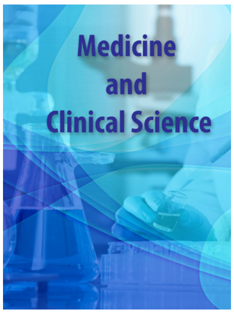
Medicine & Clinical Science

Case Report




# Successful Nasal Intubation Using Awake Fiberoptic Technique in a Patient With a Large Tongue Due to Congenital Hemangioma: Is it Enough to Celebrate Success?

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**Abstract**

*Congenital hemangioma and macroglossia are rare conditions that can lead to significant challenges in airway management. In such patients, awake fiberoptic intubation is generally recommended. Preoperative preparation is crucial for patients scheduled for awake fiberoptic intubation, and careful planning is equally important during the extubation phase. In this case report, we aim to present our experience with awake fiberoptic intubation and extubation in a patient diagnosed with congenital hemangioma and macroglossia, who had a previous history of failed endotracheal intubation.*

## Introduction

Difficult airway management is a challenging task for anesthesiologists and can lead to life-threatening complications [1]. Awake fiberoptic intubation is a technique used to secure the airway in patients with a difficult airway, and it is crucial for achieving successful intubation by maintaining the patient's wakefulness and spontaneous breathing with effective airway topical anesthesia and adequate sedation [2]. In this case, we aimed to present our experience of successful endotracheal intubation and the even more challenging extubation using awake nasal fiberoptic intubation in a patient with a difficult airway due to hemangioma and macroglossia of the tongue, who had a history of failed endotracheal intubation, for an interventional cranial AVM repair.

## Case

A 65-year-old male patient with a Middle Cerebral Artery (MCA) aneurysm was referred to us for preoperative evaluation prior to planned Digital Subtraction Angiography (DSA) in the Interventional Radiology Unit. The patient had known diagnoses of Obstructive Sleep Apnea Syndrome (OSAS), Chronic Obstructive Pulmonary Disease (COPD), recurrent pulmonary embolism, and a smoking history of 4 pack-years. According to the American Society of Anesthesiologists (ASA) risk classification, the patient was evaluated as ASA III. The patient, who used continuous positive airway pressure (CPAP) at home and rivaroxaban (Xarelto®) 20 mg tablet for the past year, was found to have macroglossia and hemangiomas on the tongue during physical examination. It was noted that the hemangioma-like multiple lesions under the tongue had been present since childhood, and the patient had difficulty eating and speaking. The Mallampati score was determined to be Grade 4. Two years ago, at an external facility, the patient was planned for surgery under general anesthesia due to a triggering finger but could not be intubated, leading to respiratory arrest and a 3-day postoperative intensive care unit stay. We requested consultations from the Otorhinolaryngology and Pulmonary Medicine departments for this difficult airway patient. The Pulmonary Medicine team recommended stopping Xarelto 24-36 hours before the operation, using ipratropium and salbutamol with a nebulizer 30 minutes before the procedure, early postoperative mobilization, respiratory exercises with triflow, and frequent postural drainage. The Otorhinolaryngology team evaluated the tonsils as Grade 1, bilateral vocal cords as mobile, rima as open, and epiglottis and laryngeal structures as normal. It was decided to postpone the operation to the next day to prepare for difficult intubation. In the Interventional Radiology Unit, equipment including fiberoptic bronchoscopy, video laryngoscopy, emergency cricothyrotomy set, high-flow oxygen device, nasal and oral airways, various sizes of endotracheal tubes, guidewires, Magill and Macintosh blades, supraglottic airway devices, and suction with catheter were prepared. The Otorhinolaryngology team was present in the

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***Figure 1.*** *Pre-Intubation Facial Appearance*

