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# Intra-operative Cuff Leak-An Anaesthetist's Dilemma

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## Introduction

Intra-operative air leaks via endotracheal tubes (ETTs) are not uncommon. However, it is interesting to know what caused the leak. It can be due to defects in the cuff, inflation tube, pilot balloon or inflation valve. We report an intriguing cause of air leak from a flexo-metallic ETT 1 hour after the commencement of surgery.

## Case Presentation

A 64-year-old female was posted for anterior maxillectomy and supra-omohyoid neck dissection for a mass, proven to be a malignant melanoma by biopsy. The mass had eroded inner alveolar margin at the left incisive foramen level and palatine process of the maxilla. Nasal intubation with a 7.5 Fr flexo-metallic ETT with a Macintosh laryngoscope was done, and Magill's forceps were used for advancing the tube through the vocal cords. The tube was secured with adhesive plaster on nose at 26 cm mark. A Ryle's tube was inserted through the nasal route following which throat packing was done. The patient was positioned for surgery. One hour after the commencement of surgery, the surgeon reported bubbling in the surgical field. The set tidal volume was also not being delivered. An air leak around the ETT cuff was suspected. The pilot balloon was found to be deflated, and attempts to reinflate it were futile. The ETT was immediately changed to a new one over an airway exchanger. The tube was secured in place after confirming position by auscultation and capnography. No further air leak was observed, and the surgery was resumed. No damage could be visualised on naked eye examination of the ETT. On inflating the cuff under water, bubbling was detected through a small nick at 22 cm mark on ETT surrounding the pilot balloon channel (Figure 1a). The damage site was confirmed by injecting methylene blue through the pilot balloon under water (Figure 1b). The cuff could be inflated when the point of damage was sealed with an adhesive tape. A power saw was used for dissection of the tumor mass at the hard palate, and it might have led to ETT damage.

## Discussion

A leak in the ETT precludes effective ventilation and predisposes to aspiration, especially in oral surgeries. It must be suspected if no other cause of loss of tidal volume/inadequate tidal volume delivery is intra-operatively deciphered. It should be replaced with another ETT as soon as possible. ETT leak has been documented in reused ETT due to damage during an attempt to remove the adhesive plaster[1] or from bitten notch on it.[2] It may also be due to improper fixation of the tube by adhesive plaster[3] from low product quality compliance[4] and manufacturing defects causing leak from the wall of the ETT at the insertion point of pilot balloon.[5] These causes can either be made out on pre-use check or intra-operatively whilst the tube is in place. Others are obvious after the removal of ETT. In the present case, the damage caused by the surgical saw at the portion of ETT wall with a pilot balloon inflation channel was small enough to be visible on naked eye inspection but critical enough to compromise ventilation.



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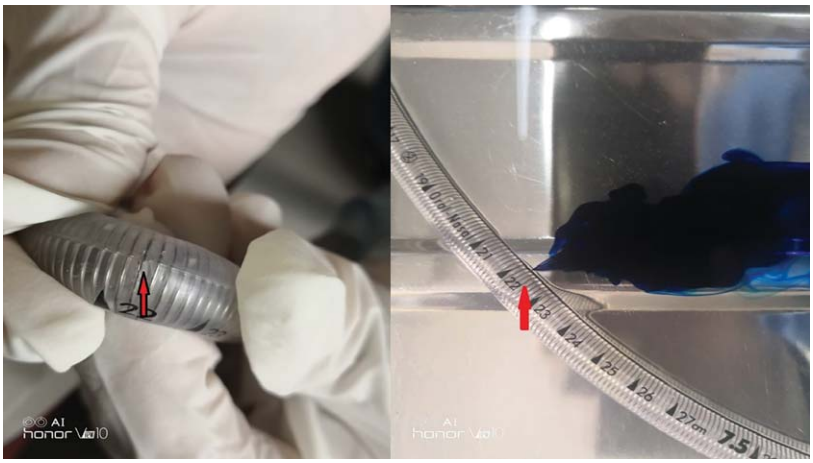

**Figure 1 a-b. (a) Defect in ETT at 22 cm mark (b) Leaking of methylene blue through defect in ETT.**

## Conclusion

We need to rule out causes related to surgical procedures also for intra-operative endotracheal tube cuff leaks.

**Ethics Committee Approval**: N/A

**Informed Consent**: An informed written consent was obtained from the patient who participated in this study.

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