

VENTILATION DIFFICULTY DUE TO HERNIATION OF INFLATING TUBE OF THE CUFF INSIDE THE ENDOTRACHEAL TUBE**

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The complications due to airway equipments remain to be one of the most challenging situations for the anesthesiologists. Any part of an endotracheal tube may cause a risk when it leads to an obstruction in the airway. Here, we present an increased airway pressure due to herniation of inflating tube of the cuff inside an armored (wire reinforced) endotracheal tube during neurosurgery in prone position.

A 34 years old, female patient was scheduled for 6th thoracic vertebraectomy and bilateral transpedicular fixation after vertebrae fracture and dislocation. The patient was intubated uneventfully with an armored tube (I.D. 7.5 mm, O.D. 17 mm, Mallinckrodt, St. Louis, USA). The tube level was checked by auscultation and taped at 19 cm. The initial airway pressure was between 14 - 16 cm H₂O with a tidal volume of 450 ml and 11 breaths/min. The anesthesia was maintained by isoflurane and nitrous oxide/O₂ (50%/50%). The endotracheal tube checked again for an unintentional malpositioning of the tube after prone positioning and confirmed by auscultation and airway pressure which remained between 18 and 20 cm H₂O. After two hours, air leakage was suspected from the tube and the cuff was inflated with 1 ml of air and the leakage was ended. Airway pressure started to rise during rod placement after transpedicular screws insertion at the 3rd hour, and the neurosurgeons were informed about the problem assuming that the rise in airway pressure might be related to the surgical procedure as the manipulations due to the reduction for obtaining thoracic lordosis could be the cause of increased airway pressure. We tried to aspirate through the endotracheal tube with a 14 Ch aspiration catheter. However, we couldn't insert the catheter more than 5 cm inside the tube. The manual ventilation was started until saturation since the airway pressure and PaCO₂ peaked at 60 cm H₂O and 70 mmHg, respectively. After a rapid closure of the surgical site, the patient positioned supine, however airway pressure still remained high and the suctioning was impossible. When we inspected inside the tube, we noticed a transparent projection obstructing ½ of the inner diameter of the endotracheal tube (Fig. 1). Immediately, we removed the obstructed tube and replaced it with a standard 7.5 mm tube. The airway pressure returned into normal and increase in PaCO₂ resolved quickly. The patient was extubated uneventfully.

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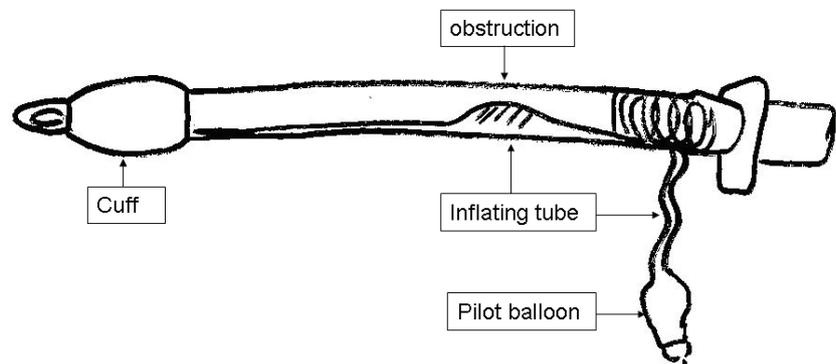
Fig. 1
The photograph of the obstruction inside the
endotracheal tube



Nitrous oxide may diffuse into the potential spaces in the structure of armoured tubes as they are manufactured in layers³. This may cause a layer separation leading to an obstructing projection inside the tube.⁴ However, in our case, the obstructing projection was originated from inflating tube of the cuff (Fig. 2). Inflating the tube cuff during the operation exacerbated the obstruction as the pressure was increased both because of the diffused nitrous

oxide and additional air volume. We observed that deflating the pilot balloon and the cuff resolved the obstruction after we replaced it with a new tube. It is important to emphasize that this was not inspected in the routine examination of the tube before intubation. We suggest that armoured tubes may require a more careful examination as they are more likely to cause unusual complications.

Fig. 2
Diagram of the herniation of
inflating tube of the cuff



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