Cureus
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Open Access Case Report

Videolaryngoscopic Retrieval of a Chronically Retained Glottic Foreign Body Under Ketamine Sedation With Preserved Spontaneous Ventilation: A Case Report

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Review began 11/05/2026
Review ended 11/08/2026
Published 11/09/2026

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DOI: 10.7759/cureus.119363

Abstract

Long-retained laryngeal foreign bodies in adults are rare and easily mistaken for chronic laryngeal disease. They pose a specific airway dilemma: the obstruction lies exactly where the anesthesiologist must work, and tracheal intubation may push the object further down. We describe a 63-year-old man with type 2 diabetes and hypertension who had a foreign body lodged across the glottis after a food-bolus impaction. His symptoms had begun more than one year earlier, but the diagnosis was made only a few months before treatment. He presented three times to the emergency department with dysphonia, wheeze, and progressive dyspnea, with unremarkable neck CT and chest radiography. The object was suspected on otolaryngologic examination and confirmed once corticosteroids had reduced severe laryngeal edema. An outpatient attempt at removal with a flexible bronchoscope failed. Intubation was judged unsafe because the tracheal tube could have displaced the object into the trachea. The anesthesiologist removed it under deep sedation (ketamine 50 mg, midazolam 3 mg, atropine 0.5 mg, topical lidocaine) with spontaneous ventilation and nasal oxygen at 4 L/min, using a GlideScope videolaryngoscope (Verathon, WA, USA) and curved forceps. The otolaryngologist stood by in the operating room to perform a tracheostomy if needed. The object, a thin translucent lamina of about 30 × 25 mm, came out intact in about 10 minutes, with stable vital signs (SpO_2 99%). The patient was discharged the next day. When intubation is itself the hazard, a tubeless shared airway under ketamine-based sedation, with a pre-agreed surgical rescue plan, can be the safest option.

Categories: Otolaryngology, Emergency Medicine, Anesthesiology
Keywords: airway foreign body, difficult airway management, ketamine, laryngeal edema, procedural sedation, shared airway, spontaneous ventilation, videolaryngoscopy

Introduction

Airway foreign bodies in adults are much less common than in children. Most are lodged in the bronchi and are removed by bronchoscopy [1,2]. Objects that remain in the larynx are rarer. When they are tolerated for months, they cause chronic dysphonia, stridor, and mucosal reaction. These signs are easily attributed to inflammatory or neoplastic laryngeal disease, and the diagnosis is often delayed [1].

For the anesthesiologist, a foreign body at the glottis is one of the hardest forms of shared airway. The operator removing it and the anesthesiologist need the same space, and the obstruction lies at the level a tracheal tube must pass. Any loss of spontaneous breathing can turn a partial obstruction into a complete one, and failures in assessment and planning are recurrent contributors to major airway complications [3]. Difficult-airway guidelines recommend preserving spontaneous ventilation when the airway is at risk and planning front-of-neck access in advance [4,5]. However, they give little direct guidance for an obstruction that would be worsened by intubation itself.

We report a chronic glottic foreign body that could not be removed at outpatient flexible bronchoscopy and could not safely be intubated past. It was retrieved by the anesthesiologist under ketamine-based deep sedation with spontaneous ventilation, without intubation, using a videolaryngoscope and curved forceps, while the otolaryngologist stood by for tracheostomy. We focus on the airway reasoning behind each decision.

Case Presentation

A 63-year-old man presented with progressive dyspnea, dysphonia, and an audible wheeze. His history included type 2 diabetes mellitus treated with metformin; arterial hypertension treated with olmesartan, doxazosin, and nebivolol; and dyslipidemia treated with simvastatin. He had no known drug allergies. His symptoms (sore throat, hoarseness, and, more recently, noisy breathing) had begun more than one year earlier. The diagnosis was made only a few months before treatment, when he reported a previous episode of food-bolus impaction in the hypopharynx. The clinical course is summarized in Table *1*.

