



Awake Fiberoptic Intubation in a Patient with Severe Cervicofacial and Mediastinal Abscess: A Case Report

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Abstract

Introduction: Emergency surgical drainage is frequently required for patients with cervicofacial space infection complicated by a cervical abscess. Typical clinical manifestations include cervicofacial swelling, fever, local pain, and respiratory distress. Inflammatory airway edema and anatomical distortion commonly result in difficult intubation in these patients, posing a critical challenge for anesthesiologists. Formulating a safe and effective airway management strategy within a limited time window is essential.

Case Presentation: A 67-year-old male presented with an odontogenic cervicofacial space infection extending to the cervical region and mediastinum, requiring emergency abscess drainage. The patient presented with severe respiratory distress and hypoxemia (room-air SpO₂ 81%). Preoperative assessment confirmed a difficult airway. High-flow nasal oxygen (HFNO) preoxygenation was administered, followed by awake fiberoptic-guided nasotracheal intubation. The primary intraoperative challenges included insufficient topical anesthesia and difficulty in glottic exposure secondary to severe inflammatory swelling.

Conclusion: HFNO-assisted preoxygenation combined with awake fiberoptic-guided intubation successfully established a definitive airway in this critically ill patient, allowing the uneventful completion of emergency abscess drainage. This strategy provides a practical reference for airway management in similar severe clinical scenarios.

Keywords

Difficult Airway, High-Flow Nasal Oxygen, Fiberoptic Bronchoscopy, Awake Intubation, Cervicofacial Space Infection

Introduction

Odontogenic lesions are the leading cause of cervicofacial space infections, which most commonly involve the submandibular and parapharyngeal spaces [1]. In severe cases, infectious lesions spread downward along the cervical fascial planes to the mediastinum, causing descending necrotizing mediastinitis, a lethal

complication associated with high mortality [2]. The standard therapeutic regimen consists of intravenous broad-spectrum antibiotics combined with surgical debridement and drainage. Delayed diagnosis and intervention may precipitate septic shock, multiple organ dysfunction syndrome, and even fatal outcomes.

Case Report

Inflammation-induced mucosal edema, anatomical structural distortion, and local tissue compression inevitably result in difficult airways in affected patients, creating substantial obstacles to perioperative airway management. For emergency patients presenting with progressive respiratory distress and refractory hypoxemia, the top priority of perioperative management is the rapid and safe establishment of a definitive airway. This case report describes the clinical difficulties and optimized airway management strategies in a patient with extensive cervicofacial space infection involving the cervical region and mediastinum, aiming to provide clinical evidence for the perioperative airway management of similar severe infectious difficult airway cases.

Case Presentation

Patient Information and Preoperative Examinations:

A 67-year-old male (155 cm, 55 kg) was admitted with a 9-day history of progressive toothache and a 4-day history of worsening neck pain. Cervical contrast-enhanced computed tomography (CT) revealed diffuse soft tissue swelling and multiple gas locules in the sublingual, submental, bilateral submandibular, cervical root, and mediastinal spaces, confirming extensive inflammatory infiltration (**Fig-1**). The diagnosis was multiple cervicofacial space infections combined with cervical and mediastinal abscesses, and emergency incision and drainage were scheduled.

