Unusual cause of airway obstruction after nasal intubation with a preformed endotracheal tube

Dear Editor,

Nasal intubation with cuffed preformed endotracheal tubes (ETT) (RAE north facing) is a standard procedure for tonsillectomy surgery. This procedure is carried out generally without complications. We report a case where after uncomplicated nasal intubation with a preformed RAE north-facing cuffed ETT, we were unable to ventilate the patient.

A 60-kg, 30-year-old ASA-I male was posted for tonsillectomy. As nasal intubation was planned, nasal vasoconstrictor (xylometazoline 0.1%) drops were instilled in both nostrils 30 min prior to induction of anaesthesia. Inside the operation theatre, standard monitoring was established. After preoxygenation, anaesthesia was induced with fentanyl 100 µg and propofol 140 mg. As bag-mask ventilation was easy, muscle relaxant atracurium was induced with fentanyl 100 µg and propofol 140 mg. As bag-mask ventilation was easy, muscle relaxant atracurium 30 mg was given to facilitate intubation. After 3 min of mask ventilation, RAE preformed north facing 6.5-mm ETT (Portex) was inserted into the right nostril of patient. Laryngoscopy was done with size-3 Macintosh blade and laryngeal view was Cormack–Lehane grade-1. ETT was advanced into the trachea under direct vision using Magill forceps. Tube passage was without any resistance. ETT cuff was inflated with 10 mL of air and tube was fixed with elastic adhesive tape. Manual ventilation was initiated with a mixture of oxygen and nitrous oxide. Significant resistance in the reservoir bag and negligible chest expansion were noted. On auscultation, bilaterally breath sounds were not auscultated. All the connections from gas outlet to ETT were verified. Resistance was persistently high with no ETCO2 graph on the monitor. Left hypochondrium was auscultated for possible, oesophageal intubation, which was negative. Immediately suction catheter was passed through the ETT suspecting some mucous plug. But we failed to retrieve it. Laryngoscopy was performed again to confirm correct placement of ETT and it was confirmed. Treatment for suspected bronchospasm was given with injection hydrocortisone 100 mg, injection dexamethasone 8 mg, and injection deriphylline 2ml intravenously, but no improvement in ventilation occurred and SPO2 dropped to 60%. Suspecting ETT obstruction, patient’s ETT was removed and bag-mask ventilation done, which was easy with visible chest expansion. Patient was reintubated with a new, the same sized (6.5-mm ID RAE North facing) tube. Now, the ventilation was without challenge. The remainder of the surgery and postoperative recovery were uneventful.

On examination of the removed ETT, a kink was seen in the region of ETT cuff [Figures 1 and 2] almost completely occluding the lumen of the tube. Although the exact cause of this problem remains unclear, we are hypothesizing two probable causes. First, as we were using 6.5-mm ID size ETT in an adult patient, there was ample space available in the tracheal lumen to allow the tube to fold on itself. The logic behind using a 6.5-mm ID size tube was extremely narrow external nares of the patient. Second, there could be a manufacturing defect leading to weakness of that part of the wall of ETT allowing it to kink. It must be noted that as the RAE North facing tubes are to be negotiated nasally, they are generally made up of blue-coloured softer material making them more vulnerable for kinking.

In anaesthesia practice, we often encounter difficulty in ventilating an endotracheally intubated patient. It could be due to many reasons like anaesthesia gas delivery malfunctions, breathing circuit obstruction (from common gas outlet to the end of ETT), poor pulmonary compliance, acute severe bronchospasm, tension pneumothorax, and endobronchial mass lesion. Thus, double-checking of the anaesthesia equipment and ETT before use and vigilant monitoring for ventilation are standards of anaesthesia practice. Acute endotracheal tube obstruction is a potentially life-threatening situation and rapid recognition and prompt action on any change in ventilatory parameters are essential. Common causes of ETT obstruction reported are mucous plug, blood clot, or intratracheal kinking. Structural defects of ETT are also not very rare and can happen in any part of the ETT. Defects in ETT cuff, over-inflated cuff herniation, intraluminal tracheal obstruction, intraluminal plastic films, and plastic membrane of tube connector causing severe airway obstruction have been reported.

One must be vigilant and act promptly to diagnose and treat the cause of airway obstruction which can present at any time during the course of anaesthesia.

We conclude that when encounter airway obstruction in an otherwise “normal everything,” “inadvertent and hidden” intratracheal kinking also must be kept in mind.

Authors contribution
The second author conceptualized the main theme of the
article. The first author did most of the literature search and writing, while the corresponding author did most of the editing and revising and the second author did the final corrections in the preparation of manuscript. In fact, all the authors contributed almost equally.

**Declarations**

The authors want to confirm that all the authors had full access to all the data in the manuscript and the corresponding author takes the full and final responsibility for the decision to submit for publication. The manuscript has been read and approved by all the authors. The requirements for authorship have been met and each author believes that the manuscript represents honest work.

The first author has taken the responsibility of the integrity of the work as a whole from inception to published article and has been designated as “guarantor.”

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**Conflicts of interest**

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