Day	Setting	Key finding or action
0	Emergency department	Dyspnea, dysphonia, wheeze; SpO_2 97% on room air; neck CT and chest radiograph unremarkable; referred to ENT
1	Emergency department (ENT fast track)	Persistent dyspnea; contrast-enhanced CT requested but not performed as urgent; discharged for ENT reassessment
6	ENT fast track	Persistent dyspnea despite steroids; suspected supraglottic foreign body; elective admission planned
9	Admission	Diffuse laryngeal edema; translucent foreign body across the glottis visible after steroids
11	Operating room	Retrieval by the anesthesiologist under deep sedation with spontaneous ventilation (GlideScope, curved forceps); ENT standing by for tracheostomy
12	Discharge	Asymptomatic; discharged home on oral amoxicillin

TABLE 1: Timeline of the clinical course

Day 0 = first emergency department visit. ENT: ear, nose and throat (otolaryngology)

Emergency department visits

At the first visit, he was eupneic on room air, with an SpO_2 of 97%. Blood tests were within normal limits apart from a blood glucose of 124 mg/dL (reference range 70-110 mg/dL); procalcitonin was below 0.05 ng/mL (reference value <0.5 ng/mL) and C-reactive protein below 0.5 mg/L (reference value <5 mg/L). Chest radiography was normal, and a neck CT reported no abnormalities requiring urgent treatment. He was referred to the otolaryngologist.

The next day, he returned with dyspnea and dysphonia. The otolaryngologist requested a contrast-enhanced neck CT, which was not performed as an emergency, and he was discharged for outpatient reassessment. Corticosteroid therapy was started. Five days later, dyspnea persisted, otolaryngologic examination showed a suspected foreign body in the supraglottic region, and elective admission was arranged.

Admission and diagnosis

On admission, laryngoscopy showed diffuse laryngeal edema with reduced laryngeal mobility (Figure *1*, white arrow). After corticosteroid therapy, the edema decreased, and a translucent foreign body became visible, lying across the glottic plane like a bridge. Blood tests showed leukocytosis of 14,210/µL with 79% neutrophils, blood glucose of 256 mg/dL, and sodium of 133 mEq/L, consistent with recent steroid treatment. C-reactive protein remained below 0.5 mg/L, and coagulation was normal. The ECG showed sinus rhythm at 65-70 bpm, left axis deviation, and signs of left ventricular hypertrophy. The repeat chest radiograph was normal.

