

CASE REPORT

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Asymptomatic giant epiglottic cyst causing an unexpectedly difficult airway: a case report

Shunyu Han¹ and Guoyan Yang^{1*}

Abstract

Background Giant epiglottic cysts can cause throat discomfort, a sensation of foreign body presence in the throat, and respiratory distress. Furthermore, individuals without symptoms might face difficulties with airway management during anesthesia-related emergencies. In extreme situations, a tracheostomy might be required.

Case presentation A 61-year-old man, who was diagnosed with a left heel spur, decided to undergo an arthroscopic osteotomy. The process of ventilating with an anesthesia mask grew more difficult and eventually impossible following the insertion of the laryngeal mask. The giant epiglottic cyst was identified through video laryngoscopy, which also facilitated successful tracheal intubation.

Conclusion For any surgery, it is essential to conduct a comprehensive anesthesia assessment, particularly for difficult airway risks. Using video laryngoscopy promptly can enhance intubation success, and suitable ventilation tools can help in failed intubation scenarios. While new technologies can facilitate airway assessment and management, mastering techniques like FONA techniques is still essential. However, calling for help in all cases remains paramount.

Keywords Epiglottic cyst, Difficult airway, Tracheal intubation, Anesthesia assessment, Video laryngoscope

Background

Epiglottic cysts are benign lesions resulting from the obstruction and retention of glandular secretions, and they can be observed in individuals across all age groups [1]. The historical occurrence of epiglottic cysts during laryngoscopy is 4 in 5000 cases (0.08%), with larger cysts being even rarer at 0.02% [2]. For adults, these cysts can be symptomless or cause minor symptoms such as feeling discomfort in the throat, a sensation of foreign body or obstruction. With the growth of the cyst, these symptoms may worsen, possibly causing breathing

difficulties [1]. Although small, incidental cysts might not need treatment, larger cysts with symptoms usually require surgical intervention [3]. It is essential to carefully manage large epiglottic cysts during tracheal intubation to prevent puncture, which might result in aspiration or hemorrhage [4]. In extreme situations, a tracheostomy might be required.

Case presentation

A 61-year-old man (height: 1.65 m; weight: 77 kg), complained of persistent pain in his left heel for over ten days. Radiographic imaging revealed a heel spur on the left heel. The patient underwent an elective arthroscopic spur resection. While pre-anesthesia assessment revealed that the patient had no previous exposure to anesthesia or medication. American Society of Anesthesiologists (ASA) grade II and Mallampati grade I. And no history

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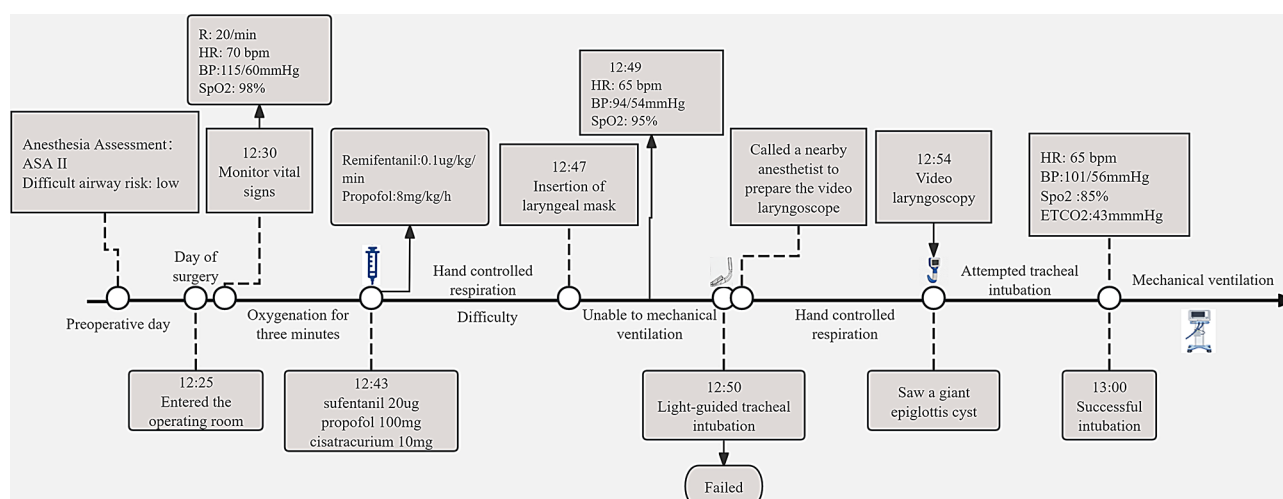


Fig. 1 The intubation process

of snoring, cervical motion was in the normal range. No abnormalities on the chest CT. The planned anesthetic management included general anesthesia with laryngeal mask ventilation.

