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Stuck endotracheal tube in the trachea: An unusual case

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Abstract

Endotracheal (ET) intubation is one of the most commonly performed procedures by anaesthesiologists to provide ventilation and oxygenation during general anaesthesia. The techniques for intubation in difficult airways have been widely studied, and equipment is available to help with the same. However, less is known about the difficulties during extubation after surgery in otherwise healthy patients. Thus, only a few pieces of literature are available. We report a case of a stuck endotracheal tube in an 81 years old female, who underwent laparoscopic cholecystectomy. During laryngoscopy, modified Cormack-Lehane grade 1 was noted, however, only a 6.0 mm internal diameter tube could be inserted. The patient received optimum ventilation and oxygenation with no other complications intraoperatively. After full consciousness and adequate tidal volume were regained, an attempt to remove ET was unsuccessful as it was stuck in the trachea. The case reported previously mostly focuses on the laryngeal edema that occurred during intubation or the mechanical defects in the tube. In the present case a narrowed subglottic area, laryngeal edema, and a complete ring formation were found in the deflated ET tube cuff, which was stuck in the subglottic area. We report an unusual case of a stuck ET tube in an otherwise healthy elderly lady.

Keywords: Endotracheal Tube, Stuck, Trachea

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Introduction

Difficult or impossible extubation is regarded as period III (extubation) complications of tracheal intubation.[1] There are reports of difficult extubation due to manufacturing defects.[2] During extubation, the supraglottic and laryngeal examination should be done by direct or indirect laryngoscopy to identify airway edema and bleeding. A cuff leak test can be used to assess the subglottic region which is done by deflating the cuff.[3] A cuff leak volume less than 110 ml, predicts post extubation stridor.[4] We present an unusual case of a deflated cuff that made a complete ring leading to a negative cuff leak test along with subglottic airway narrowing.

Case report

Eighty-one years old female, height 155 cm, and normal body habitus was posted for routine laparoscopic cholecystectomy with no associated co-morbidities at Chitwan Medical College and Teaching Hospital, Bharatpur-10, Chitwan, Nepal. After thorough patient evaluation and airway assessment, the patient was premedicated with ranitidine 150 mg and metoclopramide 10 mg orally in the evening before and morning of surgery.

After proper patient identification, an intravenous cannulation was done. Standard routine monitors were attached and vitals were recorded. Anesthesia was induced with midazolam 0.04 mg/kg, propofol 2 mg/kg, fentanyl 2 mcg/kg, and rocuronium 0.8 mg/kg was used to facilitate endotracheal (ET) intubation.

Direct laryngoscopy revealed modified Cormack-Lehane grade 1. As per routine practice to use a 7.5 mm ET tube for normal adult females, it was attempted but could not negotiate beyond the glottis. Subsequent smaller sizes of ET tubes were used until a successful fourth attempt with a 6.0 mm tube. Direct laryngoscopy revealed slight bleeding at the base of the epiglottis however no glottis edema was appreciated. The patient was put on intermittent positive-pressure ventilation with adequate tidal volume and normal peak inspiratory pressure. The intraoperative period was uneventful. After 60 minutes the surgery was completed. The patient was reversed with neostigmine 0.04 mg/kg and glycopyrrolate 0.01mg/kg. However, adequate tidal volume was not achieved as the patient was still deeply sedated. After 40 minutes, the patient was shifted to the surgical ICU with an ET tube in situ. Mechanical ventilation was continued on SIMV mode, FiO_2 0.3, tidal volume of 450 ml, pressure support 8 cmH_2O, and PEEP 5 cmH_2O.

After 4 hours, the patient was fully awake and planned for extubation. Proper oral suctioning was done. The tube cuff was deflated and gentle traction of the ET tube was done, but the tube could not be pulled out, Figure 1.

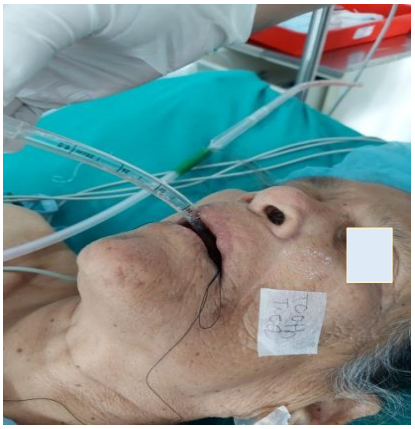
The patient had discomfort in the throat so a flexible videoscope was done. It revealed glottis edema. The patient was kept on a T-piece. Dexamethasone 8 mg was given intravenously along with nebulization with adrenaline (1 mg in 5 ml NS) every 8 hours and intravenous hydrocortisone 100 mg 12 hourly. After 17 hours, the oral cavity and peri glottic area were reassessed. There was no edema. However, the cuff leak test was negative. Evaluation of the airway was done with USG. It showed a deflated cuff and a snugly fitted ET tube in the trachea.

