

A Case Report: Anesthetic Management of a Patient with Unexpected Difficult Airway Due to an Asymptomatic Giant Epiglottic Cyst

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Case Report

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Abstract

Background

Epiglottic cysts are non-cancerous lesions, and their causes are mainly related to blockage of mucus gland discharge channels and accumulation of secretions. Huge epiglottic cysts generally have no obvious symptoms at the beginning, but when they gradually grow, they can lead to poor breathing, a foreign body sensation in the pharynx, acute epiglottitis, etc. Patients with asymptomatic epiglottic cysts may face difficulties in airway management during anesthesia-related emergencies, may lead to poor ventilation or difficulty intubation during rapid induction of general anesthesia, and may require tracheotomy in extreme cases.

Objective

To explore strategies for identifying and managing unexpected difficult airway in patients with asymptomatic giant epiglottic cyst after induction of anesthesia.

Case presentation

A 60-year-old woman was diagnosed with gallbladder stones with cholecystitis upon admission and decided to undergo laparoscopic cholecystectomy. After induction of anesthesia, difficulty in ventilation with a mask occurred. A huge cyst was seen to obscure the glottis during video laryngoscope intubation, and the first tracheal intubation failed.

Conclusion

A comprehensive anesthesia assessment is crucial for any surgery, especially for patients at risk of difficult airways. Asymptomatic giant epiglottic cysts are a potential airway crisis factor. Timely use of video laryngoscope can facilitate airway assessment, and appropriate ventilation tools can provide assistance in the event of failure of intubation.

Background

Epiglottic cysts are common benign space-occupying lesions in the hypopharynx^[1]. They are mostly caused by obstruction of mucous gland ducts of the epiglottic mucosa or congenital abnormalities^[2]. Small-volume cysts have no obvious clinical symptoms and are only accidentally discovered during physical examination or other disease examinations; When the volume of the cyst increases to a certain extent, symptoms such as sore throat, feeling of swallowing foreign bodies, and difficulty breathing may occur^[3–4]. In severe cases, airway obstruction may occur due to the cyst blocking the laryngeal entrance. Difficult airway is a relatively critical situation in clinical practice in the anesthesiology department. However, unexpected difficult airway caused by asymptomatic huge epiglottic cysts has no obvious warning signal before surgery. If anesthesia is not handled properly, cyst displacement and airway obstruction can easily occur during the induction period, which in turn leads to serious complications

such as asphyxia and cardiac arrest, with a high mortality rate^[5]. At present, there are many clinical reports on the anesthesia management of symptomatic epiglottic cysts, but the analysis of cases of asymptomatic giant epiglottic cysts causing unexpected difficult airway is relatively rare.

Case presentation

Normal circumstances

A 60-year-old female (height 1.55 m; weight 57.1 kg) experienced recurrent epigastric pain for 1 year and then for 3 days. Imaging examination showed cholecystitis, multiple gallbladder stones, and gallbladder mud deposition. The patient underwent elective laparoscopic cholecystectomy. The patient had a history of hypertension for more than 10 years and was diagnosed with Grade 2 hypertension (moderate-risk). she took amlodipine besylate tablets 1#qd and valsartan and hydrochlorothiazide tablets 1#qd orally for a long time, and complained that her blood pressure was reasonably controlled. One year ago, she was diagnosed with middle cerebral artery occlusion, and took aspirin enteric-coated tablets 1#qd (the drug had been stopped for 1 week before surgery) and atorvastatin calcium tablets 1#qd.

Preoperative anesthesia assessment

The American Society of Anesthesiologists (ASA) classification was Class II, and the Mallampati classification was Class II. The patient occasionally snore, had no airway related symptoms such as sore throat, feeling of swallowing foreign bodies, and difficulty breathing. her neck movement was normal, and her mouth opening was moderate. Laboratory tests: White blood cell count was $5.9 \times 10^9/L$, neutrophil percentage was 62%, high-sensitivity C-reactive protein was 6.6mg/L; alanine aminotransferase was 349U/L, aspartate aminotransferase was 226U/L, total bilirubin was 70.1 μ mol/L, direct bilirubin was 34.8 μ mol/L, indirect bilirubin was 35.3 μ mol/L; no obvious abnormalities were found on chest CT, thoracic and abdominal ultrasound showed cholecystitis, multiple gallbladder stones, etc., and laryngoscope related examinations were not performed. The preoperative anesthesia assessment considered that the patient had no clear risk factors for difficult airway, and routine tracheal intubation was planned for general anesthesia.