Day of operation, the patient was taken into the operating room. The vital signs were recorded: respiratory rate 20/min, heart rate 70 bpm, blood pressure 115/60 mmHg, and peripheral oxygen saturation (SpO_2) 98%. Following 3 min of preoxygenation with 6 L/min oxygenation. The patient received intravenous administration of 20 μg of sufentanil, 10 mg of cisatracurium, and 100 mg of propofol. Once breathing ceases, initiate mask ventilation. Despite this, airway pressure continues to rise, making ventilation impossible, and elevating the jaw did not improve the situation. The anesthesiologist promptly inserted a size 4 laryngeal mask to enhance ventilation; however, despite several adjustments, ventilation remained unsuccessful. An additional anesthesiologist was called in to prepare for video laryngoscopy. Meanwhile, the anesthesiologist attempted light-guided tracheal intubation, which also failed. The video laryngoscopy was performed when it was ready, and a large epiglottic cyst was discovered that completely obstructed the glottis. Significant challenges were encountered during intubation under these conditions to avoid puncturing the epiglottic cyst. An otolaryngologist was called in to aid in the tracheostomy preparation. With the help of a video laryngoscope, the anesthesiologist used the endotracheal tube's tip to elevate the epiglottic cyst, revealing part of the glottis. Through the opening, the endotracheal tube was successfully inserted, resulting in the placement of a size 6.5 # tube. The attempt was successful, and the tracheal tube was subsequently fixed following the adjustment of mechanical ventilation. The procedure (Fig. 1) lasted about 15 min. During this time, the patient's vital signs

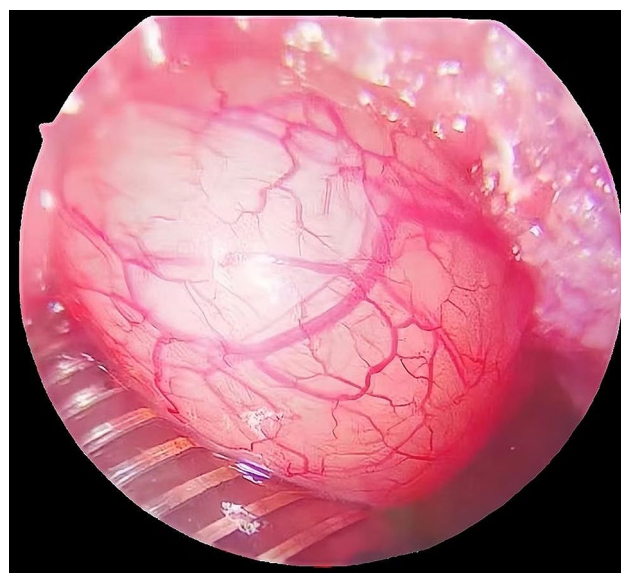


Fig. 2 A giant epiglottic cyst measuring 2×3 cm was identified during video laryngoscopy, occupying the entire epiglottic surface and completely obscuring the vocal folds prior to intubation. Additionally, the cyst impeded effective laryngeal mask ventilat

were: heart rate 65 bpm, blood pressure 101/56 mmHg, SpO_2 dropped to 85% for less than a minute, and end-tidal CO_2 at 43 mmHg.

Following the initiation of mechanical ventilation, an image was captured of the cyst, which measured 2×3 cm and completely covered the epiglottic surface (Fig. 2). After informing the family, they requested the simultaneous removal of the epiglottic cyst. The otolaryngologist stabilized the supporting laryngoscope and grasped the cyst with fiber forceps, excising it entirely using plasma energy. A significant amount of pale yellow fluid was found within the cyst. With no residual tissue remaining and hemostasis achieved, the surgery

was completed. It was also observed that the epiglottis had lost its original shape (Fig. 3). The surgery procedure was completed in 135 min. The patient was successfully extubated after waking up and then returned to the ward, and was discharged home seven days postoperatively. However, a retrospective review of the medical records indicated that the chest CT scan did not detect the epiglottic cyst.

Discussion

Giant epiglottic cysts are exceedingly rare, especially in asymptomatic cases. In addition, these cysts can create complications in airway management and possibly cause an emergency during tracheal intubation. The presence of giant epiglottic cysts may obstruct the vocal folds, requiring preventing puncturing the cyst during intubation, which could result in aspiration or hemorrhage. A similar report [5] describes successful intubation after withdrawing cystic fluid with a syringe pre-intubation. Lin [6] documented the management of seven cases involving patients with large epiglottic cysts, all of whom received definitive preoperative diagnoses. Before intubation, they evaluated the feasibility of mask ventilation under sedation; despite these preparatory measures, several attempts were unsuccessful. Takaishi [2] also reported four cases of undiagnosed epiglottic cysts identified during anesthesia induction. These patients had a history of snoring or exertional dyspnea preoperatively but were not subjected to further investigation. Fortunately, they did not experience any difficulties with mask ventilation.

Based on previous studies, it is important to evaluate mask ventilation in the face of unexpected epiglottic cysts. If mask ventilation is adequate, video laryngoscope-assisted intubation is very effective. However, if mask ventilation is insufficient and intubation is difficult, intervention may be required according to difficult airway guidelines.

