



# Awake Nasotracheal Intubation by Using Fiberoptic Bronchoscope: An Anticipated Tracheostomy

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## Abstract

Unanticipated difficult airway management cases often come in an emergency operating room and management of difficult airway must be done on an emergency basis. In emergency circumstances limited time, and available resources should be used in the management of patients with difficult airway for minimal procedural complications during preoperative and postoperative period. We report a case of successful awake nasotracheal intubation in patient with facial cut injury with fracture of the maxilla and mandibular bones having mouth opening approximately one horizontal finger by using fiberscope with the help of an epidural catheter for local anesthesia.

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**Keywords:** Awake nasotracheal intubation; Difficult airway; Fiberscope; Anticipated tracheostomy

## Introduction

Nasotracheal intubation is a commonly used procedure for oral and maxillofacial surgery. Nasotracheal intubation has more anatomical challenges than oral intubation. The risk of nasal cavity damage, epistaxis and chances of unsuccessful intubation during nasotracheal intubation is high as compared to oral intubation in an emergency for management of difficult airway. Awake intubation is the best choice for management of difficult unanticipated airway management. Fiberoptic nasotracheal in-

tubation is an important alternative way of securing the airway when the patient significantly unable to open the mouth or difficult to perform by using laryngoscope [1].

Saha et al. showed that an emergent tracheostomy is the last resort in difficult airway management situations which is associated with complications. The best and often under-appreciated and underused approach in life-threatening situation is the use of awake fiberoptic bronchoscopy guided endotracheal intuba-



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tion or nasotracheal [2]. The American Society for Anesthesiologist task force Committee on Standards and Practice Parameters Jeffrey et al. in 2013 mentioned that during difficult airway management, fiberoptic intubation is the choice of technique to secure airway and the principal adverse outcomes associated with the difficult airway include (but are not limited to) death, brain injury, cardiopulmonary arrest, unnecessary tracheostomy, airway trauma, and damage to teeth [3]. In this case report, the patient has cut injuries with fracture of the mandibular and maxilla bones which restricted to open the mouth (Figure 4).

**Case presentation**

A 49 years old male with height of 164 cm and weight of 64 kg was admitted to our hospital with the complains of 4 hours facial laceration due to injury by saw. Emergency surgery was planned for debridement.

**Past Medical history:** In 2013, the patient had rib fracture in a car accident. He underwent surgery under general anesthesia without blood transfusion. He has no history of drug allergy and chronic diseases.

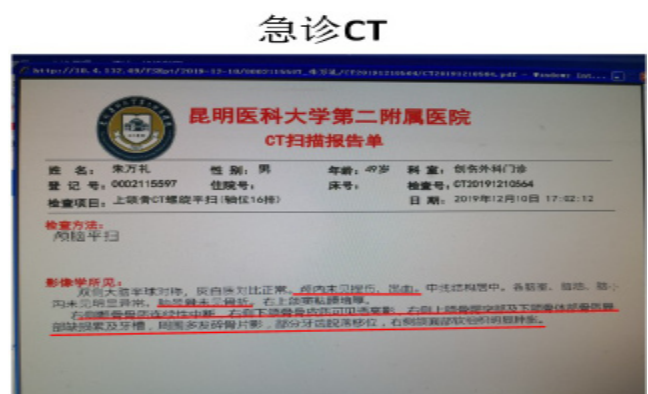
**Physical Examination:** The patient was brought on lying in the lateral position with the head raised. The patient had shortness of breath, as patient was breathing only through a small opening from the left side of the mouth (Figure 1). He was constantly vomiting blood and was slightly restless, however, he could respond to the doctor. Bilateral nasal cavities were blocked with blood clots. At the time of admission, patient’s SpO2 was 88% in oxygen of air which reached 100% after administering 6L/min oxygen by mask. The patient was tachycardic (HR101bpm) and hypertensive (BP160/80mmHg), had noisy breathing sounds in both lungs, normal sounds during auscultation of the heart, and no edema in bilateral lower limbs. In computer tomography head showed: no skull fracture, no bruises or hemorrhage in the skull, and found fracture of right cheekbone, maxilla and mandible (Figure 2).

**Pre-anesthesia Evaluation:** The patient could not lie in supine position; thus, patient’s head was raised high, the opening of mouth was less than one horizontal finger, the mobility of the upper and lower jaws was poor, bilateral nasal cavities was blocked with blood clots. Therefore, the patient was breathing through small gap of left corner of his mouth. The patient’s neck extension is limited due to continuous hematemesis and gauze bandaging (Figure 1). Patient was fasting for more than 8 hours. It was found that the bilateral nasal cavity was blocked due to blood clots. After flushing the nasal cavity with normal saline, the left nasal cavity was completely clear. The anesthetist intends to prepare for nasotracheal intubation through the left nostril (Figure 3).