Preoperative preparation

Routine preparation of anesthesia machines, masks, laryngoscopes, 7.0#tracheal tubes, guide wires, sputum aspirators and other airway devices, video laryngoscopes, and intraoperative monitoring of electrocardiogram, non-invasive blood pressure, heart rate, peripheral oxygen saturation (SpO₂), end-tidal carbon dioxide (ETCO₂).

Airway treatment during anesthesia induction

On the day of surgery, the patient was taken to the operating room for routine physical testing. Vital signs were recorded: respiratory rate 18 beats/min, heart rate 80 beats/min, blood pressure 150/89mmHg, and peripheral oxygen saturation (SpO₂) 100%. The patient was in supine position, disinfected and draped after successful general anesthesia, and received intravenous injection of 10 mg of remazolam, 25µg sufentanil, 10mg cistracurium and 80 mg propofol for anesthesia induction before surgery. After 3 minutes of sufficient oxygen denitrification, a video laryngoscope was placed in preparation for tracheal intubation. A huge epiglottic cyst was found to completely block the glottis (Fig. 1). Intubation in this case is a major challenge and puncture of the epiglottic cyst must be avoided, otherwise aspiration or bleeding may occur. The operating doctor immediately decided to withdraw the video laryngoscope and re-perform mask ventilation, while inviting an otolaryngologist to assist in preparing for the tracheotomy. With the help of a video laryngoscope, the anesthesiologist uses the tip of a tracheal tube to lift the epiglottic cyst to expose the back of the glottis. The endotracheal tube was successfully inserted, and finally the 7.0# catheter was placed. The result was successful, and mechanical ventilation was then adjusted. The process lasts for approximately 10 minutes. During this period, the patient's vital signs were: heart rate 70 beats/min, blood pressure 140/80mmHg, SpO₂ 100%, and end-tidal carbon dioxide (ETCO₂) was 37mmHg.

After mechanical ventilation began, images of the cyst were taken with the help of video laryngoscope, measuring 2×2cm, completely covering the surface of the epiglottis (Fig. 2). After informing the family, they decided to have an elective epiglottic cyst resection. After the operation, the patient was successfully extubated and returned to the ward after awakening. One month later, the patient decided to undergo epiglottic cyst resection under general anesthesia with tracheal intubation. Before surgery, the patient was examined with electronic laryngoscope (Fig. 3) to determine the location and size of the epiglottic cyst. According to the foreseeable difficult airway process, an emergency anesthesia plan was formulated before anesthesia, that is, during anesthesia induction and airway establishment. The entire anesthesia operation process was smooth. The patient woke up and was extubated and returned to the ward. After the operation, electronic laryngoscope examination was performed (Fig. 4). However, a retrospective analysis of medical records showed that no epiglottic cysts were detected on chest CT scans.

Anesthetic airway management plan for epiglottic cyst resection

The patient was diagnosed with an asymptomatic giant epiglottic cyst after surgery, and it was planned to undergo elective epiglottic cyst resection 1 month later. In view of the patient's foreseeable difficult airway, a standardized airway management plan was formulated before surgery: ¶Personnel preparation: Two anesthesiologists will perform anesthesia operations, at least one of whom has the title of deputy chief physician or above, and an otolaryngologist will be present to assist throughout the process; ¶Device preparation: routinely prepare video laryngoscope, fiberoptic bronchoscope, 7#reinforced tracheal tube, and guide wire. At the same time, prepare emergency tracheotomy kits and cricothyroid puncture needles to prepare for the establishment of surgical airway; ¶Preoperative

assessment: Electronic laryngoscope examination was performed before surgery to clarify the position, size, root and relationship with the surrounding anatomical structures of the cyst; ¶Anesthesia induction: Adopt a slow induction method that retains spontaneous breathing to avoid rapid induction leading to relaxation of airway muscles and causing cyst displacement and obstruction of the airway. SpO₂ is continuously monitored during induction to keep the patient breathing spontaneously; ¶Intraoperative monitoring: Airway pressure and ETCO₂ are continuously monitored during the induction, and gentle operation is carried out to avoid damaging the mucosa of the operation area and causing edema; ¶Postoperative extubation: After the operation, laryngoscope review was performed to confirm that there was no edema or bleeding in the laryngopharyngeal cavity. After the patient's spontaneous breathing was stable, the tube was removed, and emergency equipment such as backup mask and airway were removed.

The patient underwent epiglottic cyst resection according to the above plan. The induction of anesthesia, airway establishment, intraoperative management and postoperative extubation were smooth, and there were no airway related complications. Two weeks after the operation with electronic laryngoscope, light yellow scab skin-like attachments were seen in the lingual operation area of the epiglottis, and there were no obvious congestion or edema in the surrounding mucosa, and no signs of cyst residue or recurrence (Fig. 5).

