A NEW DOUBLE LUMEN TUBE

BY

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The value of the double lumen tube in anaesthesia for thoracic surgery has become more widely appreciated in recent years. Besides being more stable than single lumen endobronchial tubes and bronchial blockers, it permits differential pulmonary ventilation.

The best example of such a tube is the Carlens catheter (Bjork and Carlens, 1950) which was designed to intubate the left main bronchus. This can be used for operations on both lungs, but where it is necessary to amputate the left main bronchus close to the carina, the tube must first be partly withdrawn into the trachea. Difficulty in ventilation is often encountered after this manoeuvre, and is probably due to the orifice of the right tube being brought into apposition with the side wall of the trachea.

This difficulty has been overcome by a new double lumen tube (figs. 1, 2 and 3) designed for blind right endobronchial intubation. It is made from rubber, moulded to the shape of the right main bronchus, trachea and orotracheal airway. Each tube has a D-shaped section in the tracheal part, the left one terminating just above the carina, while the right one is continued as an endobronchial tube. A small rubber hook situated just below the orifice of the left tube, is designed to engage the carina to ensure correct
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positioning of the tube and to provide stability. Bronchial and tracheal inflatable cuffs are incorporated to provide an airtight and watertight seal with the trachea and bronchus. The conduit tubes to the cuffs are differentiated by their colour, red being for the bronchial cuff and white for the tracheal one. The bronchial cuff has a slit which communicates with the lumen of the tube, and when the tube is in position this slit is in apposition with the orifice of the right upper lobe bronchus, thus permitting ventilation of the right upper lobe. This cuff is a modification of the original one designed by Green and Gordon (Green and Gordon, 1955).

Before the tube is introduced, bronchoscopy is performed in order to confirm anatomical normality of the right main bronchus and orifice of the right upper lobe bronchus. With the aid of a laryngoscope, the endobronchial part of the tube is introduced into the glottis, and at this stage the oral part of the tube is pointing to the left of the patient, while the carinal hook is above the posterior part of the glottis. The tube is then rotated clockwise through little more than half a circle, i.e. about 200°, so that the carinal hook now lies in the anterior part of the glottis where its passage between the cords is permitted. The tube is then rotated anticlockwise through a quarter-circle, so that the endobronchial tube is now pointing to the right. This ensures intubation of the right main bronchus when the tube is advanced further and a definite end point is reached when the carinal hook engages the carina. Once in position, the tube is firmly secured with bandage or adhesive strapping. Before inflating the cuffs, a two-way union (Salt and White, 1959) is connected to the tube and the lungs ventilated. This union merely provides quick and easy control of the gas flow to each lung together with facilities for suction. The bronchial cuff is gently inflated until no escape can be heard when the right lung is ventilated. Similarly, the tracheal cuff is then inflated until no escape can be heard when the left lung is ventilated.

The position of the tube is now confirmed by auscultation over the lung fields, while controlled ventilation is carried out. Each lung field is auscultated with the corresponding tube first open then closed, and breath sounds on one side should be completely absent when the corresponding tube is closed and vice versa. Breath sounds heard over the right upper lobe area, with the right tube open, confirm correct apposition of the slit cuff with the orifice of the right upper lobe bronchus. These findings confirm that the tube is positioned satisfactorily.

Since the greater length of each tube has a D-shaped cross-section, the passage of a rubber suction catheter sometimes proves difficult, but a lubricated polythene catheter passes easily. The tube is made from mineralized rubber, and may be sterilized by boiling.

Flow resistance measurements in millimetres water can be obtained from the accompanying table, and a comparison with those of a No. 8 Magill endotracheal tube can be made.

A trial with the prototype proved that satisfactory function of the tube was dependent on

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**Table 1**

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<th>Flow resistances in millimetres water.</th>
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<td>Litres/min</td>
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<tr>
<td><strong>Double lumen tube, Size F.G. 39.</strong></td>
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<tr>
<td>Both tubes</td>
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<tr>
<td>Right tube</td>
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<tr>
<td>Left tube</td>
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<tr>
<td><strong>Magill endotracheal tube, size no. 8, length 31 cm</strong></td>
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Flow resistance measurements in millimetres water can be obtained from the accompanying table, and a comparison with those of a No. 8 Magill endotracheal tube can be made.

A trial with the prototype proved that satisfactory function of the tube was dependent on
confirmation by bronchoscopy, before intubation, of a normal anatomical relationship between the right main bronchus, right upper lobe bronchial orifice and carina. The present tube has been used in more than thirty patients undergoing thoracic surgery and function was satisfactory in every case.

The tube is manufactured by Willy Rusch of Stuttgart, and is made in three sizes, F.G. 37, 39, and 41. It is obtainable in this country from, Genito-Urinary Co., Ltd., London.

ACKNOWLEDGMENT
I am indebted to Dr. H. G. Epstein of the Nuffield Department of Anaesthetics, Oxford, for carrying out the flow rate resistance measurements.

REFERENCES

CORRESPONDENCE
THE FIRST ADMINISTRATION OF CHLOROFORM

Sir,—In his interesting article on “The Evolution of Anaesthesia” (Brit. J. Anaesth., 1960, 32, 141) Dr. Armstrong Davison repeats the story which until recently was believed to be true, that Simpson was the first person to administer chloroform for surgical anaesthesia at some date between November 4 and November 8, 1847.

I think that it must now be regarded as proved beyond reasonable doubt that Mr. Holmes Coote gave chloroform in the form of “chloric ether” (i.e. mixed with alcohol) to a patient of Mr. (later Sir William) Lawrence for a surgical operation at St. Bartholomew’s Hospital in the spring of 1847 at the suggestion of Mr. M. C. Furnell, an Army surgeon.

The priority of London over Edinburgh (in this matter only, of course) was hinted at in Dr. Barbara Duncum’s book The Development of Inhalation Anaesthesia published in 1947, but has now been investigated fully and confirmed by Dr. Stanley Sykes in his recently published Essays on the first hundred years of Anaesthesia, Vol. I, p. 164.

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