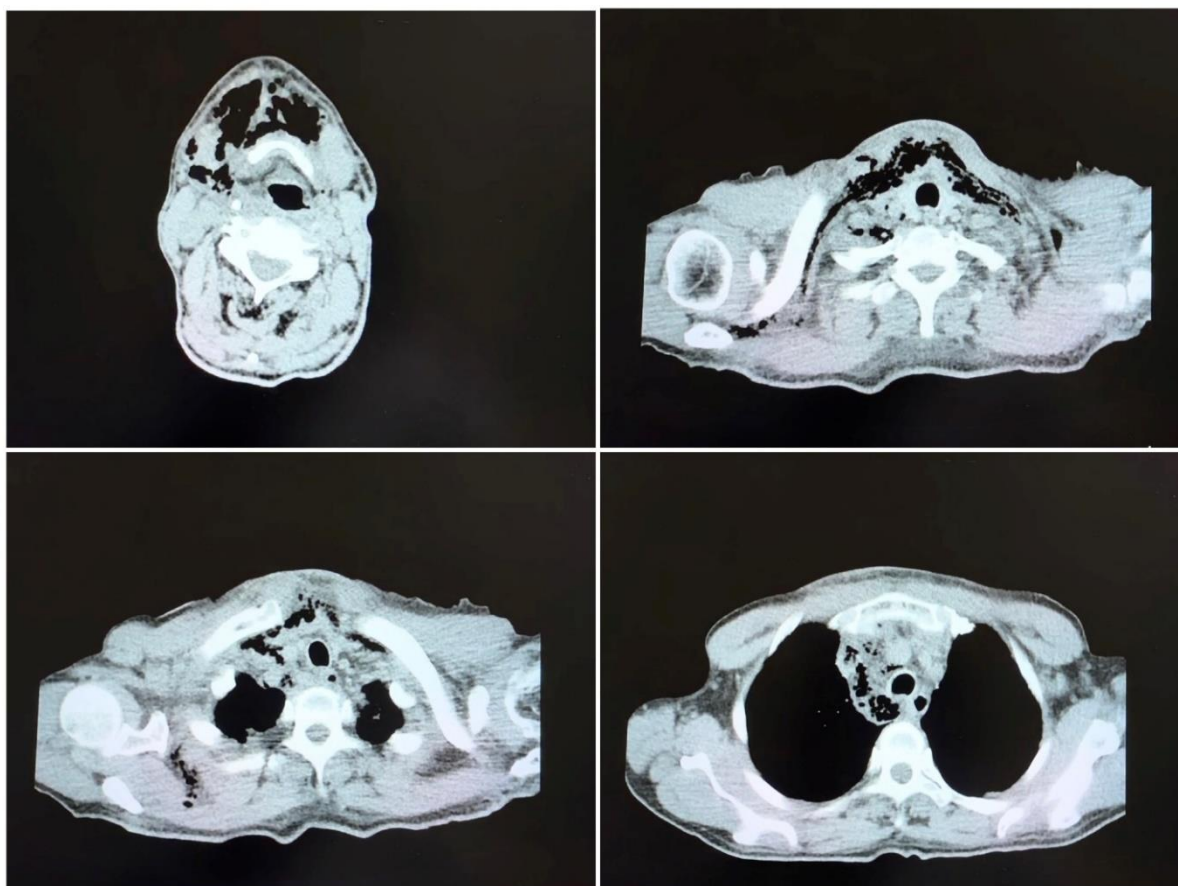


Fig-1:

The patient appeared acutely ill and required a semi-recumbent position (approximately 60°) because of respiratory distress. Tachypnea (respiratory rate: 30 breaths/min) was noted. His mouth opening was limited to less than two fingerbreadths, with severely restricted cervical movement, and the modified

Mallampati grade was IV. Oral mucosal congestion and edema were obvious, accompanied by marked maxillofacial and cervical swelling with increased local skin temperature. A tender fluctuant mass was palpable on the right side of the neck, and bilateral conjunctival edema was also observed. Baseline vital signs were as

follows: heart rate 115 beats/min, blood pressure 123/71 mmHg, respiratory rate 30 breaths/min, room-air peripheral oxygen saturation (SpO₂) 81%, and body temperature 37.2°C.

Preoperative laboratory tests showed the following: hemoglobin 129 g/L, platelet count 65×10^9 /L, white blood cell count 4.07×10^9 /L, absolute lymphocyte count 0.09×10^9 /L, interleukin-6 1266 pg/mL, and procalcitonin 2.06 ng/mL. All other routine laboratory indicators were within the normal reference range.