Discussion

Epiglottic cysts mostly originate from obstruction of mucous gland ducts, grow slowly, and often have no obvious symptoms in the early stage^[6]. When the volume of the cyst increases to a certain extent, especially when it is located on the lingual surface of the epiglottis or the vestibule of the larynx, it can occupy the airway space and change the local anatomical structure^[7-8]. This case was a typical asymptomatic huge epiglottic cyst that caused unexpected difficult airway during the induction period of anesthesia. The patient had no airway related symptoms before surgery. No cyst was detected on chest CT. Mallampati classification was Grade II. There were no clear risk factors for difficult airway. As a result, hidden airway lesions were not identified in preoperative anesthesia evaluation. However, after induction of anesthesia, the upper airway muscles were relaxed due to the action of muscle relaxants, and the cyst was displaced, which led to difficulty in mask ventilation and failure of glottis exposure. The anesthesia airway treatment process in this case reflects the timeliness of emergency treatment, the rationality of device selection, the standardization of operation and the importance of multidisciplinary collaboration^[9].

Missed diagnosis of an asymptomatic giant epiglottic cyst before operation was the core reason for this accident's difficult airway^[10]. In this case, the patient underwent chest CT examination and no cyst was found, mainly because the scanning range of chest CT extended to the upper part of the glottic region, and the resolution of the small lesions on the lingual surface of the epiglottis was insufficient, and laryngoscopy was not routinely performed clinically when there were no airway related symptoms,

resulting in the invisible airway lesions being ignored^[11]. At the same time, patients' occasional snoring symptoms have not attracted the attention of anesthesiologists. Snoring is an important early warning sign of upper airway stenosis. Airway-related examinations should be further improved for such patients. Lin^[12] documented seven patients with epiglottic cyst diagnosed preoperatively, and the surgical plan was determined. Before intubation, the doctor evaluated the feasibility of mask ventilation under sedation; however, multiple attempts at intubation were unsuccessful. A retrospective study^[13] identified undiagnosed epiglottic cysts during intubation in four patients undergoing oral surgery under general anesthesia. Among these cases of undiagnosed epiglottic cysts, two patients presented with mild exertional dyspnea or snoring, while the remaining patients were asymptomatic.

Preoperative assessment of difficult airway should involve a comprehensive integration of medical history, physical examination, and auxiliary tests. For patients with risk factors such as snoring, obesity, short and thick neck, or maxillofacial deformities, further examinations like laryngoscopy and cervical CT/MRI should be performed to clarify the anatomy of the upper airway^[15–16]. For patients undergoing non-airway surgeries, such as abdominal or orthopedic procedures, the completeness of airway assessment is often overlooked in clinical practice. This case highlights that even in the absence of obvious airway symptoms, preoperative evaluation should include laryngoscopy or thin-slice cervical CT for patients with warning signs of upper airway narrowing, such as snoring. This is particularly important for elderly patients, as degenerative changes in mucosal glands predispose them to cyst formation. Greater awareness of screening for occult airway pathologies is essential to reduce preoperative oversight.

Management of difficult airways is a critical aspect of anesthesia practice. In this case, after encountering difficulty with mask ventilation, the anesthesiologist promptly discontinued blind positive-pressure ventilation, thereby preventing severe complications such as cyst rupture and aspiration resulting from excessive airway pressure. Simultaneously, the difficult airway emergency protocol was rapidly activated, gaining valuable time for subsequent airway establishment. Furthermore, the selection of airway devices plays a vital role in managing intubation. Here, instead of attempting multiple blind intubations, the anesthesiologist promptly employed video laryngoscopy, which not only identified the cause of airway obstruction but also provided visual guidance for the intubation process, serving as a key factor in the successful resolution of this airway crisis. Although video laryngoscopy is often the preferred method for tracheal intubation in the operating room, conventional 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 airway devices can serve as an effective alternative^[17].

Unexpected difficult airway caused by asymptomatic huge epiglottic cysts involves multiple departments such as anesthesiology, otolaryngology, and general surgery. Multidisciplinary collaboration is an important support to ensure the safety of patients' airway^[18]. In this case, after an airway crisis occurred during the anesthesia induction period, an otolaryngologist was immediately invited to assist in

preparing for an emergency tracheotomy, which provided guarantee for airway management; the anesthesia plan for subsequent epiglottic cyst resection was jointly formulated by the Department of Anesthesiology and the otolaryngology, clarifying the key points and emergency measures for airway management, ensuring the smooth progress of surgery and anesthesia. In clinical practice, for patients undergoing non-airway surgery, if a space-occupying lesion in the upper airway is found before surgery or suspected during surgery, they should promptly communicate with the otolaryngology department to improve relevant examinations, formulate personalized airway management plans, and postpone non-airway surgery if necessary., prioritize airway lesions and avoid airway crises.

