



Unexpected Difficult Intubation with a Double-Lumen Tube in a Case of Asymptomatic Vallecular Cyst

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Abstract

Vallecular cyst (VC) can cause difficult intubation. If a double-lumen tube (DLT) has to be placed, difficulty in tracheal intubation becomes more complicated. The gum elastic bougie (GEB) is a widely used device for facilitating tracheal intubation. However, there is not enough study with DLT to make a prediction for success of GEB-guided intubation. Here, we aimed to describe our approach during unexpected difficult intubation due to VC in a patient required DLT insertion. We emphasize that, in the case of confronting a patient with asymptomatic VC as a cause of difficult intubation, a successful DLT intubation is possible by sliding endobronchial lumen of DLT over paediatric GEB.

Keywords: Unexpected difficult intubation, vallecular cyst, double-lumen tube, gum bougie

Introduction

Vallecular cyst (VC) is a congenital and benign cyst, filling between tongue base and epiglottis, and making tracheal intubation difficult although rarely seen in adults.^{1,2} If a double-lumen tube (DLT) has to be placed, difficulty in tracheal intubation becomes more complicated because of DLT's larger diameter and greater slope. Hereby, we aimed to state our approach in the process of unexpected difficult intubation due to asymptomatic VC in a case, with adenocarcinoma scheduled to pulmonary resection and one-lung ventilation.

Case Presentation

A 65-year-old, 103-kg, 181-cm male was evaluated preoperatively according to the medical history; the patient had bilateral renal cystic diseases and underwent operation for renal stone under general anaesthesia uneventfully 6 years ago. There were no symptoms such as hoarseness and dysphagia. Our patient has a Mallampati score of 3 and body mass index of 31.3 kg m^{-2} without limitation of neck movements. His interincisor distance was 4.5 cm. Moreover, thyromental and sternomental distances were 6 cm and 12 cm, respectively.

The patient was preoxygenated with 100% of inspired oxygen concentration prior to general anaesthesia in the operating room. Lidocaine (100 mg), propofol (200 mg), fentanyl (100 mcg) and rocuronium bromide (50 mg) were used for anaesthesia induction. An oral airway was placed, but mask ventilation was quite difficult. After addition of 20 mg rocuronium, a cystic structure filling nasopharynx was observed in laryngoscopy using Macintosh blade 3 while larynx was not visible. Epiglottis and vocal cords were not viewed again, in spite of repeated laryngoscopy with Macintosh blade 4, in the patient with Cormack-Lehane (CL) score of 4. A Miller type laryngoscope was not used to avoid unintentional rupture of the cyst due to a possible excessive compression. SpO₂ decreased to 88% during difficult mask ventilation. Then, fiberoptic bronchoscope (FOB) and videolaryngoscope were brought to the operating room immediately. Meanwhile, the paediatric gum elastic bougie (GEB) (10 Fr × 70 cm w/coude tip introducer paediatric bougie), which was available in the operating room, was inserted towards the behind of the cyst blindly by an experienced anaesthesiologist with the aid of Macintosh laryngoscope.



Figure 1. A DLT with endobronchial lumen slid over paediatric gum bougie.

We moved the bougie forward until feeling normal click's (not hold up). After the GEB was advanced through the trachea, endobronchial lumen of DLT (Tuoren endobronchial tube left-sided, 41 Fr) (Figure 1) was slid over the GEB. At the level of glottis DLT turned to the right slightly, whereas it was twisted to the left while moving forward in the passage. GEB was pulled back from oropharynx while DLT was advancing simultaneously.

Intubation time, described as the time between passage of GEB through the vocal cords and insertion of DLT over the GEB, was almost 30 seconds. After the endobronchial lumen of DLT was thought to be placed in the left side, end-tidal CO₂ value was 44 mmHg. Peripheral oxygen saturation increased to 99%. The location of DLT was checked with flexible intubation bronchoscope (FOB; Karl Storz, 4.0 × 65 Germany, 11302BD2) and verified that it was in left main bronchus.

Data of the patient were re-evaluated retrospectively, after having difficulties in intubation. Combined both positron

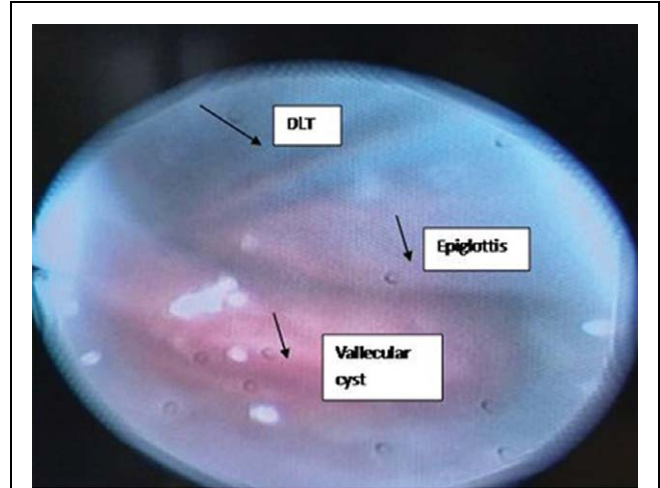


Figure 2. Appearance of the cystic lesion through FOB performed orally after placement of DLT.

emission tomography and computer tomography (CT) results after pre-anaesthetic evaluation revealed a mucosal cyst that filled the vallecula which was referred to ear nose throat specialist for endoscopic examination without informing anaesthesiologist prior to surgery.

