AIRWAY OBSTRUCTION WITH CUFFED ARMoured TRACHEAL TUBES

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LATEX armoured endotracheal tubes are commonly used for patients in unusual postures or when unusual flexion or extension of the neck is required, the aim being to provide a non-kinking airway. These tubes are quite soft in general and more so at the non-armoured portions at the proximal and distal ends and at the thin cuff. These are the places where these tubes can kink. The kinking at the proximal end can be minimized by inserting the tube connector up to the first spiral or even beyond it, if possible without damaging the spirals. Many times even if the kinking occurs here it is visible and correctable but could still be inconvenient if the head of the patient is inaccessible as in operations around the head and neck.

The distal bevelled end, however, is out of sight and kinking can occur if this end impinges on the carina, giving rise to respiratory obstruction. Aneurysmal or uneven dilatation of the cuff can lead to eccentric displacement of the tracheal tube, resulting in respiratory obstruction.

Recently while administering anaesthetics for two intracranial operations using the latex armoured endotracheal tubes I encountered severe respiratory obstruction. After checking the whole system, when no cause could be found it was presumed that the cuff had probably herniated in front of the opening of the tracheal tube and on both the occasions the cuff was deflated. This resulted in complete relief of the obstruction. The anaesthetic was maintained uneventfully in both cases with the cuff deflated and using higher gas flows. After extubation the tubes were tested in a glass tube. It was found that an uneven inflation of the cuffs caused the bevelled ends to impinge against the wall of the tube and this must have been happening in the trachea (Figure 1). Subsequent deflation allowed the bevel to recede from the wall of the trachea.

DISCUSSION

Obstruction is possible at the proximal end of the latex armoured tubes but a connector passed up to or over the first spiral can obviate this risk. Other causes of obstruction while using such tubes can be blistering of the tubes or the cuff wall and other allied causes.¹⁻⁵ Sometimes deformation of the wire spiral following biting can be the cause.⁶ Obstruction using the latex armoured cuffed tubes was reported by Cohen and Dillon⁷ in four cases and the aneurysmal dilatation of the cuff and impingement of the bevelled end against the tracheal wall was

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FIGURE 1.

responsible in three of them. Hedden and his colleagues⁸ also reported a patient who had complete respiratory obstruction due to the end of the tracheal tube being forced against the lateral tracheal wall by an eccentrically inflating cuff, among other factors.

There was no doubt that the cause of obstruction in our cases was the aneurysmal dilatation of the cuff and impingement on the tracheal wall, as it could be reproduced experimentally. One cannot, however, rule out the bending of the tip against the carina. As suggested earlier by Cohen and Dillon⁷ the tip of the tube should be shortened and a well pleated cuff should be permanently attached to the wall of the tube. The situation is not serious if the obstruction is detected early. In our cases the early detection was aided by the fact that both patients were on controlled respiration and increased resistance could be detected in the reservoir bag.

It is suggested that the tubes be checked carefully before use. Apart from making the cuffs well pleated, it is also suggested that the tips of these tubes be made shorter and, if possible, stiffer.

SUMMARY

Respiratory obstruction associated with the use of cuffed armoured tracheal tubes is reported in two cases. The cause of the obstruction was an uneven

(aneurysmal) dilatation of the cuff which led to the impingement of the distal end of the tube against the tracheal wall. This obstruction was relieved by deflation of the cuffs. Short and stiff tips and well pleated cuffs are suggested for these soft tubes. Careful examination of the tubes before use is stressed.

RÉSUMÉ

On rapporte deux cas d'obstruction respiratoire associés à l'usage de tubes endotrachéaux armés munis d'un ballonnet. L'obstruction était produite par une dilatation anévrysmale du ballonnet qui comprimait l'extrémité distale du tube endotrachéal contre la paroi trachéale. Cette obstruction fut levée en dégonflant le ballonnet. On suggère d'utiliser des tubes à extrémités courtes et fermes et munis d'un ballonnet adéquat. Il est impérieux de procéder à un examen minutieux des tubes avant de s'en servir.

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