Conclusion

Asymptomatic giant epiglottic cysts are an important risk factor for clinically concealed difficult airway. They are easily missed due to the lack of typical symptoms before surgery. During the anesthesia induction period, cyst displacement can cause airway crises such as difficulty in mask ventilation and failure of glottis exposure. Video laryngoscope has important application value in the assessment and management of difficult airways caused by asymptomatic giant epiglottic cysts. It can significantly improve the efficiency of glottis exposure and reduce operating time. It is the preferred device for airway treatment in such patients. Clinical anesthesiologists should improve their awareness of identifying hidden difficult airways and standardize the emergency treatment process for difficult airways, thereby reducing the incidence of airway related complications and ensuring patient anesthesia safety.

Declarations

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Ethics approval and consent to participate

This retrospective case report was conducted in accordance with the Declaration of Helsinki. The study protocol was approved by the Ethics Committee of The Affiliated Yangming Hospital of Ningbo University (Yuyao People's Hospital) (Approval No. [2026-02-005]). Given the retrospective nature of the study, the requirement for *written informed consent for participation* was waived by the Ethics Committee. Patient data were completely anonymized with no identifiable personal information disclosed.

Consent for publication

Written informed consent for the publication of this case report, including clinical details and any potentially identifiable images, was obtained from the patient

during a follow-up visit after the second surgery, prior to the formal ethics application.

