A CUFFED ENDOTRACHEAL TUBE WITH AN INCORPORATED ENDOBRONCHIAL BLOCKER

The problem of excessive tracheobronchial secretions during anesthesia must be dealt with in "wet" thoracic cases. Instances have been reported in which patients literally have drowned in their own secretions during operation. Major post-operative complications may be caused by spilling-over of highly infectious material into previously healthy parts of the lung. The solution to this problem has been sought in several ways. Positioning the patient to confine the secretions to the dependent parts of the lung has been practiced by Overholt (1). Both Endobronchial intubation (2) and bronchial tamponade (3) are designed to prevent infectious material from entering healthier parts of the lung. Occlusion of bronchi with aspiration-types of bronchial blockers (4) has the additional advantage of allowing evacuation of secretions from the affected parts by constant suction.

The proper placement of a bronchial blocker can be technically difficult. The blocker can be inserted blindly, or under fluoroscopic guidance during bronchoscopy. A second exposure of the larynx is necessary to insert an endotracheal tube. Moreover, only a tube of comparatively small bore can be placed in the trachea without trauma to the larynx. In addition, the blocker may be dislodged during intubation of the trachea or positioning of the patient. Finally, with the blocker separate from the endotracheal tube, an air-tight fit after inflation of the tracheal cuff often may not be obtained.

It is the purpose of this presentation to describe an endotracheal tube in which an endobronchial blocker (fig. 1), devised by Stuertzheber, is incorporated, which can be used to solve some of the problems outlined. This tube is manufactured in a number of sizes (French 34, 36, 38, 40 and 42) and in two lengths.* For pneumonectomies in which only the main stem bronchus need be occluded, the bronchial blocker extends 7 cm. beyond the end of the endotracheal tube. When lobectomy or segmental resection is planned, the bronchial blocker extends 9 cm. beyond the end of the tube for deeper endobronchial occlusion. The outer surface of the blocker is coated roughly with rubber to prevent accidental dislodgement. An olive shaped metal tip on the blocker insures an opening for suction and allows fluoroscopic identification. Three rubber tubes lead from the proximal end of the endotracheal tube. The first, with a small pilot balloon, leads to the inflatable endotracheal cuff. The second, with a large pilot balloon, permits inflation of the blocker. The third tube is intended for suction and aspiration of secretions through the blocker. Aspiration of the trachea can be accomplished in the usual way through the lumen of the endotracheal tube.

Before intubation, a curved wire stilet is inserted into the suction tube to give direction and stiffness to the otherwise limp blocker. Intubation is performed by inserting the endotracheal tube with the blocker foremost through the glottis under direct laryngoscopy. The main stem bronchus selected is then blindly intubated by advancing and rotating the proximal end of the endotracheal tube either to the right or left. This enables the blocker to slide along the lateral tracheal wall and to fall into the desired bronchus. After intubation of the bronchus the blocker is inflated and the stilet removed. Proper positioning of the blocker can be confirmed by fluoroscopy, auscultation or differential inflation of the lungs. If gas escapes from the suction tube leading to the blocker after positive pressure respiration has been started, the bronchus has not been completely blocked off. Gentle pressure on the large pilot balloon will distend the blocker further until complete occlusion has been obtained.

The advantages of this endotracheal tube are as follows:

1. For intubation of the trachea and blockage of a bronchus only one exposure of the larynx is required and placement of the blocker is easily accomplished.

*The tube can be obtained from the American Bich Corporation, 794 Lincoln Place, Brooklyn 16, New York.
FIG. 1. Diagram of cuffed endotracheal tube with incorporated endobronchial blocker. 1. Endobronchial blocker. 2. Endotracheal tube. 3a. Tube intended for suction through blocker. 3b. Tube for inflation of the blocker. 3c. Large pilot balloon leading to blocker.

2. An air-tight occlusion of the trachea can be obtained and a maximal degree of gas exchange can be maintained through the wide bore of the tube.

3. The metal tip of the blocker facilitates fluoroscopic localization and a patent tip through which suction can be carried out.

4. Either the entire lung or lobes to be resected can be isolated from normal tissues and secretions can be constantly aspirated without interfering with ventilation of the remaining pulmonary tissues. At the surgeon's request, the blocked off parts can be inflated or collapsed, thus facilitating identification and dissection.

5. A bronchus can be closed after resection without previously applying clamps.

Possible disadvantages are:

1. Failure to intubate the desired bronchus may result if there is stenosis, occlusion of the lumen or distortion and displacement of the carina. These abnormalities, however, usually are recognized at preliminary bronchoscopy or in the roentgenogram.

2. Occasionally the blocker will project too far into a bronchus to permit satisfactory closure of the bronchus. In this case the surgeon may have to invert the blocker into the trachea or the endotracheal tube may have to be withdrawn toward the glottis.

REFERENCES


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