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LETTER TO THE EDITOR

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Intraoral endotracheal tube obstruction

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Background

The use of endotracheal tube (ETT) is critical for maintaining airway. Airway obstruction is caused by ETT-manufacturing defects, cuff herniation, intraluminal obstruction, mucus, and kink. Whenever there is acute onset of difficult ventilation, suspect bronchospasm, or pneumothorax. An obstruction that develops in the ETT can be dangerous unless solved rapidly (Lewer et al. 1997; Chua and Ng 2002; Hajimohammadi et al. 2009; Paraswamy 2019).

Case representation

We present a case of intraoperative intraoral tube kink in a 47-year-old female of 52kg with no comorbidities, diagnosed with carcinoma ovary, and posted for staging laparotomy. Pre-induction monitors and an arterial line were secured for continuous blood pressure monitoring. The patient was induced with IV (intravenous) midazolam 1mg, glycopyrrolate 0.2 mg, fentanyl 150 µg, and propofol 70 mg. Neuromuscular blockade was performed using atracurium 25mg IV. Patient was intubated with cuffed ETT of internal diameter 7mm and fixed at 19cm and was ventilated in volume-controlled mode, with a tidal volume of 450ml and respiratory rate of 12/min. Anesthesia was maintained on 50% oxygen in air and 1.5% isoflurane. Injection atracurium 5mg was repeated half hourly. After 2 h of surgery, peak airway pressures rose suddenly to 51cm H_2O, end-tidal carbon dioxide to 55mm Hg, heart rate to 140bpm, and blood pressure to 200/110mmHg. Plateau pressure could not be calculated in our anesthesia machine. Oxygen saturation was maintained at 97% with 0.5 fractional inspired oxygen concentration ($FiO_{2)}$. On auscultation, mild wheeze was heard bilaterally. Propofol 20mg was given, relaxant repeated, and salbutamol puffs administered via ETT. Injection hydrocortisone100mg and magnesium 2gm IV infusion was started. But problems persisted. The patient was bag ventilated in manual mode with FiO_2 100% and 6 L/min flow. No kink in ETT was noted at the angle of the mouth. Arterial blood gas sample sent showed PaO_2 170mmHg, $PaCO_2$ 60mmHg, and pH 7.2. Exhaled tidal volume was reduced to 200ml. A 12-French suction catheter was passed to rule out ETT block by mucus, but could not be passed beyond 20cm. Direct laryngoscopy showed ETT bent intraorally between vocal cord and angle of mouth (Fig. 1). To change ETT, anesthesia was deepened with propofol 50mg and atracurium 10mg. Fifteen minutes elapsed between rising airway pressure to changing ETT. Following this, airway pressure dropped and vitals stabilized. The surgery continued for one more hour. Patient was extubated on table and postoperative period was uneventful.

Discussion

In a ventilated patient, airway obstruction is suspected when there are high peak inspiratory pressures, decreased compliance, and increased difference between inhaled and exhaled tidal volumes. Remember mnemonic DOPE, D-ETT displacement, O-obstructed ETT, P-pneumothorax, and E-equipment failure (Henderson 1993). Direct vision of glottis and vocal cords and confirming the ETT placement under videolaryngoscopy should be the first attempt. ETT obstruction can be identified by passing a suction catheter. ETT obstruction due to biting is common and is usually seen at the angle of mouth and can be prevented by avoiding light planes of anesthesia.

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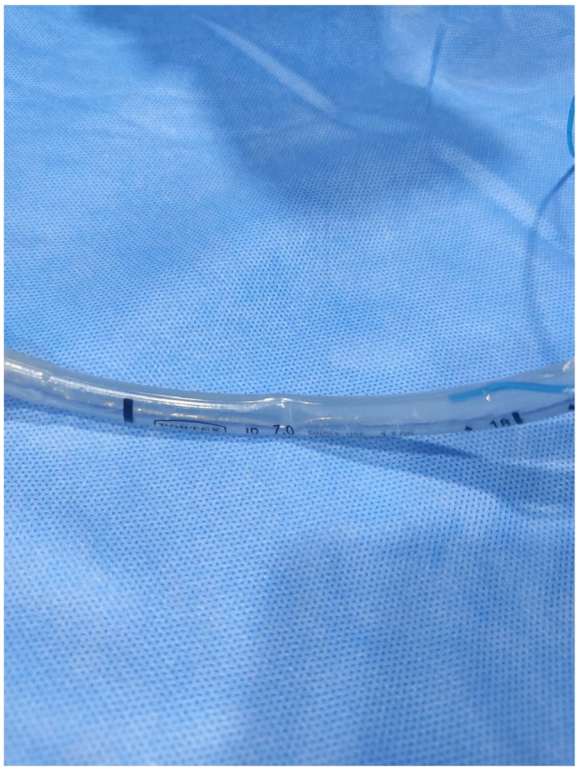

Fig. 1 Kinked tube

Conclusions

When adequate ventilation is difficult after intubation, the causes have to be rapidly identified and corrective measures have to be taken to avoid hypoxemia, acidosis, and cardiac arrest.

Abbreviations

ETT: Endotracheal tube; IV: Intravenous; FiO_2: Fractional inspired oxygen concentration.

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Authors' contributions

All authors have read and approved the manuscript. PN: Conception and design of the study, acquisition of data, analysis and interpretation of data, drafting the article or revising, final approval of the version to be submitted. DT: Conception and design of the study, acquisition of data, analyzed the data, drafting the article or revising, final approval of the version to be submitted. RAJ: Analysis and interpretation of data, drafting the article, final approval of the version to be submitted. DK: Analysis and interpretation of data, drafting the article or revising, final approval of the version to be submitted.

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Not applicable.

Consent for publication

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Competing interests

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