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Figures

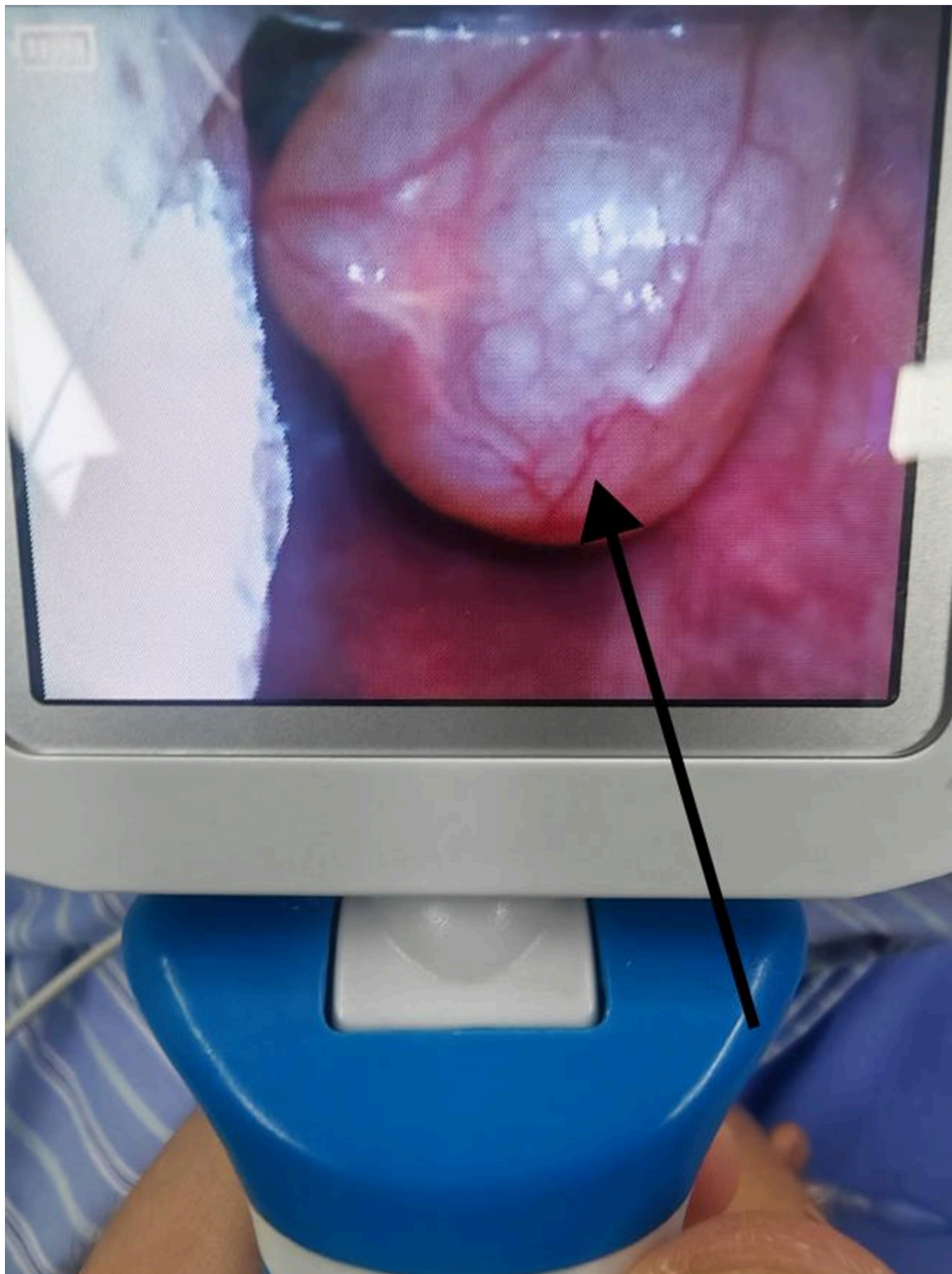


Figure 1

When the patient was undergoing laparoscopic cholecystectomy with general anesthesia and tracheal intubation, a round, translucent cystic bulge was found under the video laryngoscope (arrow points to the cystic lesion) on the lingual surface of the epiglottis. The surface mucosa was smooth, and the blood vessel texture was clear. The capsule wall was thin and the clear contents in the capsule were visible. The epiglottis and glottis could not be seen clearly.

