DISCUSSION

The cat was selected for this study because the volume of the middle ear cavity is large, approximating the human middle ear, and the tympanic bulla affords a convenient site for sampling gas and making pressure measurements. The middle ear represents a closed air space which can be vented from time to time when the eustachian tube is opened. In deeply anesthetized animals, we have observed that the pressure in the middle ear tends to be low and the eustachian tube remains closed. When nitrous oxide is inhaled, the pressure slowly rises to overcome the passive resistance of the eustachian tube. In our cats there was no evidence of rupture of the tympanic membrane, presumably because the Eustachian tube opened before sufficient pressure to cause a perforation developed. It seems possible that nitrous oxide inhalation, with its resultant rise in middle ear pressure, might be partly responsible for tympanic perforation, hemotympanum and serous otitis media as sequela of general anesthesia, particularly in patients with swelling or proliferation of mucous membranes which interfere with normal function of the eustachian tube.

The technical assistance of Richard T. Leung is gratefully acknowledged.

REFERENCES

A New Double Lumen Endobronchial Tube Connector

JOHN F. VIJJOEN, M.D., F.F.A.R.C.S.*

A connector† which was developed for use with a double lumen endobronchial tube has the following advantages: (1) It is uncomplicated in design, simple to operate, and easy to manufacture. (2) Using only one maneuver: a) it shuts off one lung from the ventilatory source; b) it enables this isolated lung to collapse freely to the atmosphere; c) without any further intervention, it allows the passage of a suction catheter, a catheter for oxygen insufflation, or selective ventilation; whichever is indicated by clinical circumstances, or individual preference of the anesthesiologist. (3) Being made of plexiglass, one is able to see whether or not it is properly adjusted. (4) The connector may be used for "one lung" anesthesia or in bronchopneumography.

* Director of Thoracic Anesthesia, Cleveland Clinic, Cleveland, Ohio.
† Available from Jones Medical Instrument Co., Chicago.

DESCRIPTION

The connector (fig. 1) consists of two slightly modified plexiglass discs held in tight apposition by a nut, bolt, and spring washer. The discs rotate easily upon one another, and yet are not so loosely approximated as to allow leakage of gases. The first disc is perforated by two holes, into which fit the metal ends for attaching to the double lumen endobronchial tube. In the second disc three holes are cut—one large hole and a small one on either side of it. The large hole is of sufficient size so that when opposite to the small holes in the first disc, it overlies both of them. The smaller holes are the same size as those in the first disc. Surmounting this large hole is a plexiglass funnel, the free end of which fits directly into the anesthetic machine or ventilator delivery tubing. By simply rotating the second disc upon the first, the large hole is opposite only one of the small holes in the first disc, i.e., opposite that lung which
is to be ventilated. Simultaneously the small hole in the second disc comes to lie opposite its counterpart allowing passage of catheters, etc. On the circumference of the connector there is a simple stop mechanism for each of the three positions. The connector has been used with the Carlen's and Bryce-Smith tubes in 32 cases, comprising lobectomies, right pneumonectomies and hiatus hernia repairs, and has been entirely satisfactory.

The virtue of this connector lies in its simplicity and ease of operation. The transition from normal to "one lung" ventilation can be made with minimal disturbance. The passage of catheters into the collapsed lung will produce no interruption in the continuity of the anesthesia. The only theoretical objection is gas turbulence between the funnel and smaller holes. This could be overcome if so desired.

![Fig. 1. Connector assembled and attached to double lumen endobronchial tube.](image)

by further streamlining the interior of the funnel.

**A Bailing Device for the Automatic Removal of Condensate from Breathing Tubes**

Meyer Saklad, M.D., David Wickliff, David Eubanks, B.S.

Fluid accumulates in the breathing tubes of ventilators. The source of the fluid is two-fold; the cooling of humidified gases from the patient's lungs, and from humidifiers, heated and ultrasonic. If the fluid collects in sufficient amounts, air flow may be interfered with. Because of this water traps have been placed in the breathing channel. For the most part, such traps have not been completely satisfactory for the following reasons:

1. They are not placed in the lowermost part of the breathing channel.
2. They may overflow.
3. They cannot be emptied without interfering with ventilator function.

An automatic bailing device was, therefore, designed to be inserted in the lowermost part of the breathing tubes. The apparatus consists of a plastic chamber which is in com-

![Figure 1.](image)

![Figure 2.](image)