



Failed endotracheal tube cuff deflation due to unusual kinking of inflation tube

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Dear Editor;

In tonsillectomy patients, the Boyle–Davis mouth gag is conventionally used to open the oral cavity and obtain an optimum view for surgery. A previous study has reported that endotracheal tube (ETT) malpositioning is caused by the use of a Boyle–Davis mouth gag [1]. Herein, we present a rare complication of inflation tube kinking due to the use of the gag.

A 25-year-old female patient weighing 50 kg was scheduled to undergo bilateral tonsillectomy. The patient's history and physical examination findings were normal, except for a recent episode of an upper respiratory tract infection, for which she had received antibiotics and anti-allergies. The patient was transferred to the operating theater, and all monitors were attached. The anesthesia machine and equipment were checked. The flexometallic ETT was thoroughly examined for leaks and malfunctions.

After pre-oxygenation with 100% oxygen, the patient received fentanyl 100 mcg intravenous (IV) and propofol 100 mg IV injections. Cisatracurium 8 mg IV was also injected. The trachea was intubated with an 8.0-mm cuffed

flexometallic ETT (Romsons, Romsons Group Private Limited, Agra, India). The cuff was inflated, and air entry was checked and considered equal and adequate on both sides. Anesthesia was maintained with oxygen, nitrous oxide, isoflurane, and cisatracurium. The patient was then referred to a surgeon. They prepared the patient with proper neck extension and introduced the Boyle–Davis mouth gag for maximum vision and tonsil removal. Again, the air entry was checked, and both sides were considered equal and adequate. The patient was stable with all vital signs within normal limits. The surgery lasted 45 min. Upon completion of the surgery, inhalational anesthetic agents were discontinued. With a spontaneous respiratory effort, neostigmine 2.5 mg and glycopyrrolate 0.5 mcg were injected. The pilot balloon was deflated, and the ETT was removed. The ETT cuff was partially deflated upon extubation. However, we did not observe any resistance during extubation. The patient was fully awake and comfortable, with no signs of laryngospasm or respiratory difficulty. We administered dexamethasone 4 mg in a single-shot IV, and the patient was transferred to the recovery room. Upon careful examination of the ETT,

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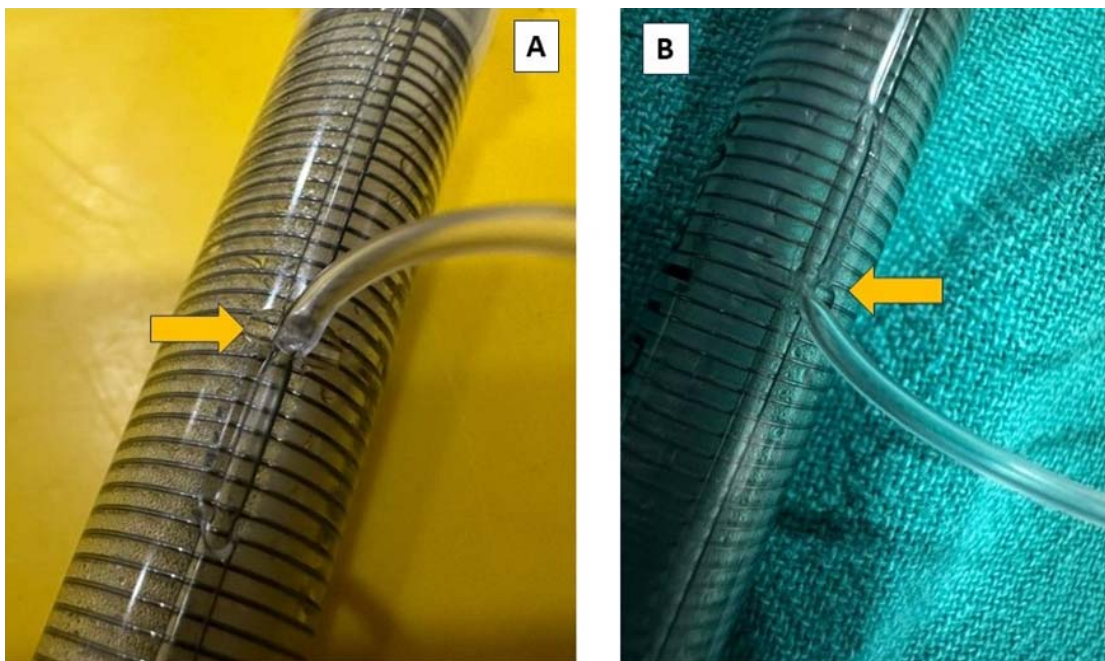


Fig. 1. Orthogonal views of the compressed inflation tube at the point of the entrance of the wall of the endotracheal tube (A, B)



Fig. 2. Deflated pilot balloon and the partially inflated cuff of the endotracheal tube

we observed that the inflation tube was constricted at the entrance into the wall of the ETT, which might have caused the incomplete cuff deflation (Figures 1 and 2). She was followed-up in the ward for any hoarseness of voice or breathing difficulty; however, the patient was fine and subsequently discharged.

The inability to deflate the ETT cuff is challenging. While the removal of the ETT is possible with incomplete deflation of the cuff, as in our case, there is a risk of trauma to the airway, which can lead to vocal cord injury and hoarseness [2]. We observed narrowing of the

inflation tube at the entrance to the ETT. We believe that this may be due to the point pressure exerted by the Boyle–Davis mouth gag when the patient was orally intubated. The Boyle–Davis mouth gag commonly causes global displacement of the ETT because of pressure, unlike in our case. Fennessy et al. have reported a similar problem in 22 of 23 patients undergoing tonsillectomy [1]. Nag et al. have reported a similar case of incomplete deflation of the ETT after removal [3]. The authors observed kinking of the inflation tube due to inappropriate tape fixation of the ETT. Suman et al. have reported a similar problem because the adhesive tape was too close to the balloon tube and ETT [4]. However, another case was reported by Adams et al., who observed that the pilot balloon malfunctioned because of an ETT bite blocker [5]. We were able to deflate the cuff and remove the ETT after removing the bite blocker. At the extreme end, there can be a complete inability to deflate the cuff and failure to remove the ETT. Borkar et al. resorted to puncturing the balloon with a 23 G spinal needle orally after failing to puncture via cricothyrotomy [6]. The cause of malfunction was a retained bandage in their case.

Incomplete or total failure of cuff deflation is possible

during ETT extubation, and many causes have been discussed. However, there is no evidence of an inflated cuff when the obstruction is distal to the deflated pilot balloon. While placing the Boyle–Davis mouth gag, the tongue depressor can compress the inflation tube. We recommend always checking the inflation line compression before allowing the surgeon to start the procedure. Moreover, a cuff leak test should be performed before extubation. It may be helpful to diagnose an inflated cuff in cases where the ETT is challenging to remove at the time of extubation. The inflation tube can be checked for kinking as one of the causes of failed cuff leak tests. However, it may not be helpful in a partially deflated cuffed ETTs, as in our case, although it can prevent the complications of tracheal extubation with a completely inflated cuff

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AUTHOR CONTRIBUTIONS

Bhavna Sriramka: Conceptualization, Data curation, Investigation

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Komal Sharma: Data curation, Methodology

Sara Zubair: Conceptualization, Data curation

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