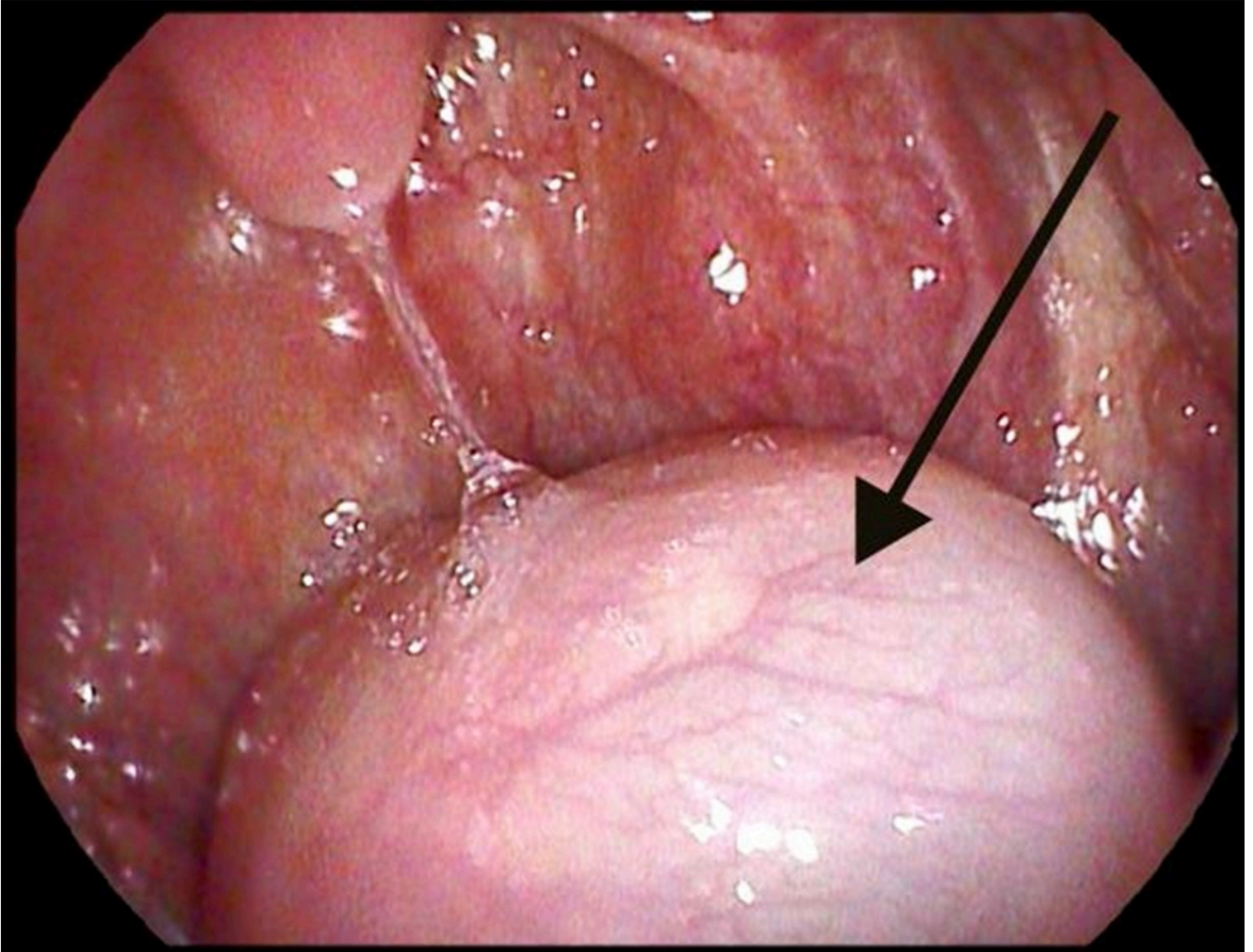


Figure 2

Fiberoptic laryngoscope examination records before epiglottic cyst operation. In the mucosal area between the oropharyngeal cavity, the root of the uvula and the epiglottic valley, a cystic bulge can be seen (arrow points to the cystic lesion), the surface is covered with a small amount of mucus, and the surrounding mucosa shows physiological folds.