Induction and Airway Management:

Given the patient's severe respiratory distress and persistent hypoxemia, high-flow nasal oxygen (HFNO) was applied for preoxygenation to prolong the safe apnea time during awake intubation. The patient was kept in a semi-recumbent position throughout the procedure. HFNO was delivered via bilateral nasal prongs with a fraction of inspired oxygen (FiO₂) of 1.0, starting at 30 L/min and titrated to 40 L/min according to the patient's tolerance. After 5 minutes of continuous preoxygenation, the patient's SpO₂ gradually increased from 81% to 94%. Meanwhile, intravenous pretreatment with glycopyrrolate 1 mg, methylprednisolone 40 mg, and esmolol 10 mg was administered, followed by sequential topical airway anesthesia.

Cricothyroid puncture was considered unsafe and was not performed because of extensive cervical soft tissue infection, swelling, and surgical emphysema, which obscured the anatomical landmarks. The detailed topical anesthesia procedure was performed as follows:

Oropharyngeal anesthesia: The patient was instructed to retain lidocaine mucilage in the oral cavity for 5 minutes. A laryngotracheal anesthesia device was then gently inserted orally, and 3 mL of 2% lidocaine was sprayed toward the pharynx along the tongue surface.

Nasal mucosal anesthesia: Bilateral nasal mucosa was coated with cotton swabs soaked in a mixed solution of 30 mg ephedrine and 2% lidocaine (total volume: 5 mL) to achieve mucosal vasoconstriction and local anesthesia.

Fiberoptic-guided precise airway anesthesia: An experienced anesthesiologist performed fiberoptic bronchoscopy. Under direct visualization, 3 mL of 2% lidocaine was sprayed onto the congested and edematous pharyngeal and epiglottic tissues. The patient developed severe coughing during the procedure. Fiberoptic visualization revealed severe oropharyngeal mucosal edema, obvious anatomical distortion, and significant elevation of the floor of the mouth, resulting in difficult glottic exposure. The patient's SpO₂ transiently dropped to 90%. The bronchoscope was immediately withdrawn, and oxygen inhalation was continued to allow sufficient time for the topical lidocaine to take effect after reassuring the patient.

Second intubation attempt: The fiberoptic bronchoscope was reinserted through the nasal cavity, and an additional 3 mL of 2% lidocaine was sprayed around the epiglottis and glottic aperture. The patient still presented with intractable coughing and poor cooperation. With continuous HFNO administration through the contralateral nostril, the patient's SpO₂ fluctuated between 84% and 92%, and the heart rate ranged from 110 to 130 beats/min.

Third intubation attempt: After the patient's coughing was relieved and his condition stabilized, the bronchoscope was gently reintroduced. Successful glottic exposure was achieved. A total of 3 mL of 2% lidocaine and 60 mg tetracaine were sprayed into the subglottic region through the bronchoscope working channel. Despite the suboptimal topical anesthesia effect and extremely challenging glottic visualization, repeated instrumental manipulation would significantly increase the risk of abscess rupture, mucosal bleeding, and laryngospasm. Therefore, we decided to establish a definitive airway immediately under the existing anesthesia conditions to avoid further potential risks. A 6.5-mm internal diameter (ID) reinforced endotracheal tube was advanced along the bronchoscope for nasotracheal intubation. Successful tube placement was confirmed by continuous normal capnographic waveforms. After airway establishment, general anesthesia was induced with midazolam 2 mg, ciprofol 10 mg, sufentanil 15 µg, and rocuronium 50 mg, and maintained with sevoflurane and remifentanyl.

throughout the surgery.

Postoperative Outcome

The surgical drainage procedure was completed uneventfully with thorough debridement of the infectious foci. The patient was transferred to the intensive care unit (ICU) for continuous supportive treatment. However, the patient developed progressive postoperative complications, including septic shock, acute renal failure, acute myocardial infarction, and intracerebral hemorrhage. On postoperative day 14, the patient's family decided to withdraw treatment after full discussion and informed decision-making, and the patient subsequently died.