The management of the difficult airway is a critical aspect of anesthesia development. Without imaging and laryngoscopic support, preoperative assessment is essential. Key components of this assessment include interincisor distance (IID), the upper lip bite test (ULBT), and the Mallampati classification. The European Society of Anesthesiology and Intensive Care (ESAIC) recommends a comprehensive evaluation of the airway and multiple tests before any surgery. A multilevel airway assessment should include anatomical factors (e.g., upper lip bite test, mandibular hypoplasia), physiological factors (e.g., history of airway issues, preexisting hypoxemia), and environmental factors (e.g., operator experience, airway-related surgical conflicts) [7].

A study has demonstrated that the Condyle-Tragus Maximal Distance (C-TMD) is more valuable than

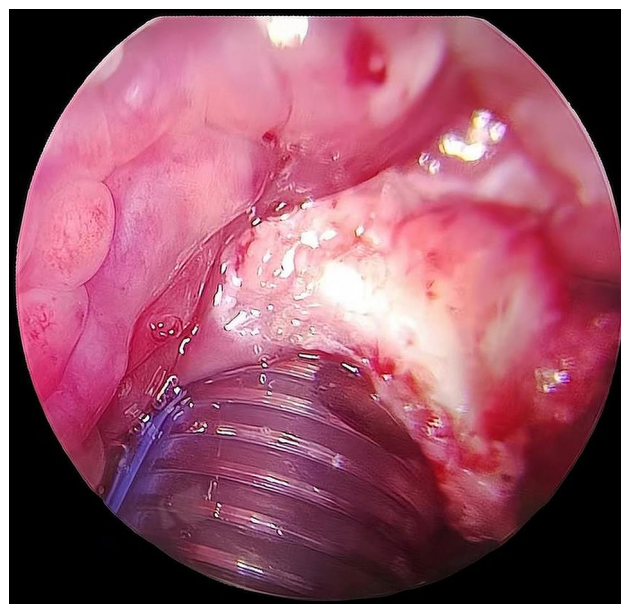


Fig. 3 The image demonstrates that the epiglottis has altered from its original morphology following the excision of the epiglottic cyst

traditional measures for preoperative airway assessment [8]. Additionally, Front of Neck Access (FONA) should be considered as part of the multilevel airway evaluation, particularly in identifying potential challenges associated with cricothyrotomy. Despite the significantly reduced likelihood of encountering difficulties during intubation, it remains imperative to learn and teach FONA techniques [9].

In cases of asymptomatic epiglottic cysts, external assessment of anatomical positional changes following anesthesia is not feasible. For patients presenting with anatomical abnormalities, experts recommend the use of imaging techniques to ensure accurate detection [10]. Imaging modalities such as computed tomography (CT), magnetic resonance imaging (MRI), X-rays, and ultrasound (US) are effective in delineating the anatomical features of the upper airway and are recommended for the evaluation of difficult airways. However, considering cost, equipment availability and radiation exposure, upper airway ultrasound is often favored as the preferred modality [11, 12]. Nonetheless, there is insufficient evidence to support the routine application of these tests [7].

Artificial intelligence (AI) algorithms are increasingly used in predicting difficult airways. By integrating imaging techniques such as X-rays, CT, and MRI, AI develops individualized algorithms tailored to the anatomical features of a patient's airway. Furthermore, it can assess the likelihood of difficult intubation by analyzing various patient data, including medical history, age, weight, and facial characteristics. The sensitivity of

these predictive models is approximately 80–90%, while their specificity ranges from 90–100% [11, 13].

Airway management is on the brink of a revolution with the emergence of robotic intubation technology. Robotic intubation aims to achieve precise and objective intubation by combining the precision, control, and visualization capabilities of robotic systems with the expertise of medical professionals. Notable systems, such as the Da Vinci and Kepler, have been under exploration in this field for over a decade. In 2018, the prototype IntuBot was introduced as an automated intubation solution, indicating that AI and automation are likely to shape the future of intelligent airway management systems. However, the high cost of these technologies remains a significant barrier to widespread adoption [14].

Additionally, the selection of airway devices is critical in managing intubation. While video laryngoscopy is often preferred for intubating patients in the operating room [15], traditional tracheal intubation may not always be the optimal choice. Therefore, it is essential to ensure that tracheal intubation equipment is readily available when needed. In cases of failed intubation, supraglottic devices can serve as effective alternatives [16].

This case was managed by a senior anesthesiologist, whose expertise in difficult airway management was crucial to its success. Because decisions made under the pressure of a difficult airway can lead to errors [16]. In most cases, comprehensive preoperative assessment and preparing for airway management could improve this situation.

Conclusion

For any surgery, it is essential to conduct a comprehensive anesthesia assessment, particularly for difficult airway risks. Using video laryngoscopy promptly can enhance intubation success, and suitable ventilation tools can help in failed intubation scenarios. While new technologies can facilitate airway assessment and management, mastering techniques like FONA techniques is still essential. However, calling for help in all cases remains paramount.

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Author contributions

SYH wrote the manuscript. GYY managed the patients. All authors read and approved the final manuscript.

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Data availability

All information pertaining to this case report is included in the manuscript.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

The written informed consent for publication was obtained from the patient.

Competing interests

The authors declare no competing interests.

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