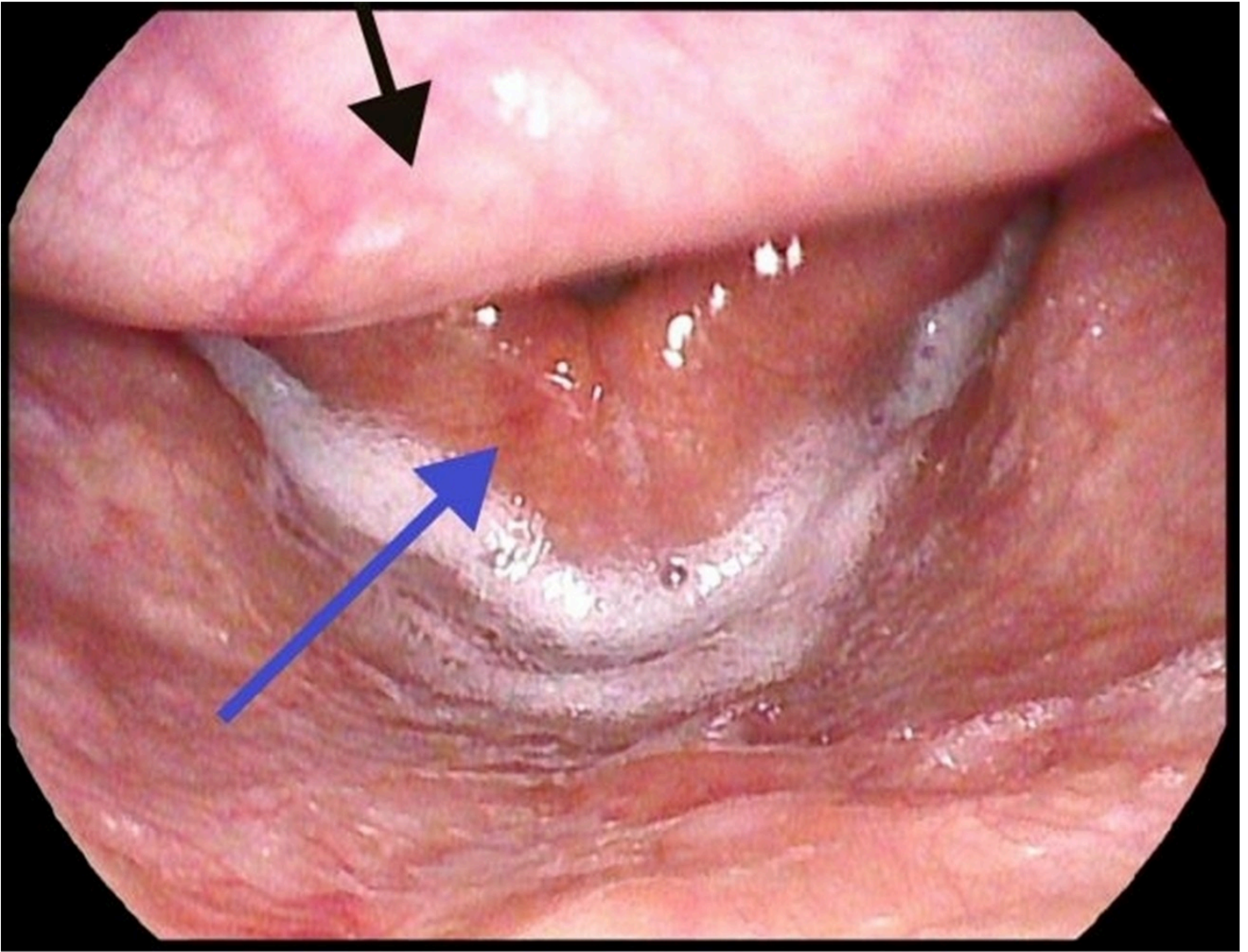


Figure 3

The fiberoptic laryngoscope examination record of epiglottic cyst resection. The lens penetrates through the oropharynx to the laryngopharyngeal entrance. The blue arrow points to the normal epiglottis with smooth surface and fine blood vessel texture can be seen. It is an important anatomical landmark of the larynx. Black arrow: Points to the cyst at the junction of the dorsal root of the tongue and the epiglottic Valley. The cyst is light pink and round, with complete surface mucosa and clear boundaries with surrounding tissues.

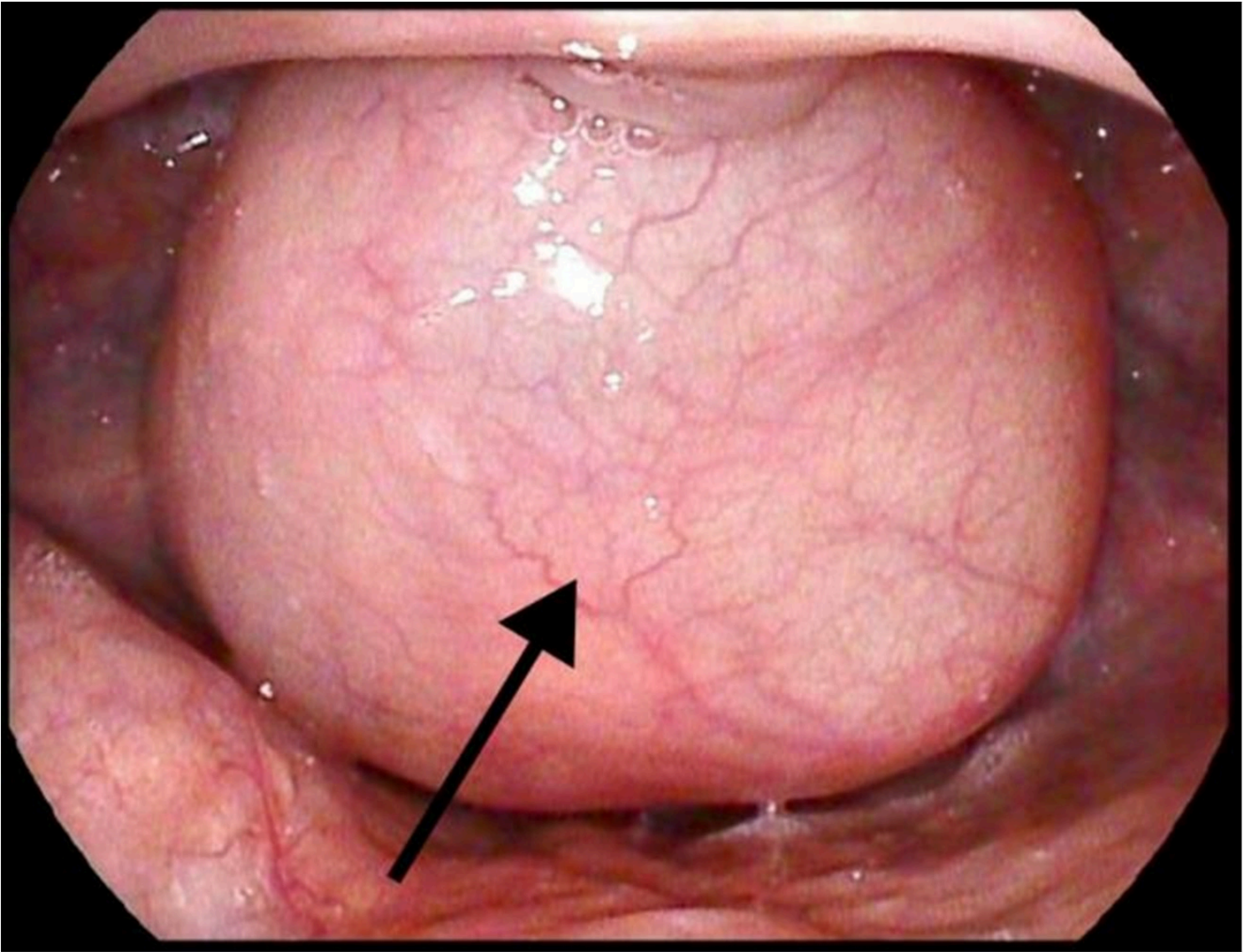


Figure 4

The fiberoptic laryngoscope of the epiglottic cyst. Arrow points to the pedicle of the epiglottic cyst at the junction of the epiglottis and the base of the tongue; the local tissue was located on the lingual surface of the epiglottic. The size of the tumor was about 2.0×2.0cm. It was cystic and raised. The cyst was light pink and round. The surface mucosa was complete, the capsule wall was thin, and the clear contents in the capsule could be seen through.