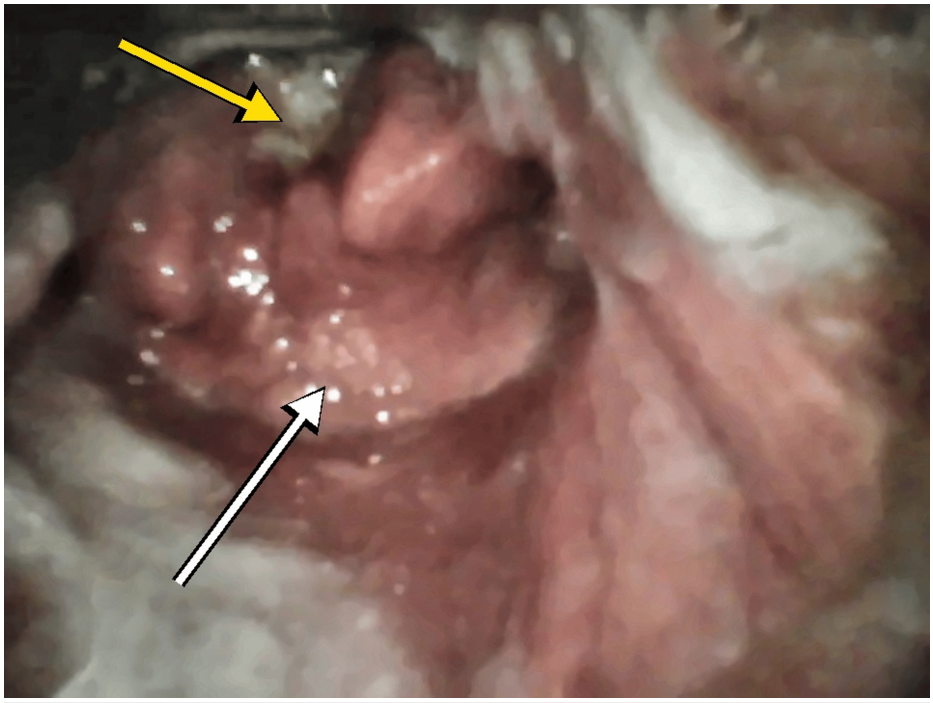


FIGURE 1: Foreign body in situ

Videolaryngoscopic view of the swollen, secretion-covered laryngeal inlet in the sedated, spontaneously breathing patient. The yellowish edge of the foreign body is visible at the top of the field, lodged across the glottic plane (yellow arrow). The white arrow indicates the edematous mucosa of the laryngeal inlet.

Airway assessment and plan

The otolaryngologist had attempted removal with a flexible bronchoscope in the outpatient clinic, without success. The airway team then met to plan the next attempt. Three features made the case unusual. First, the object lay across the glottis and partly blocked it. Second, symptoms had been present for over a year, and the object was embedded in swollen, friable mucosa. Third, any tracheal tube would have had to pass through the same opening: a tube, a bougie, or a jet ventilation catheter could push the object into the subglottis or trachea, where it would be harder to reach and could cause complete obstruction. For the same reason, neuromuscular blockade and positive-pressure face-mask ventilation were avoided.

The agreed plan was to remove the object from above, under deep sedation, with the patient breathing spontaneously. Ketamine was chosen because it preserves airway reflexes, muscle tone, and respiratory drive better than other sedatives [6]. The rescue plan was agreed in advance: stop and wake the patient if obstruction worsened and, if oxygenation failed, proceed to front-of-neck access [5]. The otolaryngologist was present in the operating room throughout, ready to perform an emergency tracheostomy.

Procedure

In the operating room, standard monitoring was applied, and oxygen was given via nasal cannula at 4 L/min throughout. Atropine 0.5 mg was given to reduce secretions, and midazolam 3 mg and ketamine 50 mg were titrated intravenously until the patient tolerated laryngoscopy while breathing spontaneously. Topical anesthesia of the oropharynx and larynx was obtained with lidocaine spray (Ecocain). The anesthesiologist inserted a GlideScope videolaryngoscope with a size 4 titanium blade (Verathon Inc., Bothell, WA, USA). The glottic inlet appeared swollen and covered in secretions, with the edge of the object visible (Figure *1*).

Secretions were removed with a rigid suction cannula (Figure *2*). The object was then grasped with curved forceps and gently freed from the mucosa (Figure *3*), and it was withdrawn through the mouth in one piece (Figure *4*).

