e-ISSN (online): 2745-9497

**Journal of Anesthesiology and Clinical Research (JACR)**

Journal website: https://hmpublisher.com/index.php/jacr

# Non-Sleep Non-Apnea Nasal Fiber Optic Intubation for Difficult Airway Management: A Case Series

**Fivilia Anjelina Bora[1], I Made Gede Widnyana[2*]**

[1]Registrar, Department of Anesthesiology and Intensive Care, Faculty of Medicine, Universitas Udayana/Prof. Dr. I.G.N.G. Ngoerah General Hospital, Denpasar, Indonesia

[2]Consultant, Department of Anesthesiology and Intensive Care, Faculty of Medicine, Universitas Udayana/Prof. Dr. I.G.N.G. Ngoerah General Hospital, Denpasar, Indonesia

**ARTICLE INFO**

**Keywords:**
Airway management
Intubation
Nasal fiberoptic intubation
Neck tumor
Preoperative evaluation

***Corresponding author:**
I Made Gede Widnyana

**E-mail address:**
*fabbius2021@gmail.com*

All authors have reviewed and approved the final version of the manuscript.

*https://doi.org/10.37275/jacr.v4i2.297*

**A B S T R A C T**

**Introduction:** Patients with tumors on the neck and mouth are known to be at risk for difficult intubation. Failing to secure the airway can lead to increased patient morbidity and mortality. This study aimed to present a case series with non-sleep non-apnea fiber optic intubation for difficult airway management. **Case presentation:** In this paper, we present three patients; a 57-year-old woman, a 59-year-old man, and a 68-year-old woman who have airway problems with a tumor located on their neck and mouth but were successfully intubated by non-sleep non-apnea nasal fiber optic intubation, one of airway management technique. Good visualization was achieved by fiber optic devices. Preparing the patient holistically and systematically during the perioperative period was the other important thing to do. MOANS score and LEMON score are used to predict the potential event of a difficult airway preoperatively. These scores help the physician to decide what step will be done with the patient. **Conclusion:** Anesthetic morbidity and mortality can be reduced with better preoperative evaluation and clear guidelines and practice for difficult intubation.

## 1. Introduction

Management of a difficult airway is very important to reduce the incidence rate of morbidity and mortality prior to anesthesia.[1] Every patient should be evaluated preoperatively and prepared for any possible findings related to potentially difficult intubation.[2] Combination with advances in visualization techniques can lead to successful intubation.[3] Fiberoptic intubation (FOI) is routinely performed in awake or sedated patients with problematic airways.[4,5] It is ideal for patients with a small mouth opening, minimizing cervical spine movement in trauma or rheumatoid arthritis, upper airway obstruction, such as angioedema or tumor mass, facial deformity, and facial trauma.[4,6]

## 2. Case Presentation

This study presents three cases of difficult airway management.

**Case 1**

A 57-year-old woman with the chief complaint of a mass intra-oral since six months ago, diagnosed as infected wound and squamous cell carcinoma regio mandibula post mandibulectomy, presents for debridement. Preoperatively, we found the patient was ASA 3, with MOANS score 2/5 (mask seal: adequate; obesity: no, BMI 19.1 kg/m$^2$; age: 57 years old; no teeth: yes; stiff lungs: no) and LEMON Score 4/10 (look: no facial deformity; evaluate: inter incisor distance 2 fingers, thyrohyoid distance and mentohyoid were difficult to evaluate; Mallampati was difficult to evaluate; obstruction: no; neck mobility: good flexion and deflexion). Conclusion: She was probably difficult to ventilate and intubate.

**Case 2**

A 59-year-old man with the chief complaint of a mass on the neck, diagnosed as poorly differentiated thyroid carcinoma lung metastases post left total thyroidectomy thyrothymic extension type 2, sternotomy thoracotomy, intrathoracic tumor resection, left functional neck dissection, left neck seroma and overt hypothyroid. The patient was presented for right radical neck dissection + left neck seroma drainage. Preoperatively, we found the patient was ASA 3, with MOANS Score 2/5 (mask seal: adequate; obesity: no, BMI 17.99 kg/m$^2$; age: 59 years old; no teeth: yes; stiff lungs: no) and LEMON Score 10/10 (look: facial deformity (+), massa size ± 20 cm x 20 cm, fixed to the neck muscle with pain on palpable; evaluate: inter incisor distance 2 fingers, thyrohyoid distance and mentohyoid were difficult to evaluate; Mallampati was difficult to evaluate; Obstruction: yes, history of snoring while sleeping positive; neck mobility: limited flexion and deflexion). Conclusion: He was probably difficult to ventilate and intubate.