Considering the pros and cons of removing or leaving the ET tube until the cuff leak test was positive; a decision was made after proper patient counselling to gently pull out the ET tube. Every possible precaution was taken to restore the emergency airway. With the cooperation of the patient, sustained and forced traction was applied and the tube was extubated successfully, Figure 2. This was followed by nebulization with adrenaline.

After extubation, the ET tube was evaluated which showed a complete ring-like structure formed due to a completely deflated cuff. This ring could have possibly sealed the space between the cuff and the trachea. The cuff was blood-stained which could be due to the force

applied. The internal lumen of the tube also had a mixture of secretions and blood which might have been due to coughing and bucking with the tube. However, some degree of edema could not be ruled out which could have snugly fitted the tube in the trachea.

After 24 hours of extubation, a CT scan of the neck was done to evaluate any undiagnosed airway pathology. The CT scan showed narrowing at the subglottic region (0.54 cm) and length of narrowed area was 1.8 cm, Figure 3.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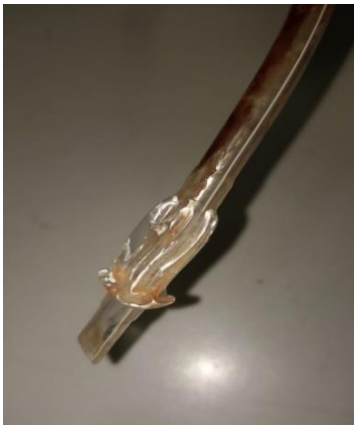
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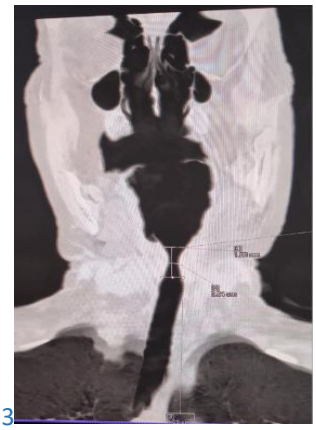
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Figure 1. A fully awake patient with a stuck ET tube after surgery; Figure 2. Endotracheal tube after extubation showing a complete ring formation at the distal end; Figure 3. A CT scan of airway after removal of stuck ET tube

Discussion

In this case of stuck ET tube after laparoscopic cholecystectomy in an otherwise healthy elderly lady was successfully extubated applying traction and slightly greater force after assessing with a flexible video scope and ultrasound.

Although unusual, difficulty in the extubation of ET tube in surgical patients has been reported and one of the common causes was failure to deflate the cuff.[1] Other reported cases were due to distorted laryngeal anatomy[5] and ET tube entangled[6] with a feeding tube.

Various techniques have been employed to remove the stuck ET tubes. In one case report, the patient was completely paralyzed and under direct visualization with a laryngoscope, the tube, and larynx were manipulated followed by forceful extubation in an 8 years old child laryngeal mass that ruptured during the process.[5]

Laryngeal edema is a common complication of endotracheal intubation which may be due to damage to the mucosa of the larynx. Pressure exerted by the cuff can lead to ischemia resulting in an inflammatory response. Laryngeal edema may narrow the airway resulting in difficulty in breathing which may require re-intubation. Glucocorticoids have been used to prevent laryngeal edema in risky patients. Intravenous corticosteroids, adrenaline nebulization, and an inhaled mixture of helium and oxygen have shown to be effective in its management.[7]

A similar case has been reported where the ET tube could not be extubated after completion of surgery. Flexible video scope examination did not show edema and inflammation of the oral cavity, peri glottic area, and trachea. The patient was successfully intubated with a 7.0 mm size of ET tube after failing to intubate with a 7.5 mm size. After an unsuccessful attempt by twisting and turning the ET tube, a forceful extubation revealed the tube cuff had formed a rigid near-complete ring-like structure at the distal end of the tube.[8]

After a thorough assessment of the airway with a flexible video scope and ultrasound, we managed to extubate the patient by applying sustained traction but with greater force than

usual without any complication.

Conclusion

This was a challenging case of a stuck ET tube after laparoscopic cholecystectomy in an otherwise healthy elderly lady. We could successfully extubate by applying slightly greater force after ensuring no obvious pathology by a flexible video scope and ultrasound. A CT scan after extubation was normal. Thorough assessment before using gentle force and re-assessment after extubation was done.

Author contribution

Concept and design- All (KA, GPD); Literature review- KA; Data collection and analysis- All; Draft- KA; Revision- All; Accountability- All authors have read and agreed to the final version of the manuscript.

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Conflict of interest

None

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Supplementary material

The data and supplementary material that support the findings of this study are available from the corresponding author upon reasonable request.

Consent

All the appropriate patient consent has been taken in the form of verbal and written. In the consent form, the patient gave consent for her images and other clinical information to be reported in the journal. The patient was counselled that her name and initials would not be published and due efforts would be made to conceal the identity, but anonymity cannot be guaranteed.

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