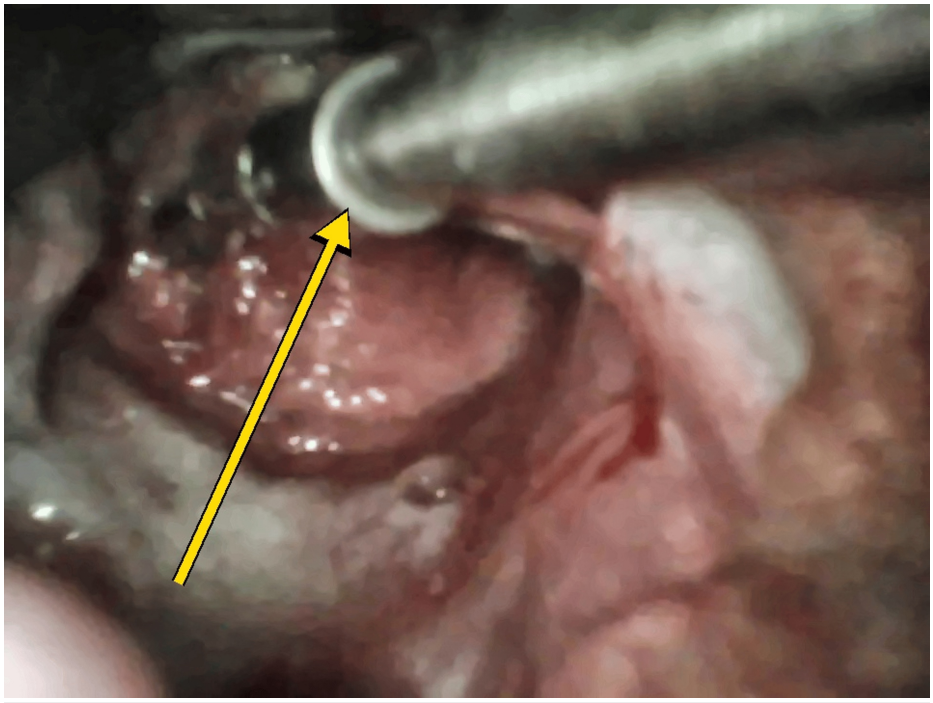


FIGURE 2: Clearing the field

A rigid suction cannula (yellow arrow) removes secretions from the glottic inlet before the forceps are introduced, under continuous spontaneous ventilation.

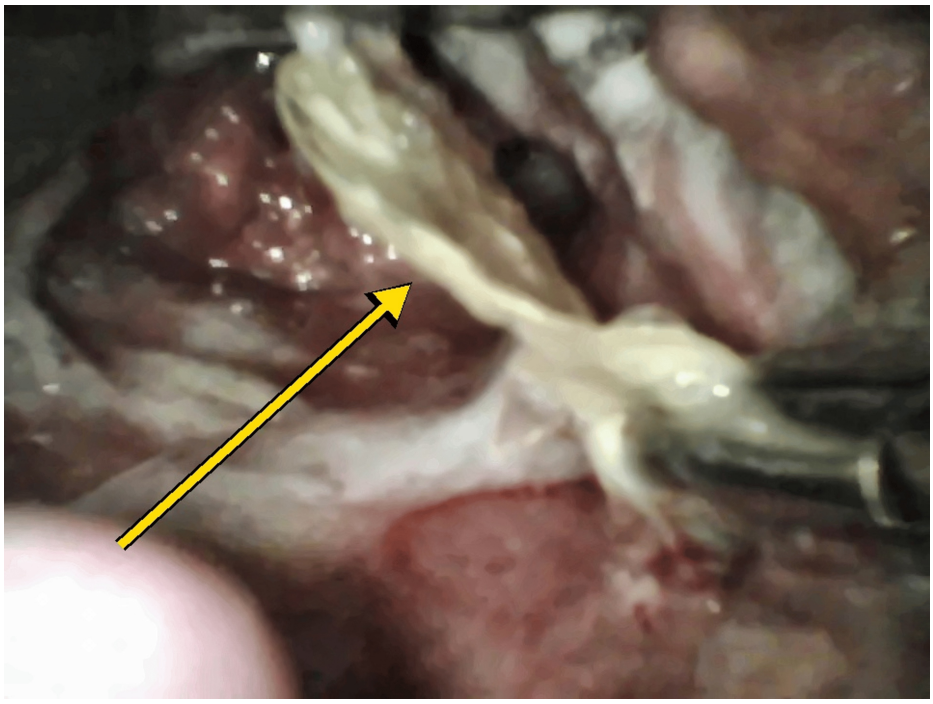


FIGURE 3: Disengagement

The foreign body (yellow arrow), grasped with curved forceps, is freed from the inflamed mucosa and lifted out of the glottis.