***Figure 2.*** *Pre-Intubation Tongue Appearance*

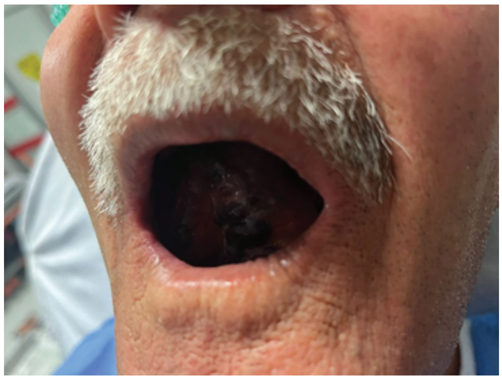

***Figure 3.*** *Sublingual Hemangiomas*

operating room for potential difficult airway management. Awake fiberoptic nasal endotracheal intubation was planned. All procedures were explained to the patient, and written consent was obtained. The patient was positioned on the operating table and monitored according to ASA standards. In room air, SpO2 was 90%, heart rate was 81 beats/min, and blood pressure was 122/62 mmHg. The patient was placed in a sitting position, local anesthesia was administered to the oropharynx with Locanest 10% spray, and then repositioned supine. Preoxygenation was provided via high-flow nasal oxygen. Premedication with 2 mg IV midazolam was administered. The Otorhinolaryngology team evaluated the nasal cavity, nasopharynx, base of the tongue, oropharynx, larynx, vocal cords, hypopharynx, and epiglottis for possible hemangioma using flexible fiberoptic laryngoscopy. Additional 1 mcg/kg IV fentanyl and 1 mcg/kg IV dexmedetomidine were administered to achieve the necessary sedation, following the initial 2 mg IV midazolam. Nasal airway was placed and connected to high-flow oxygen. A 6.5 mm spiral endotracheal tube was placed on the distal end of the fiberoptic bronchoscope and advanced controlled through the nasal passage to the trachea under video guidance. With the patient's spontaneous breathing and stable hemodynamics, the vocal cords were observed. After administering 1 mg/kg IV rocuronium and 2 mg/kg IV propofol (Propofol 1%, Fresenius) for apnea and paralysis, the endotracheal tube was slid over the bronchoscope for intubation. The cuff of the endotracheal tube was inflated, bilateral equal lung expansion was confirmed with a stethoscope, and tube placement was verified with end-tidal CO2. Following successful nasal endotracheal intubation, anesthesia was maintained with 2% sevoflurane and a 50:50 mixture of oxygen and air. No intraoperative opioid requirement was noted. Neurosurgery requested 5000 IU IV heparin. The patient's intraoperative hemodynamic data remained stable. At the end of the operation, sevoflurane was discontinued, and the patient was ventilated with 100% oxygen. Minimal nasal hemorrhage was observed secondary to nasal aspiration. The total anesthesia duration was 120 minutes, and neuromuscular block was reversed with 2 mg/kg IV sugammadex. After achieving adequate muscle strength, the patient was extubated. Post-extubation, the patient experienced difficulty with spontaneous breathing and abdominal respiration. Ventilation was provided using a jaw thrust maneuver with an oxygen mask. An additional 2 mg/kg sugammadex was administered. The patient was stimulated with painful stimuli to continue ventilation. Despite using various sizes of oral airways, maintaining the oral airway was challenging. The patient, with an oxygen saturation of 80%, was placed in the right lateral decubitus position and mask ventilation was initiated. IV prednisolone 1 mg/kg and IV pantoprazole 40 mg were administered. The patient's ventilation improved, and after resolution of difficult breathing, postural drainage was performed with the patient in a sitting position. Ventilation support continued with a mask. Motor response to verbal stimuli was obtained. The patient was transferred to the Post-Anesthesia Care Unit (PACU) with nasal oxygen for recovery. During 24 hours of PACU monitoring, the patient's vital signs remained stable, and the patient was smoothly transferred to the ward.

## Discussion

Airway management is a fundamental responsibility for anesthesiologists and is associated with a significant portion of anesthesia-related morbidity and mortality, often due to deficiencies in training or equipment [3]. Difficult airway is a clinical situation where there is difficulty with mask ventilation, tracheal intubation, or both, with an incidence ranging from 0.3% to 13% [4]. Various techniques are available for managing difficult airways today. However, situations where ventilation or intubation fails can occur, leading to severe outcomes such as permanent neurological deficits or even death [3]. According to the American Society of Anesthesiologists (ASA) difficult airway guidelines, awake fiberoptic intubation is considered the most appropriate and recommended method for managing anticipated difficult airways. However, it requires the anesthesiologist to provide sedation that maintains patient comfort and spontaneous breathing [5].