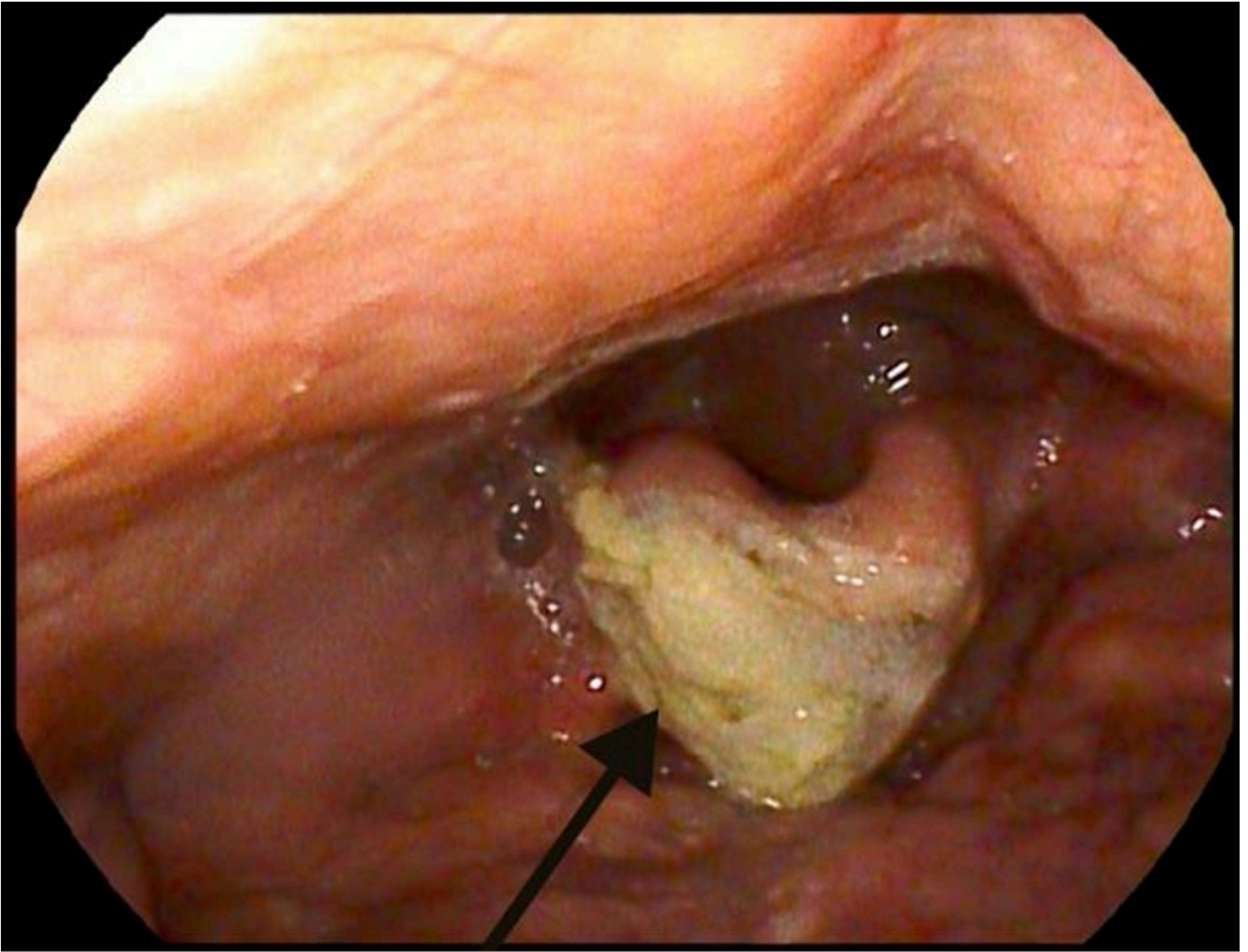


Figure 5

Postoperative fiberoptic laryngoscopic review at 2 weeks after epiglottic cyst resection. Arrow points to the surgical area on the lingual surface of the epiglottis, where pale yellow crust-like attachments are visible; the surrounding mucosa shows no obvious congestion or edema, and no residual or recurrent cyst is found.