

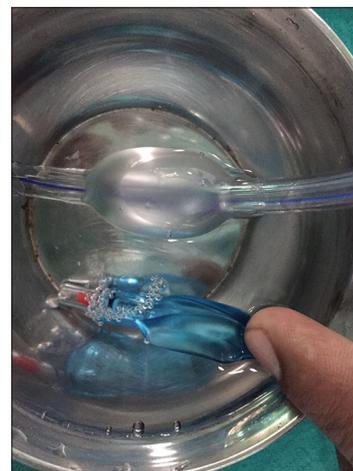
## Unusual manufacturing defect of the endotracheal tube: Problem revisited

Sir,

Manufacturing defects of endotracheal tube (ETT) are still encountered in routine anesthesia practice. Many such defects go unnoticed during routine inspection prior to their use. We report a case of manufacturing defect at the junction of pilot balloon and spring-loaded one-way valve in a prepacked, single use, cuffed ETT. This case highlights the significance of standard monitoring of ventilation and the role of a vigilant clinician in detecting such defects and avoiding critical events that can arise from the use of such defective ETTs. It also emphasizes the need for double-checking ETT prior to their use. Difficulty in ventilating a tracheally intubated patient as a result of ETT defect is known in anesthesia practice. Despite the common practice of visual inspection and testing of ETTs for physical defects prior to use, some manufacturing defects still go unnoticed.<sup>[1]</sup>

The patient, 8-year-old female weighing 24 kg, posted for fistulectomy for internal fistula of the left eye under general anesthesia. Her trachea was intubated with a 6.0 mm ID cuffed ETT and was ventilated with tidal volume (Vt) of 200 ml with a rate of 15/min. The correct placement of the tube was ensured and after three to

four machine delivered breaths exhaled Vt started decreasing by more than 60 ml at around 20 cm H<sub>2</sub>O of cuff pressure. The tube in question is a CE-certified product (Hansraj Nayyar, Mumbai, India). We initially thought that the cuff needs to be inflated but in spite of inflating it the exhaled Vt would increase but only to decrease after a few breaths. When the leak was significant and end-tidal carbon dioxide started building up, we removed the tube and inserted a new tube, and thereafter ventilation was satisfactory. When we inserted the cuff of the tube in a bowl of water to check its potency, we did not find any leak, but the cuff was not sustaining the pressure to which it was inflated as measured by the cuff manometer. To our surprise, when we dipped both the pilot balloon and the cuff, the leak was detected at the junction of spring-loaded one-way



**Figure 1:** Original photograph showing the leak at the junction between pilot balloon and spring-loaded one-way valve

valve and the pilot balloon [Figure 1] [Video], which is first of its kind to be reported.

A manufacturing defect in an ETT can lead to difficulty in ventilation involving any part of the ETT. Cuff defects leading to herniation of the ETT cuff and intraluminal tracheal obstruction,<sup>[2,3]</sup> elliptical defects in the wall of the tube causing air leak,<sup>[4]</sup> and kinking of ETT<sup>[5]</sup> have been described.

In conclusion, double-checking of ETTs before their use aids in avoiding unnecessary intraoperative problems that can arise from the use of defective ETT although the method is not full proof. Most of the ETT defects described in literature could not be identified during routine preoperative inspection at least of this nature. Thus, the role of a vigilant anesthetist as well as standard monitoring of ventilation is invaluable for patient safety in the presence of a defective ETT. Further, the report points to the manufacturing practice and the need for stringent quality control of the manufacturer concerned in the production of such lifesaving equipment.

#### **Financial support and sponsorship**

Nil.

#### **Conflicts of interest**

There are no conflicts of interest.

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DOI: 10.4103/0972-5229.175935

**How to cite this article:** Singha SK, Kujur S. Unusual manufacturing defect of the endotracheal tube: Problem revisited. *Indian J Crit Care Med* 2016;20:130-1.