Discussion

The risk of a "cannot intubate, cannot oxygenate" (CICO) scenario is substantially higher in infectious difficult airways than in routine settings. In this case, an otolaryngologist was on standby in the operating room with emergency tracheostomy equipment before awake intubation was initiated. Preemptive preparation for surgical airway rescue is an essential safety measure for high-risk airway management rather than a sign of procedural failure [3].

Dexmedetomidine is widely used as an adjuvant sedative for awake intubation because of its sedative, anxiolytic, and respiratory-sparing properties [4]. However, no intravenous sedatives, including dexmedetomidine, were administered in this case for three key reasons. The patient's tachypnea, mandatory semi-recumbent position, and extremely low baseline SpO₂ indicated maximal recruitment of respiratory reserve, such that even mild sedation might impair respiratory drive and upper airway tone. In addition, the markedly elevated inflammatory biomarkers suggested impending septic shock, in which the α_2 -adrenergic effects of dexmedetomidine could exacerbate hypotension. Finally, the 10-15-minute loading infusion required for dexmedetomidine was incompatible with the urgent need for emergency airway establishment.

HFNO served as a critical supportive measure in this procedure. It effectively increased the patient's SpO₂ from 81% to 94% during preoxygenation and provided continuous apneic oxygenation throughout the repeated

intubation attempts. This intervention substantially prolonged the safe apnea time, allowing adequate time for repeated glottic exposure without acute oxygen desaturation [5]. Continuous oxygen delivery through the contralateral nostril also maintained stable oxygenation during bronchoscope manipulation, ensuring procedural safety.

Multiple overlapping factors contributed to the unsatisfactory topical anesthesia effect in this case. First, local tissue acidosis in the infectious lesions reduced the non-ionized fraction of lidocaine, weakening its permeability through the neural sheaths and limiting anesthetic efficacy [6]. Second, severe mucosal edema increased the diffusion distance from the topical anesthetics to the target nerve endings. Third, limited mouth opening hindered precise directional spraying of the anesthetics under direct visualization. Fourth, the inability to perform cricothyroid puncture left the subglottic region, the most sensitive area for triggering coughing and laryngospasm, without effective anesthesia. Finally, tetracaine requires 3-5 minutes to reach peak efficacy, whereas intubation was performed immediately after drug administration, preventing the achievement of optimal anesthetic effect.

The key clinical message from this case is that, in extreme difficult airway scenarios, promptly establishing a definitive airway should take priority over achieving perfect topical anesthesia. When successful glottic exposure was achieved on the third attempt, delaying intubation to obtain optimal anesthesia would have risked losing visualization because of patient restlessness or positional changes. Moreover, each repeated manipulation increased the risks of laryngospasm, abscess rupture, and respiratory muscle fatigue-induced decompensation. Therefore, performing intubation immediately under suboptimal anesthesia conditions was a reasonable risk-benefit clinical decision. This approach presupposes proficient fiberoptic skills and the availability of surgical airway backup. It is not a routine recommendation but may be life-saving in extreme circumstances.

Conclusion

This report presents a critical case of severe difficult

Case Report

airway secondary to extensive cervicofacial space infection complicated by a mediastinal abscess. With cricothyroid puncture being unfeasible and topical anesthesia remaining limited, awake fiberoptic-guided nasotracheal intubation assisted by HFNO successfully established a definitive emergency airway. Although the patient ultimately died of progressive sepsis and multiple organ failure, this case highlights that, in extreme infectious difficult airway scenarios where ideal topical anesthesia is unattainable, seizing the opportunity to establish a definitive airway should take priority over pursuing complete topical anesthesia.

Conflict of Interest

The author has read and approved the final version of the manuscript. The author declares no conflicts of interest.

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