

Esophageal Temperature Probe as a Cause of Air Leak around the Endotracheal Tube Cuff

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Abstract

The endotracheal tube cuff is projected to seal the subglottic area in order to avoid air leaks and pulmonary aspiration. Tube malposition and accidental invasion of the trachea by esophageal devices may initiate air leaks. Lung ventilation control, ventilator measurements and capnography precision may be lost in the presence of leaks. The use of low flow anesthesia technique may also become unreliable. This case report describes a tracheal placement of an esophageal device leading to a massive air leak around a soft low-pressure cuff.

INTRODUCTION

The endotracheal tube (ETT) cuff is designed to seal the subglottic area in order to prevent massive pulmonary aspiration and to avoid air leaks that may occur around the tube. Despite the presence of the cuff, an air leak may occur, and it frequently leads to the replacement of the ETT.

CASE REPORT

A 57 yr-old male presenting severe ischemic heart disease was scheduled for a myocardial revascularization surgery with cardiopulmonary bypass. Monitoring included radial artery blood pressure, central venous pressure, pulse oximetry and ECG. The ETT cuff was tested with air and presented no problems.

General anesthesia was induced and a Rush 9.0 mm internal diameter ETT was positioned in the trachea and the cuff was filled with 8 ml of air. The lungs were mechanically ventilated to maintain an end-tidal carbon dioxide pressure of 33 mm Hg. Peak inflation pressure (PIP) was 17 cm H₂O at this moment. An esophageal temperature probe was lubricated with lidocaine 2% gel and inserted nasally approximately 25 cm without difficulties. After a few minutes we noted an audible air leak near the patient's mouth, observed that the PIP decreased to 11 cm H₂O and capnography showed a considerably decrease. All the connections of the ventilator machine were checked and seemed to be flawless.

In view of this we speculated that the teeth could have damaged the cuff during its passage. A cuff pressure of 40

cm H₂O was measured at this moment, and then we insufflated the cuff with more 6 ml of air to achieve a pressure of 70 cm H₂O expecting to seal the airway. In despite of this, the air leak was still audible. We then noted that the temperature probe was measuring 32.5 C and room temperature was about 21.5 C. We considered that the probe might be placed in the trachea. It was pulled out a few centimeters which was facilitated by cuff deflation. The cuff was filled with air again to achieve a pressure near 30 cm H₂O and the air leak immediately stopped. PIP returned to 17 cm H₂O and the temperature measured rose to 35.6 C, which was more likely to correspond to the esophageal probe position. The trachea was extubated six hours later in the intensive care unit without interurrences.

DISCUSSION

Ideally there should not be any leak around the cuffed ETT and its presence may be troublesome in special clinical situations. Massive leaks may prohibit ventilation management, particularly in patients with reduced lung compliance that require a tight pulmonary pressure control. Ventilator lung function measurements such as lung compliance and resistance also became inaccurate. Air leaks also interfere with capnographic precision. Low flow anesthesia technique is more difficult to be applied and use of inhalation anesthetics pollutes the environmental in the presence of a leak. Pneumonias in the intensive care unit are strongly related to leakage around the tube, and regarding this, a study on improving cuff's design and compliance was carried out and has confirmed that it was sufficient to reduce

the leakage experimentally.² Air leaks can also be explained by tube malposition³ and inadvertent invasion of the trachea by esophageal devices, such as nasogastric tubes and esophageal temperature probes, which occur more easily when using soft low pressure cuffed ETT.⁴ This case report described a massive ETT's air leak due to a tracheal placement of an esophageal device. It was resolved without further problems.

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