An incidental finding of endotracheal tube obstruction at the level where inflation line enters into the tube

Madam,
A 33-year-old female, ASA physical status I patient, presented for subtotal thyroidectomy. All standard monitors including electrocardiography (ECG), pulse oximetry (SPO₂), and noninvasive blood pressure (NIBP) were attached. Standard anesthesia induction and endotracheal intubation with 7.5-mm internal diameter (ID) cuffed armoured (Mallinkrodt) endotracheal tube (ETT) was done. Lungs were ventilated using volume control mode after connecting to the anesthesia machine with close circuit. Bilateral air entry, lung compliance, and endtidal carbon dioxide (ETCO₂) were confirmed. In this case, the head end of the patient was away from the anesthesia machine, hence, long length closed circuit was used. After approximately 1 h and 30 min of commencement of the surgery, suddenly monitor stopped displaying ETCO₂, airway pressure rose above 35 cm of water (cmH₂O) which was earlier 16–17 cmH₂O, and endtidal volume was zero. While SPO₂ remained 100%, we checked all possible causes sequentially. The anesthesia machine, circuit, all valves,
and connections were checked. On manual ventilation, high resistance was felt and there was significantly decreased bilateral air-entry on auscultation. Suction catheter was inserted through the ETT to remove possible mucous plug/blood clot but it could not be negotiated beyond 2–3 cm. A check laryngoscopy was done and ETT was changed. Now, manual ventilation was optimal and ETCO$_2$ curve was normal. The surgery continued and trachea was extubated after surgery uneventfully.

Later, it was found that there was an obstruction at the level where the pilot balloon tube was entering into the ETT [Figure 1]. It was only evident when the cuff was inflated, so to confirm, we injected methylene blue into the pilot balloon [Figure 2].

Many manufacturing defects in ETT have been observed in the past, which include overpressure cuff herniation,\textsuperscript{[1,2]} intraluminal tracheal obstruction,\textsuperscript{[2]} distal end intraluminal meniscal obstruction,\textsuperscript{[3]} and tube kink.\textsuperscript{[4]} Patients with controlled ventilation, close observation of changes in peak airway pressures, lung compliance, ETCO$_2$, and endtidal volume are warranted.\textsuperscript{[5]}

In this case, occlusion was due to a defect in the inner film of the tube at the level where pilot balloon’s inflation line enters the wall of the ETT. Remarkably, when the cuff was deflated, the inner film also got settled on the wall and the lumen became normal in contour. Because it was a thyroid surgery, injury to the pleura or airway could not be overlooked and the surgeons were asked for any notable pleural or airway injury. Although there was an evidence of bilateral decreased air entry, when the suction catheter could not be negotiated through the tube, it was more in favor of endotracheal blockade.\textsuperscript{[2]} However, a chance of kinking was remote because we used an armoured tube.\textsuperscript{[5]}

In this case, the SpO$_2$ always remained 100% but ETCO$_2$ trace was not seen and there was high resistance on manual ventilation. All these factors suggested that some oxygen (O$_2$) was being delivered with positive pressure but there was no endtidal trace. Because the endotracheal tube was under the drapes it was difficult to rule out tube handling, continuous pressure over the pilot balloon, or tube kinking, which could lead to this defect in this case. Oxygen and air were used for maintenance of anesthesia. The availability of cheap disposable products in the market today has resulted in the quality of the products being not up to standards.

Thus, this case highlights that there can be an obstruction due to a manufacturing defect and it can occur at any course of time during anesthesia. Vigilant monitoring and close observation of any change in ventilatory parameters can provide an early warning.

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**Conflicts of interest**

There are no conflicts of interest.

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