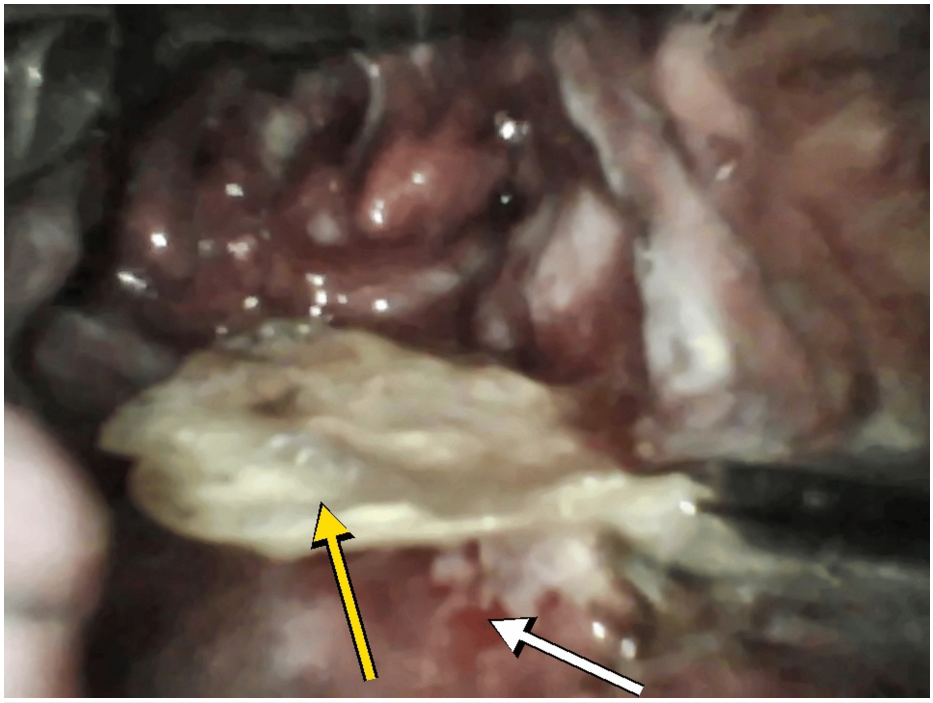


FIGURE 4: Extraction

The foreign body (yellow arrow) is withdrawn intact through the oropharynx. Minor mucosal bleeding (white arrow) is visible at the former site of impaction.

The object was a thin, translucent, semi-rigid lamina with a rounded outline and one irregular notched edge, partly coated with yellowish fibrinous material and blood. Measured against the graduations of a 5 mL syringe, it was approximately 30 × 25 mm, with a thickness of less than 1 mm (Figure *5*).

