A NEW COMPLICATION OF FLEXOMETALIC ENDOTRACHEAL TUBES

Sir,—We have recently encountered a new complication associated with the use of a flexometallic endotracheal tube. An adult patient underwent surgery for the excision of a thyroid mass. There was no tracheal deviation, no retrosternal extension of the mass and no compression of the trachea. Anaesthesia was induced with thiopentone 275 mg and, following the administration of suxamethonium 100 mg, the trachea was intubated easily at the first attempt with a reinforced flexometallic endotracheal tube. The chest was seen to expand with inflation, but after the cuff was inflated with 8 ml of air the patient could not be ventilated. When the cuff was deflated, ventilation of the patient was possible but when the cuff was reinflated, total airway obstruction occurred. The endotracheal tube was removed and replaced by another flexometallic tube and a subtotal thyroidectomy was performed as planned. The patient made an uneventful recovery.

Testing of equipment is a prerequisite for safe anaesthesia. The faulty endotracheal tube was tested before use by submerging the cuff in sterile water. The tube had no visible defects and the cuff was intact. The defect, which became serious only during use, was an aneurysmal dilatation of the balloon inflating tube at the proximal end of the tracheal tube (fig. 1).

![Diagram](image)

**FIG. 1.** A. Cross-section of a red rubber tracheal tube. The inflating tube is constructed in the wall of the tracheal tube. B. Cross-section of a latex reinforced tracheal tube. The pilot inflating tube is within the lumen of the tube. C. Cross-section of latex reinforced tracheal tube illustrating site of proximal aneurysm of inflating tube which caused the airway obstruction.

Problems with reinforced latex cuffed endotracheal tubes are associated often with the method of construction in layers. The latex may split into these layers and this may cause failure of deflation of the balloon as a result of the trapping of air in the false layers of latex (Davies, 1963). Air in false tracks may result also in distal obstruction of the tracheal tube by balloon herniation over the distal orifice of the tube at the bevel (Kohli and Manku, 1966). Contact with trichloroethylene and ether may aggravate layer separation (Burns, 1956).

Latex allows greater flexibility of the tube than does red rubber, but it is more susceptible to deformity on inflation. This may be manifest as an aneurysmal dilatation of the cuff with subsequent airway obstruction (Cohen and Dillon, 1972; Mirakhur, 1974). The lower modulus of elasticity of latex rubber in comparison with red rubber results also in easier compression of latex. Compression of inflating tubes by the distal end of endotracheal tube connectors has been reported (Birkhan and Heifetz, 1965; Heddon, Smith and Torpey, 1972; Dunn, 1975).

Flexibility of reinforced endotracheal tubes is achieved by means of a thin wall, and a strong reinforcing material such as a wire or cloth spiral. Although stronger materials are available they are not suitable for use in endotracheal tubes, as determined by the American National Standards Institute (American National Standard for tracheal tube and cuffs, Z79.1, 1974). At present there are no standards set for flexometallic endotracheal tubes.

References


British Standards for Endotracheal Tubes

Sir,—We write to express our concern about the proposed new British Standard relating to endotracheal tubes (B.S. 3487) which incorporates the draft recommendations of the International Standard ISO TC 121. The draft specification for B.S. 3487 is currently available for public comment.

Although this recommendation has not yet been adopted by the British Standards Institute, certain major British manufacturers of endotracheal tubes have already started to manufacture to the new draft standard. Thus the manufacture of new tubes has commenced without the information being made available to anaesthetists and, we feel, without adequate consultation throughout the specialty. As far as we can ascertain, no anaesthetist in the Glasgow area was aware of the impending changes in tube design and our first awareness of the problem was when a batch of