After intubation, using FOB through the mouth, cyst was seen intact and images were taken in the patient with supine position (Figure 2). Video-assisted thoracoscopic surgery technique and right lower lobectomy were performed successfully, and the patient recovered in the operating room uneventfully. Written consent for publication has been obtained from the patient.

Discussion

Difficult airway is one of the primary causes of the anaesthesia-associated morbidity and mortality. VC is a rare presentation in adult and may cause difficult intubation via obscured for airway. DLT remains the gold standard in airway management for thoracic surgery. Placement of a DLT is more complicated than that of a standard tracheal tube because the DLT is larger in diameter, longer, and has a more fixed shape. Bougie usage in the management of unexpected difficult endotracheal intubation with single-lumen tube is an important component of plan A according to algorithm of Difficult Airway Society. With the aid of the bougie using single-lumen tube, the initial successful intubation rate in the first attempt was stated as 89%.³ Blind bougie insertion is associated with trauma and is not recommended for CL score 3b or 4.⁴ Although CL score is 4, we tried endobronchial intubation with DLT over GEB in our patient who had difficulty of mask ventilation and desaturation.

It is recommended that after a single intubation attempt with the GEB fails in emergent patients with a CL grade 4

Main Points

- It should be kept in mind that an asymptomatic vallecula cyst may cause unexpectedly difficult ventilation and intubation by obstructing larynx and covering glottis in a patient undergoing thoracic surgery.
- A universally accepted guideline should be established that includes a custom algorithm rather than modified algorithms in unexpected difficult intubation with DLT.
- In unexpected difficult intubation, it should be considered that successful intubation may be possible by sliding the bronchial lumen of the DLT over the pediatric GEB placed in the trachea in a patient with vallecula cyst.
- Although the use of GEB is not recommended in CL 3b and 4 patients, it may be life-saving to try once in the case of unexpected ventilation and intubation difficulties.

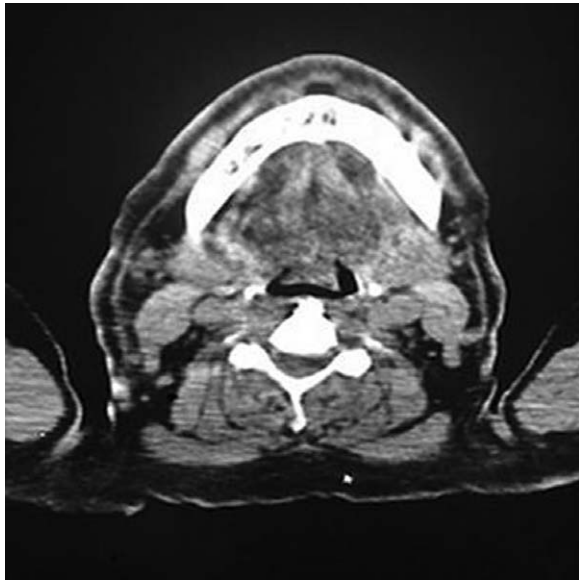


Figure 3. View of the lesion with a maximum width of 2.36 cm and an antero posterior diameter of 1.25 cm at the level of vallecula.

laryngoscopic view, other devices should be used immediately.⁵ Riaz et al.⁶ reported a successful GEB-guided endotracheal intubation using a conventional laryngoscope in a patient with obscured glottis vision by VC. Similarly, we performed endobronchial intubation by sliding DLT over GEB, which we placed in the trachea using a Macintosh laryngoscope.

In our practice of clinic, pushing forward DLT over paediatric GEB, in the patients who have CL score 2b/3a and intubation difficulties with Macintosh laryngoscope is an applied method. The larger size and the concavities of DLT might contribute to unsuccessful intubation in some instances. Bougie assisted intubation with DLT might provide easiness and decrease the side effects.

Thus, we also believe that the increased risk of airway trauma, such as bleeding and oedema caused by unsuccessful and repeated intubation attempts, may be reduced. However, there is not enough study with DLT to make a prediction for success of GEB-guided intubation.

We have not been informed about the presence of VC in our case. After the operation, when the CT was reevaluated together with the radiologist, the lesion which was filling vallecula it couldn't be distinguished from the surrounding tissue (Figure 3). We think that the fact that our patient was asymptomatic and we were not informed about the PET report caused us to encounter unexpectedly difficult intubation.

Despite use of videolaryngoscopy, FOB and, videolaryngoscopy or direct laryngoscopy combined with FOB have also

been described in standard difficult intubation scenarios,^{7,8} information about successful use of videolaryngoscope and FOB for DLT insertion especially in the case of unexpected difficult intubation is still limited. And their use requires experience to succeed. Paediatric FOB is required for DLT, and its manipulation is more difficult than for single-lumen tube. An accepted guideline has not yet been available for DLT use in difficult intubation but a review has recently addressed an algorithm including the use of introducers such as GEB in unexpected difficult intubation for thoracic surgery.⁹

Conclusion

We emphasise that successful DLT intubation is possible by sliding endobronchial lumen of DLT over paediatric GEB in a patient with asymptomatic VC as a cause of difficult intubation. In the case of unexpected difficult intubation with DLT, Intubation with a Macintosh laryngoscopy-assisted bougie can be tried once before attempting devices, such as videolaryngoscope or FOB.

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