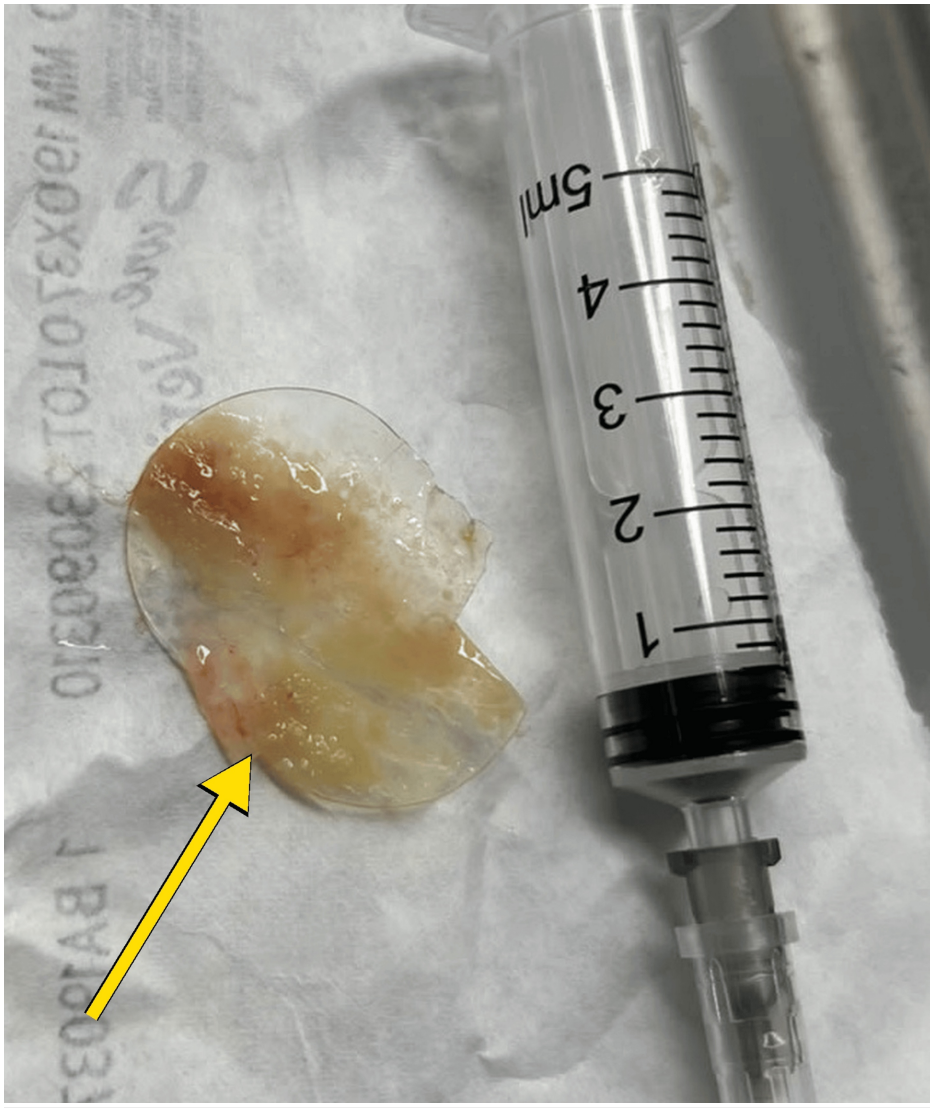


FIGURE 5: Retrieved foreign body

A thin, translucent, semi-rigid lamina (yellow arrow) of approximately 30 × 25 mm, partly coated with fibrinous material and blood, shown next to a 5 mL syringe for scale.

The patient breathed spontaneously throughout and was never intubated. There was no laryngospasm and no need for assisted ventilation. Vital signs remained stable for the whole procedure (blood pressure 127/78 mmHg, heart rate 70 bpm, SpO_2 99%). The procedure lasted about 10 minutes. Videolaryngoscopy after removal showed no residual fragments, hyperemic vocal cords, minor mucosal bleeding, and no edema. Dexamethasone 8 mg was given intravenously to limit post-procedural laryngeal edema.

Outcome

Recovery was uneventful, and dyspnea and stridor resolved. The patient was discharged home the next day in good condition, on oral amoxicillin and his usual medication.

Discussion

The central lesson of this case is that intubation, normally the safe endpoint of airway management, was itself the main hazard. Difficult-airway algorithms assume that a tube can eventually be placed below the problem [4,5]. Here, the problem was at the glottis, so any device passed through it risked turning a partial, tolerated obstruction into a complete one below the vocal cords.

Why the diagnosis was delayed

The object was thin and translucent, so it was not seen on the radiograph or the CT, and it was further hidden by severe laryngeal edema. It became visible only after steroid treatment reduced the swelling. Most

adult airway foreign bodies are organic or otherwise radiolucent, and normal imaging does not exclude them [1,2]. In an adult with chronic dysphonia or stridor that began after a choking episode, early direct laryngoscopy is more informative than repeated imaging.

