

An Uncommon Cause of Endotracheal Tube Obstruction During Anaesthesia Recovery: A Case Report

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Abstract

Intraoperative ventilatory failure is not an uncommon and life-threatening event. Various causes have been associated with it, however endotracheal tube (ETT) obstruction remains a difficult one to recognize. It can result from blood impaction, mucus plug, manufacturing defects and tube malfunction. This case report describes a sudden ventilatory failure at the end of a surgical procedure in a child under general anaesthesia. A blood clot obstructing the ETT was detected and successfully managed.

Keywords: *Airway Obstruction; Intubation*

Introduction

Intraoperative ventilatory failure is not an uncommon and life-threatening event. Various causes have been associated with it, however endotracheal tube (ETT) obstruction remains a difficult one to recognize. It can result from blood impaction, mucus plug, manufacturing defects and tube malfunction [1]. Once the diagnosis of ETT obstruction has been identified, a prompt response is required to restore ventilation. Replacement of the ETT is a cornerstone in management. This case report describes a sudden ventilatory failure at the end of a surgical procedure in a child under general anaesthesia. A blood clot obstructing the ETT was detected and successfully managed.

Case Report

A 14 years old girl (weight 45 kg, height 155 cm) was scheduled for cystectomy of left lung hydatid cyst under general anaesthesia. There were no abnormal findings in the preoperative evaluation. There was no recent history of upper respiratory tract infection. Auscultation of the chest immediately prior to the surgical procedure revealed presence of breath sounds bilaterally with no added sounds. Laboratory workup (haematology and chemistry profile) were within normal values. ECG showed a normal sinus rhythm. Apart from the left lung hydatid cyst, no other abnormal findings were identified on the chest x-ray.

A smooth intravenous (IV) induction of anaesthesia was performed with propofol, fentanyl and vecuronium. Direct laryngoscopy revealed a laryngeal view of grade I. The trachea was intubated with a 6 mm cuffed ETT. Following intubation, capnographic monitoring was initiated and bilateral air entry confirmed by auscultation of the chest. The ETT was fixed at the 13 cm mark. The patient was then mechanically ventilated at a peak airway pressure (PAP) of 15 cmH₂O and anaesthesia was maintained with oxygen, nitric oxide and sevoflurane.

The surgical procedure was carried out in the left lateral position and was uneventful. The patient was then put on the supine position and a left chest tube was placed to drain the pleural space. Following the placement of the chest drain, drug administration was discontinued, and the patient had spontaneous ventilation with adequate chest rise and exhaled tidal volume of 200 - 250 ml. Around five minutes later, although being on 100% oxygen, the patient became distressed, exhaled tidal volume dropped to 60 - 100 ml and SpO₂ declined progressively to reach 79%. PAP reached 35 cmH₂O and end tidal CO₂ (ETCO₂) 70 mmHg. Upon auscultation of the chest, there was no wheezing, but air entry diminished bilaterally. Fortunately, the blood pressure and heart rate were within normal range.

Introduction of the suction catheter was met with resistance and thus was unable to pass. When pulled out, the suction catheter was blood stained. The patient was immediately ventilated with an ambo bag. However, resistance to the manual ventilation was evident. At that time, we suspected acute obstruction of the ETT. Hence, the patient was extubated and oxygenated via face mask. Inspection of the tube revealed a blood clot occluding the air passage (Figure 1 and 2). Immediately after extubation, there were signs of improved compliance and chest rise. Haemodynamically, the patient was stable and the ETCO₂ returned to normal. The patient woke up completely and there was no further incidence. She was transferred to the intensive care unit (ICU) where she spent the first night. Next day she was shifted to the paediatric surgery ward. She stayed there without any complications and was discharged on post- op day 5.

Discussion

Intraoperative ETT obstruction is not uncommon. However, it is important to differentiate it from other causes of intraoperative ventilatory failure such as bronchospasm, pneumothorax and chest wall rigidity [2]. Hence, eliciting signs from physical examination and detecting abnormal patterns on capnographic monitoring are valuable tools to rule out other possible reasons. Our patient developed an increase in PAP and ETCO₂. This was associated with a drop in the exhaled tidal volume and SpO₂. Upon physical examination and monitoring of the respiratory and haemodynamic parameters, the possibility of a bronchospasm or pneumothorax were less likely. The resistance to passing the suction catheter raised the possibility of an ETT obstruction. The resistance felt in attempting to ventilate the patient manually reinforced our suspicion of an ETT obstruction.

The fact that the occlusion occurred after the procedure was carried out and when sedation was stopped, drives us to suggest that the active effort of expiration due to light sedation could have triggered blood impaction in the ETT. Another contributing factor is the type of surgery. Thoracic surgery has been reported to be complicated by blood clots occluding ETT. Thapa, *et al.* experienced an ETT obstruction by a blood clot in an 8-month infant who underwent emergency drainage and thoracoscopic decortication for a retropharyngeal and anterior mediastinal abscess [1].

ETT obstruction by a blood clot has been reported to be associated with patient's repositioning. Lim, *et al.* describes a case of ETT obstruction by a blood clot in a patient undergoing lumbar spine surgery after being put into prone position [3]. Our patient had a similar scenario with the acute obstruction happening after repositioning.



Figure 1



Figure 2

Conclusion

Acute obstruction of the ETT is a life-threatening condition that needs to be recognized and managed swiftly. Anaesthetists need to keep ETT obstruction at the back of their mind in cases of intraoperative ventilatory failure. In well-established settings, fiberoptic bronchoscopy (FOB) is the goal standard management. It has the advantage of being a diagnostic and therapeutic tool. However, in the absence of FOB, anaesthetists should have a high clinical sense and index of suspicion for cases of ETT obstruction.

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