

## A case of Difficult Tracheal Extubation of an Armoured Endotracheal Tube

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### Abstract :

Use of repeatedly ETO sterilized armoured endotracheal tube is routine practice in our set up. Hereby we discuss a case of difficult tracheal extubation following prolonged intubation i.e. 11 hours for neuro surgical operation. The details of the procedure and causes are discussed

**Key Words :** Difficult Extubation, Endotracheal tube cuff, General Anaesthesia

### Introduction:

The problem of difficult intubation is well known to anaesthesiologists however difficulties with extubation is less common but can be equally as dangerous and even fatal. <sup>(1)</sup> The scarcity of reported cases in the medical literature is indicative of the low incidence of difficult extubation with the majority of these difficulties being due to incomplete deflation or folding of the tracheal tube cuff or inadvertent surgical fixation of the tube. <sup>(1, 2)</sup>

We reported a case of difficult extubation of an Armoured ET which was managed successfully.

### Case report:

A 45 years old female patient weighing 55 kg posted for Acoustic Neuroma surgery for right Cerebellar Pontine mass. On pre-operative assessment there was no past history of GA or tracheal intubation. No restriction in mouth opening or neck movement and inspection of pharyngeal structures revealed Mallampatti class ?. Patient was given general anaesthesia. Proper inflation & deflation of cuffed tube was checked preoperatively. Intubation done with well lubricated high volume low pressure cuffed armoured tube no. 36. Tube passed easily through vocal cords. Cuff inflated with 7 CC air till there was no palpable leak. Anaesthesia was maintained with O<sub>2</sub> and N<sub>2</sub>O (50% each) and Isoflurane 1% to 2%. Controlled ventilation of the lungs was achieved with Inj. Vecuronium Bromide. One hour after operation cuff was reinflated with 6 CC air as pilot balloon seemed deflated. Airway management was

otherwise uneventful during surgery. Total duration of surgery was 11 hours. At the end of surgery neuromuscular blockade was reversed. Pilot balloon deflated after proper suctioning. Extubation of the trachea was attempted but it was difficult. Attempt was made again to remove the tube carefully with substantial force or even after relaxation with Inj. Sodium Thiopentone 150 mg and Inj. Suxamethonium 25 mg but failed. Partial inflation or deflation of the tube cuff did not relieve the problem. On direct laryngoscopy there was no supraglottic edema or constriction and upper part of the tube cuff was seen to be inflated below vocal cords. We tried to deflate the cuff by cricothyroid membrane puncture (CMP) twice with 21 G intradermal needle but extubation was not possible. Inj. Dexamethasone 8 mg was given intravenously. Patient was conscious but co-operative. Then we used a spinal needle 20 G to puncture the cuff during direct observation using a laryngoscope. After 2 to 3 attempts it was possible to pull out the tube with some force. Patient was shifted to ICU and kept under close observation in a 15° to 20° head-up position. After one hour she developed hoarseness with strider. Nasal intubation with no.7.00 PVC cuffed tube was done under sedation with Injection Medazolam 3 mg IV. Injection Dexamethasone 8 mg IV repeated 8 hourly. Extubation was done next day morning. Indirect Laryngoscopy done next day showed mild laryngeal edema. Patient had sore throat for two days post operatively but no major complications such as respiratory discomfort or damage of the vocal cords or epiglottis were observed. Inspection of the tube showed no fold in cuff. Cuff of the tube cut opened, inspection of pilot balloon assembly was normal.

### Discussion:

Inability to remove the ET is a rare but potentially dangerous complication. Forcibly pulling out the tube with a fully inflated cuff can result in laryngeal trauma,

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vocal cord edema & dislocation of the arytenoids cartilage.<sup>(3)</sup> There is little evidence or guidance or protocol exists to address difficult tracheal extubation.<sup>(4)</sup>

Possible causes of inability to remove the tracheal tube are failure to deflate the cuff caused by a damaged pilot tube, trauma to the larynx, cuff herniation, adhesion to the tracheal wall and surgical fixation of the tube to adjacent structures.<sup>(5, 6)</sup> Anatomical abnormalities such as laryngeal web, a large anterior commissure tumour and congenital subglottic stenosis also contributed to difficult extubation by catching on the cuffs of ETs.<sup>(2, 7, 8)</sup> Sequelae can vary from aspiration to fatal haemorrhage if undue force is applied.<sup>(5)</sup>

In a case of difficult extubation which was precipitated by pulling off the pilot balloon & valve assembly in order to deflate the cuff, deflation of the cuff was eventually accomplished using a syringe and needle inserted past the occlusion in the stump of the pilot tube. Other suggested options includes the use of needle to puncture the cuff either during direct observation using a laryngoscope or through the CTM or simply by cutting the pilot tube proximal to the obstruction.<sup>(1)</sup> In an another case of difficulty in advancing a tracheal tube and subsequent difficult extubation in an asymptomatic patient, the origin of this complication was an unsuspected subglottic stenosis and a subsequent experiment showed how the relatively large folds of the of an armoured tube could become caught on a narrow section of the airway.<sup>(2)</sup> A case of difficult extubation of double lumen tube that required a cricoids split operation to facilitate its removal found that the presence of an air leak around an endotracheal tube should be confirmed prior to inflating the cuff and reconfirmed during a prolonged case by deflating and reinflating the cuff regularly.<sup>(8)</sup> Difficult extubation due to inability to deflate the ET cuff as a result of failure of pilot balloon assembly emphasized the importance of checking the ET cuff and pilot system before administration of anaesthesia even in the case of a new ET.<sup>(9)</sup>

In the present case the difficult tracheal extubation could not be related to any of the above mentioned causes. In our case pilot balloon assembly might have acted like one way valve because of repeated ETO sterilization of the tube, allowing the tube cuff to inflate but not to deflate. Further the duration of surgery was longer (11 hours) and the tube cuff might have dried up because of dry gases and stucked tightly with tracheal

wall. Close observation of the patient after difficult extubation is needed to treat any complication that arises. Injection Dexamethason 8 hourly and head up position post operatively helped to reduce edema in the region.

### **Conclusion:**

Difficult extubation should be handled efficiently without getting panicky. Try to rule out possible causes. Use techniques which does not cause trauma to airway. Observation of patient after extubation is necessary as it helps in managing the complications arising out of it and to reduce morbidity & mortality.

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