Why intubation was ruled out

In most predicted difficult airways, awake tracheal intubation is the recommended first approach [7]. In this patient, it would have meant passing a flexible scope and a tube through a glottis partly occupied by the object, which was mobile but adherent to inflamed mucosa. It could have been pushed into the subglottis or trachea, where retrieval would require rigid bronchoscopy, and distal migration could cause ball-valve or complete obstruction. The same risk applied to a bougie, a jet ventilation catheter, or vigorous face-mask ventilation. Once intubation was excluded, the airway had to be managed without a tube until the object was out.

Why spontaneous ventilation under ketamine

In pediatric airway foreign bodies, both spontaneous and controlled ventilation are used, and neither has proven clearly superior [8]. Controlled ventilation, however, requires muscle relaxation and positive pressure, both of which can move a mobile object distally. Spontaneous breathing preserves muscle tone, the cough reflex, and respiratory drive, and if the airway deteriorates, the drugs can be stopped, and the patient is allowed to recover.

Ketamine suited this goal, as it preserves respiratory drive, upper airway tone, and protective reflexes better than propofol or opioids [6]. A low dose of midazolam limited emergence reactions, atropine reduced the ketamine-induced secretions that would have obscured the view, and topical lidocaine reduced the risk of cough and laryngospasm during instrumentation. Dexamethasone after removal aimed to limit swelling of mucosa that had been inflamed for over a year and had just been manipulated, by analogy with the evidence for prophylactic corticosteroids before extubation [9].

Why videolaryngoscopy

The outpatient attempt with a flexible bronchoscope had failed: its small grasping tools are poorly suited to a flat object of about 3 cm, wider than the glottic opening and embedded in swollen mucosa, and a further attempt under general anesthesia would have required a secured airway. The videolaryngoscope gave the anesthesiologist a direct, magnified view of the glottis without a tube, and let the whole team follow each step on the screen. With curved forceps, the object could be grasped from above and withdrawn in a single movement. Because the anesthesiologist both managed the airway and removed the object, the delays and conflicts of a shared airway between two operators were avoided.

Oxygenation and rescue

Oxygen via nasal cannula at 4 L/min provided a reserve during brief periods of reduced breathing. High-flow nasal oxygen would offer a larger reserve and could be considered in similar cases [10], although the positive pharyngeal pressure it generates may matter when the object is mobile. The most important safety step was agreeing the rescue plan before starting: when to stop, when to wake the patient, and when to perform front-of-neck access, with the otolaryngologist in the room ready to perform a tracheostomy [3,5].

Limitations

This is a single case, and the technique depended on a cooperative patient, an object that could be grasped, and an experienced operator. A larger, rigid or deeper object, or a less stable patient, might require rigid bronchoscopy or a planned surgical airway from the start.

Conclusions

A chronically retained glottic foreign body can create an airway in which intubation itself is the main danger. In this patient, deep sedation with ketamine, preserved spontaneous ventilation, supplemental oxygen, and videolaryngoscopic retrieval with curved forceps allowed safe removal in a single attempt without a tube. Success depended on recognizing early that the standard algorithm did not apply, on choosing drugs that preserve breathing and reflexes, and on agreeing a surgical rescue plan before starting. Adults with persistent dysphonia or stridor after a choking episode should undergo early laryngoscopy, even when imaging is normal.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Vincenzo Cuzzone, Marco Di Girolamo, Yosela Odorisio, Gabriella Iannandrea, Amelia Paglia

Acquisition, analysis, or interpretation of data: Vincenzo Cuzzone

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Supervision: Vincenzo Cuzzone, Marco Di Girolamo, Yosela Odorisio, Gabriella Iannandrea, Amelia Paglia

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **AI use statement:** The authors have declared that no AI tools were used during the work or in the drafting of this article. The authors take full responsibility for the work. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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