**Case 3**

A 68-year-old woman with a chief complaint, a mass on the lower right cheek that grew into intraoral, diagnosed as right mandibula tumor suspect malignancy, presents for bimanual palpation and biopsy. Preoperatively, we found the patient was ASA 3, with MOANS Score 2/5 (mask seal: adequate; obesity: no, BMI 15.06 kg/m$^2$; age: 68 years old; no teeth: yes; stiff lungs: no) and LEMON Score 3/10 (look: facial deformity (+) massa size ± 5 cm x 7 cm with exudate and pain on palpable; evaluate: inter incisor distance 2 fingers, thyrohyoid distance 3 fingers and mentohyoid 2 fingers; Mallampati was difficult to evaluate; Obstruction: no; neck mobility: good flexion and deflexion). Conclusion: She was probably difficult to ventilate and intubate.


Figure 1. Case 1 is on pictures A and B; Case 2 is on picture C; and Case 3 is on picture D.

These three patients were inducted for awake nasal fiberoptic intubation. In the receiving room, they were nebulized with lidocaine 4%, sprayed 2 puffs of xylocaine spray (10% lidocaine) into the uvula and to pharyngopalatine fauces, 3 drops oxymetazoline HCL 0.05% into the left and right nasal cavity. Dexamethasone 10 mg intravenously given as premedication and 1-2 mcg/kg fentanyl for sedation. Patients were observed still breathing, awake, and hemodynamically stable at that time. After that, fiberoptic nasotracheal intubation was done. Anesthesia was continued by giving another anesthesia agent to deepen the anesthesia. Hemodynamic status was stable before, during, and after anesthesia.

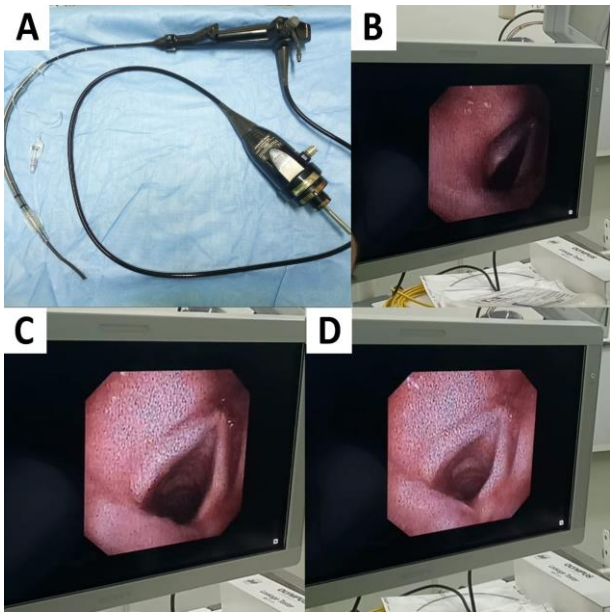


Figure 2. A fiberoptic device with a non-kingking tube (A); The visualization during fiberoptic nasotracheal intubation (B, C, D).

**3. Discussion**

Preoperative evaluation is needed to determine whether the patient has a potential problem with difficult airway management. The predictors of difficult ventilation are described by the mnemonic MOANS (M: mask seal, O: obstruction or obesity, A: advanced age (more than 55 years old), N: no teeth; and S: stiffness of the lungs or snoring while sleeping). The predictors of difficult intubation are described by the mnemonic LEMON (L: look externally; look for signs of inhalational burn, large overbite, facial trauma, edentulous mouth, short neck, or obesity. E: evaluate the 3-3-2 rule; to allow for the alignment of laryngeal, pharyngeal, and oral axes, observe the following; distance between the patient's incisor teeth- at least 3 finger breadths distance between the chin and hyoid bone - 3 finger breadths distance between thyroid notch and floor of the mouth - 2 finger breaths. M: Mallampati score; Class I: soft palate, fauces pillars, uvula entirely visible; Class II: soft palate, fauces, uvula partially visible; Class III: soft palate, the base of uvula visible; Class IV: only hard palate visible. O: obstruction; any condition that causes obstruction of the airway will make laryngoscopy difficult, for example, foreign body. N: neck mobility; patients who require cervical spinal motion restriction are more difficult to intubate). This is usually seen in cases of trauma, cervical stenosis.[2,7] Score 1 will be given to each item positively found on the patient, and MOANS has a total 5 scores, while LEMON has 10 total scores. We evaluated that all these three patients have a 2/5 MOANS score with problems of age over 55 years and no teeth, which means they probably find it difficult to ventilate (oxygenate). We also evaluated their LEMON

score; we found that the first patient had a 4/10 score; the second patient had a 10/10 score; and the third patient had a 3/10 score, which means they all probably had difficulty intubating. It is very important to evaluate these two scores preoperatively in order to avoid CICO (cannot intubate, cannot oxygenate) situation prior to intubation.[7]