Preoperative preparation is crucial for patients planned for awake fiberoptic intubation. Airway reflexes must be suppressed, adequate sedation, anxiolysis, maintenance of an open airway, and sufficient ventilation must be ensured. Care should be taken to avoid respiratory depression and hypoxemia from the medications used [6].

In awake fiberoptic intubation, premedication, local anesthesia, and sedation are sequential steps. Suppression of airway reflexes may involve lidocaine-containing sprays, lidocaine nebulization, or regional blocks. Although regional blocks appear to be faster and superior compared to other approaches, they are more invasive and require experience. In a systematic review by Cabrici et al., which examined 2045 patients intubated with awake fiberoptic techniques, the methods used for local anesthesia yielded similarly good results without any identified superiority among them [4]. In our case, we used lidocaine-containing spray before sedation for airway reflex suppression and did not encounter any adverse effects.

Various agents are used for achieving conscious sedation during awake fiberoptic intubation, including benzodiazepines, opioids, propofol, and dexmedetomidine. Midazolam provides amnesia and increases patient comfort. Propofol acts quickly, induces deep amnesia, but at high doses can cause apnea and loss of tone in the upper airways, which may complicate visualization of the epiglottis with bronchoscopy. Opioids such as fentanyl and remifentanil suppress hemodynamic responses and discomfort [6]. Recently, the use of the alpha-2 agonist dexmedetomidine has increased, providing both sedation and analgesia without causing respiratory depression. Dexmedetomidine offers anxiolytic, amnestic, and moderately analgesic effects, resulting in patients appearing drowsy but easily arousable and communicable. In a study by Sackan et al., comparing two groups of patients intubated with awake fiberoptic techniques who received sedation with dexmedetomidine versus fentanyl and midazolam, the dexmedetomidine group showed better intubation conditions, higher anesthesiologist satisfaction, and reduced hemodynamic responses [7]. Another study comparing dexmedetomidine and fentanyl found that dexmedetomidine provided better intubation conditions, was more effective in sedation and hemodynamic stability, and resulted in less desaturation during bronchoscopy [6]. A further study comparing dexmedetomidine alone with a combination of low-dose dexmedetomidine and fentanyl found similar results for airway patency, vocal cord movement, cough response, and intubation comfort, but higher incidence of hypotension and bradycardia in the dexmedetomidine alone group [8]. In our case, we used a combination of low-dose dexmedetomidine and fentanyl, and did not encounter any hemodynamic instability or difficulties.

During awake fiberoptic intubation, patients are at risk of hypoxia due to sedation, local anesthesia, procedural complications, and coexisting conditions. Commonly used oxygen devices are low-flow and often lack adequate capacity. High-flow humidified nasal oxygen therapy has been shown to improve oxygen saturation, reduce the work of breathing and respiratory rate, and is increasingly used. A study involving 50 patients with anticipated difficult airways using high-flow humidified transnasal oxygen during awake fiberoptic intubation showed that it was well tolerated in patients with spontaneous breathing, improved oxygenation, and potentially prevented desaturation resulting from apnea or hypoventilation, supporting its use as a safe procedure in these patients [9]. In our patient with an anticipated difficult airway, we used high-flow humidified oxygen and maintained satisfactory oxygenation. While all preparations are typically focused on intubation, it is essential to recognize that extubation may require similar meticulous preparation and could be even more challenging.

## Conclusion

For patients with anticipated difficult airways, preoperative assessment and equipment preparation are crucial for both intubation and extubation. All procedures to be performed on patients planned for awake fiberoptic intubation should be clearly explained, and informed consent must be obtained. In cases of anticipated difficult intubation, awake fiberoptic intubation should be considered, and anesthesiologists should be adequately trained and equipped for this technique. In conclusion, preparing the equipment, informing the patient about the procedure, and being aware of potential complications are essential elements for successful awake fiberoptic intubation and extubation.

### Informed Consent

Informed consent was obtained for presenting the case.

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