INCORRECT FIXATION OF ENDOTRACHEAL TUBE: A CAUSE OF NON-INFLATION OF THE CUFF*

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Introduction

Adequate control of endotracheal tube (ETT) cuff volume and pressure is essential during mechanical ventilation under general anesthesia or for ventilatory support in the Critical Care Unit. Over-inflation can lead to tracheal wall injury while under-inflation can result into a leak that can lead to difficulties in ventilating and oxygenating patients as well as an increase in the risk of aspiration. There are few case reports in the literature describing the causes of endotracheal tube cuff leak or inability to inflate or deflate the endotracheal tube cuff. We report the case of endotracheal tube cuff that could not be inflated/deflated due to the kinking/ obstruction of the inflation tube secondary to the fixation of the endotracheal tube.

Case Report

A 45-year-old male patient was admitted to Emergency Department with polytrauma following road traffic accident. After initial resuscitation and subsequent amputation of both lower limbs, patient was shifted to Intensive Care Unit for further ventilatory support. The 8 mm cuffed endotracheal tube (Portex blue-line, Smiths Medical, USA) was fixed at 21 cm with adhesive tape (Durapore, 3M, US).The initial fixation of ETT was done in operating room and as per our protocol, refixation of the ETT was done in ICU. However, no subsequent manipulation of the ETT was undertaken, thereafter. Four hours later, an audible leak from ETT was noticed. An attempt was made to inflate the cuff but there was a resistance. The cuff leak persisted, though pilot balloon was getting inflated normally. At this point, it was decided to change the ETT. After removal of the ETT, we examined the inflation tube underneath the adhesive tape. It was found that the tape was tightly applied over folded inflation tube at its junction with ETT, leading to its kinking and inability to inflate the ETT cuff (Fig. 1). After straightening the inflation tube, both the pilot balloon as well as the endotracheal tube cuff could be easily inflated and deflated.

Discussion

Endotracheal tube cuff leak is commonly observed in Anesthesia and Intensive Care set up. It may result in inadequate ventilation and potential risk of pulmonary aspiration. Leak in endotracheal cuff or inability to inflate the cuff may be due to problem in Inflation system i.e. inflation tube, valve or pilot balloon. Laurent et al[1] reported a similar problem but that was due to kinking of inflation tube in nasotracheal tube, as a result of its anatomical route. In another case report, inflation tube got cut after fixation causing leaky ETT cuff [2].

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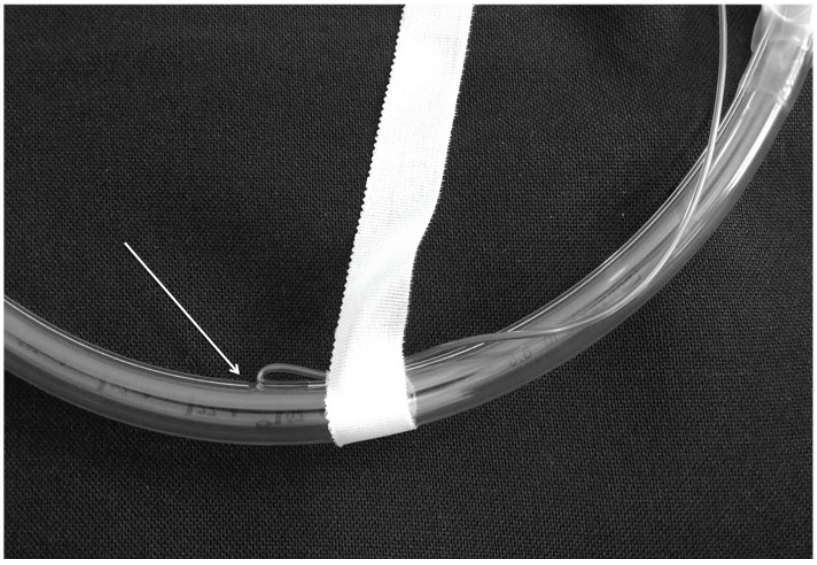
Fig. 1
Kinking of inflation tube following its folding on itself. (indicated by arrow)



In our case, the ETT cuff leak occurred due to acute folding of inflation tube at its junction with ETT leading to inability to inflate the ETT cuff. The cuff leak was not detected before shifting the patient to ICU as the refixation of ETT in ICU was inappropriate. The pilot balloon was inflating but the intraballoon pressure was not being transmitted to the ETT cuff.

Conclusion

We recommend that whenever adhesive tape is applied for tube fixation; ensure that the inflation tube underneath is not acutely folded at its point of insertion into ETT, so that its kinking and subsequent failure to inflate the ETT cuff is prevented.

References

1. Laurent CS, Lee D, Benumof J: Kinking of the Pilot Tube Prevents Inflation of the Cuff. *Anesth. Analg*; 2003, 96(2):632-633.

2. Gupta B, Farooque K, Jain D, Kapoor R: Improper tube fixation causing a leaky cuff. *J. Emerg. Trauma Shock*; 2010, 3:182-184.