The next step is to decide what is the best technique to reach the best visualization for any cases with difficult intubation and prepare all the things needed to be based on the guideline preoperatively.[8,9] Based on the American Society of Anesthesiologists (ASA) Practice Guidelines for Management of the Difficult Airway 2022, the algorithm for adult patients, because these three patients are suspected of difficult laryngoscopy and suspected difficult ventilation with face mask/supraglottic airway, we decided to do intubation attempt with the patient awake (non-sleep). The awake intubation techniques include fiberoptic bronchoscope, video laryngoscopy, direct laryngoscopy, combined techniques, and retrograde wire-aided intubation.[3] We did awake (non-sleep) non-apnea nasal fiberoptic intubation on these three patients, the best technique appropriate to their condition. Compared to the video laryngoscope that has been widely used to intubate patients with difficult intubation, we preferred fiberoptic to facilitate the intubation of these three patients because, in the first case, the patient was difficult to open her mouth, the Mallampati was difficult to evaluate; on the second case, the patient has the complete 10 scores for his LEMON score, and we had no choice for using another device, except fiberoptic; on the third case, the patient was also difficult to open her mouth, the Mallampati was difficult to evaluate, and inserting the blade of video laryngoscope might destruct the tumor intra oral or stimulate bleeding from the tumor.

The other important thing is that the patient should be informed about the possibility of awake fiberoptic intubation.[10,11] We informed the patients about their condition, the steps of anesthesia, including the premedication given in the receiving room, how the way of intubation until the end of anesthesia, and the feeling of discomfort during those steps above.

## 4. Conclusion

Anesthetic morbidity and mortality can be reduced with better preoperative evaluation and clear guidelines and practice for difficult intubation.

## 5. References


1. Black AE. Management of the difficult airway. Hatch Sumner's Textb Paediatr Anaesth 3rd ed. 2003; 315–29.
2. Tripathi S, Shinde DV, Shaikh ZP. Lemon score: a tool to predict difficult airway in Ed in Indian Setting. Int J Med Biomed Stud. 2019; 3(12): 62–7.
3. Apfelbaum JL, Hagberg CA, Connis RT, Abdelmalak BB, Agarkar M, Dutton RP, et al. 2022 American Society of anesthesiologists practice guidelines for management of the difficult airway. Anesthesiology. 2022; 136: 31–81.
4. John F. Butterworth, David C. Mackey JDW. Morgan & Mikhails's clinical anesthesiology. 6th ed. New York, Chicago, San Francisco, Lisbon, London, Madrid, Mexico City, Milan, New Delhi, San Juan, Seoul, Singapore, Sydney, Toronto; 2018: 496–557.
5. Wong J, Lee JSE, Wong TGL, Iqbal R, Wong P. Fibreoptic intubation in airway management: A review article. Singapore Med J. 2019; 60(3): 110–8.
6. Tsukamoto M, Kameyama I, Miyajima R, Hitosugi T, Yokoyama T. Alternative technique for nasotracheal intubation using a flexible fiberoptic scope. Anesth Prog. 2022; 69(2): 35–7.
7. Saoraya J, Vongkulbhisal K, Kijpaisalratana N, Lumlertgul S, Musikatavorn K, Komindr A. Difficult airway predictors were associated with decreased use of neuromuscular blocking agents in emergency airway management: a retrospective cohort study in Thailand. BMC Emerg Med. 2021; 21(1): 1–9.
8. Rhee S-H, Yun HJ, Kim J, Karm M-H, Ryoo S-H, Kim HJ, et al. Risk factors affecting the difficulty of fiberoptic nasotracheal intubation. J Dent Anesth Pain Med. 2020; 20(5): 293.

9. Nedrud SM, Baasch DG, Cabral JD, McEwen DS, Dasika J. Combined video laryngoscope and fiberoptic nasal intubation. Cureus. 2021; 13(11): 11–4.
10. Chung MY, Park B, Seo J, Kim CJ. Successful airway management with combined use of McGrath((R)) MAC video laryngoscope and fiberoptic bronchoscope in a severe obese patient with huge goiter – a case report. Korean Journal of Anesthesiology. 2018; 8–12.
11. Gropper, Michael A., Neal H. Cohen, Lars I. Eriksson, Lee A. Fleisher, Kate Leslie JPW-K. Miller's Anesthesia. 9th ed. Canada: Elsevier; 2020; 1373–412.