitrarily as the guideline for extubation of patients after general anesthesia. A lower inspiratory pressure should be required as one of the guidelines for discontinuation of mechanical ventilation in patients with pulmonary insufficiency.[3]

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(Accepted for publication December 6, 1984.)

Anesthesiology
62:696–697, 1985

Alteration of Double-lumen Endobronchial Tube Position by Flexion and Extension of the Neck

To The Editor:—Several problems concerning the clinical use of a double-lumen endobronchial tube (DLEBT) have been discussed in recent issues of ANESTHESIOLOGY.[1,2] Since it is well known that flexion and extension of the neck in intubated patients can cause considerable movement of an endotracheal tube[3] and since the distance from carina to the right or left upper lobe bronchus is short, movement of the DLEBT, if any, could be crucial.[1,2,4,5] Therefore, we examined the alteration of the DLEBT position accompanying flexion and extension of the neck.

Thirteen patients (table 1) undergoing lobectomy or pneumonectomy were studied before surgery. For all patients, a DLEBT (NCC Broncho-Cath® Left, Fr #37 or 39) was inserted into the trachea under general anesthesia. Correct position of the DLEBT was determined by auscultation while clamping each lumen with the patient, supine and the head in a neutral position. We also used a bronchoscope (BF 3C3, 4.5 mm in O.D Olimpus), inserted through the tracheal port of the DLEBT, to observe the location of the right main bronchus, and to confirm the position of the radioopaque

TABLE 1. The Results of Thirteen Patients

	Age (yr)	Weight (kg)	Height (cm)	Distance From Carina to LUL Bronchus (mm)	Movement of Proximal Tip (mm)	Movement of Distal Tip (mm)
Mean ± 1 SD	60 ± 14	50 ± 7	159 ± 8	56 ± 4	28 ± 6	27 ± 6
Ranges	29–76	38–59	147–175	50–65	10–35	15–35

line encircling the tube at 4 cm from the distal tip (black in color) in the carina and the inflated bronchial cuff (blue in color) in the left main bronchus. We defined this position of the DLEBT as the neutral position. Two anterior–posterior chest x-rays then were taken in each patient, one with the neck flexed, another with the neck extended.

The position of the three radioopaque marks (distal tip, encircling line, and tracheal tip) were compared, by measuring the distance between each mark in the two chest x-rays. In all patients, flexion of the neck caused the DLEBT to move distally, while extension of the neck caused it to move orally. The results are summarized in table 1. There was no correlation between the height of the patient and the distance the DLEBT moved. There were two potential complications: in one patient extension of the neck almost caused the bronchial cuff to move out from the left main bronchus, in another flexion of the neck almost caused obstruction of the left upper lobe bronchus. Both were confirmed by bronchoscopy.

Our observations clearly indicate movement of the DLEBT in the trachea and bronchus with flexion and extension of the patient's neck. Since the distance from the carina to the left upper lobe orifice ranged from 50 to 65 mm, motion of the head could cause malposition of the bronchial port of the DLEBT with either inadvertent extubation or obstruction of the left upper lobe. Therefore, whenever the patient is repositioned, we recommend that the position of the DLEBT be rechecked by auscultation, bronchoscopy, and/or roentogenography.

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(Accepted for publication December 10, 1984.)

Anesthesiology
62:697–698, 1985

Are Seizures Caused by Nitrous Oxide or Isoflurane?

To the Editor:—Drs. Poulton and Ellingson have described a patient who developed both clinical and electroencephalographic evidence of seizure activity on induction of anesthesia with isoflurane and nitrous oxide.[1] The seizure was attributed to isoflurane. The investigators considered that nitrous oxide did not contribute to the phenomenon observed.

I believe the possibility of an effect from nitrous oxide should not be discounted. The finding that the convulsive activity appeared with induction of anesthesia