

## A RARE INCIDENT OF A COMPLETE PILOT BALLOON DISCONNECTION OF A REINFORCED ENDOTRACHEAL TUBE AT EXTUBATION

**Dr. Muaweih Ababneh<sup>1</sup>, Dr. Momen Hamdan<sup>2</sup>, Dr. Ahmed Abu Ryash<sup>3</sup>**

<sup>1</sup> A. Professor, Isra University, College of Allied Medical Sciences, Amman, Jordan, Consultant Anesthetist, Clinical Director, Anaesthesia Department. Abdali Hospital, Amman. Jordan

<sup>2</sup> Specialist Anaesthetists, Anaesthesia Department, Abdali Hospital, Amman, Jordan.

<sup>3</sup> Lecture of Isra University, College of Allied Medical Sciences, Amman, Jordan.

**Correspondence:** Dr. Momen Hamdan,  
[muaweih.ababneh@abdalimedical.com](mailto:muaweih.ababneh@abdalimedical.com)

### Abstract:

We report a case of complete disconnection of the pilot balloon into the airway, or larynx of a reinforced tube when the tracheal tube was extubated. Prior to use, the endotracheal tube was tested and functioned normally. The patient was extubated uneventfully and sent to post anaesthesia care unit (PACU), 10 minutes later he started to cough, and the pilot balloon coughed out. Patient was well in himself and discharged same day.

### Introduction

An endotracheal tube (ETT) malfunction has been reported in literature including mechanical obstruction, tube kinking, balloon herniation, patient biting on the tube, obstruction of the lumen by blood or foreign body, but not to our knowledge a complete pilot balloon dislodgment. This incident may cause life-threatening ventilatory failure; we have never experienced such an incident before. Unfortunately the anaesthesiologist didn't notice the absence of the ETT pilot balloon at extubation, emergence was uneventful and the child was transferred to the PACU, few minutes later he started to cough, suddenly he coughed the pilot balloon, a review of the literature we didn't found similar case report.

### Case Presentation

A 4 years child (weight 22 kg), was admitted as a day surgery for adenotonsillectomy, on pre-operative ASA I with no previous medical illnesses. He was induced (in presence of his parent) inhalational technique Sevoflurane 30% nitrous oxide in oxygen smoothly, shortly after a 22 G intravenous cannula was secured 20 mcg Fentanyl, 2 mg Cisatracurum given. Patient was intubated (CMAC videolaryngoscope) with a size 4.5 reinforced tube, Fig. 1. Cuff was inflated 1 ml of air, intubation was easy, first attempt (Cormak-Lehane grade 1), auscultation revealed both lungs are ventilated well, tube fixed and secured at 12 cm, during the procedure a 2 mg Morphine and a 250 mg Paracetamol were given intravenously.

Procedure lasted 30 minutes uneventful, child started spontaneous breathing, fully awake, cuff deflated and extubated smoothly and he was transferred to PACU, handed to our staff, vital signs were normal and the child was comfortable. 10 minutes later PACU staff nurse called the attending anaesthesiologist that the child started to cough and he coughed out a foreign body out of his mouth! On arrival the child was breathing normally and stable again. When the coughed foreign body was examined it turned out to be the ETT pilot cuff, Fig. 2. The child remained in PACU for further 30 minutes for observation then transferred back to the day case, at 4 pm was visited by the anaesthesiologist and decided to release him home as he was in a good condition.

We thought this incident was particular to the tube itself, so we decided to open a new size 4.5 tube from the same manufacturer, to our surprise it was dislodged easily from the tube, Fig. 1. Decision was made to withdraw all sizes same manufacturer tubes from the operating rooms and stores, our local supplier was informed, and the affected tube was handed to them and they are launching their own investigation



Fig. 1.



Fig. 2

## Discussion

Many manufacturing defects in ETT have been observed in the past, which include overpressure cuff herniation,<sup>1</sup> intraluminal tracheal obstruction by kinking,<sup>2</sup> occlusion of distal ETT lumen by a plastic meniscus,<sup>3</sup> dissection of reinforced tube,<sup>4</sup> and breakage of rings in armored tube causing complete obstruction.<sup>5</sup> Similar finding of armored endotracheal tube obstruction at the level where inflation line enters into the tube was reported by Kumar et al,<sup>6</sup> where the obstruction occurred approximately one and half hours after commencement of surgery.

In our case, it was a rare defect of disconnection of the endotracheal tube balloon at extubation completely, given the child recovered comfortable with no any signs of respiratory compromise or signs of airway blockage, we presume that that balloon slept into the oropharynx, the size of the balloon and tracheal diameter of the child most likely will cause some signs or symptoms of airway obstruction. Moreover, he was breathing normally in PACU, so when he was more aware felt it and coughed it out.

This case illustrates the potential device malfunction that can develop. Even small defects that develop in well-engineered products, such as the manufacturing defect leading to pilot balloon dissection as described here, can lead to critical emergency situations. Wasn't noticed by the anaesthesiologist, though he should be more vigilant, integrity of any device inserted into a patient should be checked always when removed.

Review of literature, we couldn't find similar case report.

## Conclusion

This case report highlights an unusual malfunctioning due to a manufacturing defect which could have caused a critical incident. We were lucky in this case nonetheless vigilance, checking all devices is paramount for safe practice.

## Competing interests

The authors declare that they have no competing interests.

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