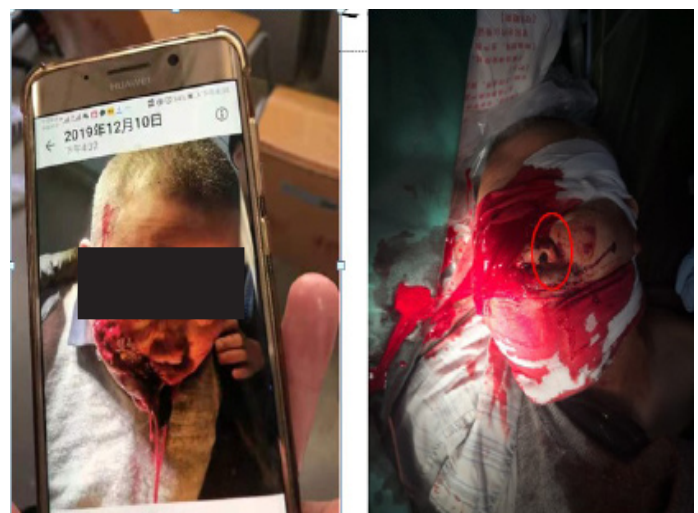
**Intubation preparation:** The senior anesthesiologist and ENT specialists were called to the operating room for further evaluation of the patient. Due to the gauze bandaging in head, face covering both eyes, neck and there was active bleeding from the wound, only able to open mouth approximately one horizontal finger. Thus, the patient has difficulty in ventilation. Therefore, we have to choose awake nasotracheal intubation through left nostril using a fiberoptic bronchoscope. Despite being the gold standard, fiberoptic intubation (FOI) is still associated with significant morbidity [4].



**Figure 1:** Patient came to operating room lying right lateral with the head raised. Patient had active bleeding from wound. Patient breathing from small gap in left corner of mouth.



**Figure 2:** CT scan HEAD: no skull fracture, no bruises or hemorrhage in the skull, and found fracture of the right cheekbone, maxilla and mandible.



**Figure 3:** At emergency department before gauze bandaging (Left). Planning to intubate from left nostril at emergency operating room after removing blood clots (Right).





**Figure 4:** Successful awake nasotracheal intubation by using fiberoptic bronchoscope.



**Figure 5:** Awake nasotracheal intubation by using fiberoptic bronchoscope.

#### **Preoperative and postoperative anesthesia procedures:**

Firstly, the ENT specialist was requested to prepare tracheostomy equipment for emergency management of the airway. The anesthesiologist used a mask to pre-oxygenate, the exhaled oxygen concentration was more than 90%, and 2% lidocaine was used for local anesthesia. At the same time, 3% ephedrine was put in nasal cavity to minimize the bleeding by constricting the nasal blood vessels, and intravenous sufentanil 5 mcg was used to sedate the patient. In prospective cohort study Conti et al. demonstrated that sufentanil may produce adequate awake analgesia-sedation, with no detectable effects on respiratory drive, respiratory pattern, and inspiratory impedance of the respiratory system and gas exchange in critically ill patients with partially ventilatory support [5]. The patient was placed in the lateral position, the mask was intermittently inhaled with oxygen 8L/min, and an epidural catheter was inserted into the lateral opening of the fiberoptic bronchoscope until the tip of the catheter was visible. The patient was injected with 2% lidocaine

3ml each time in the patient's nasopharynx, glottis, and subglottis. The patient was asked to swallow the secretions from the oropharynx to the esophagus or spit out of the mouth, so as not to affect the effect of local anesthesia. Finally, the internal diameter of 7.0 mm reinforced endotracheal tube was successfully inserted (Figure 4). The end-expiratory carbon dioxide (ETCO<sub>2</sub>) waveform and its value were seen in the monitor. The above gold standard criteria show confirmation of the successful intubation, and the patient had no obvious discomfort such as coughing. During the period of surgery for maintenance anesthesia, sevoflurane and remifentanyl were used. The operation lasted for about 2 hours, and the vital signs were stable during the operation. After the operation, the patient was transferred to the ICU with a nasotracheal tube to continue the monitoring airway and treatment. The tracheal tube was removed on the second day of operation. In the second stage of operation, mandibular incision internal fixation was done on the 5<sup>th</sup> postoperative day. He was discharged on the 6<sup>th</sup> postoperative day.

#### **Discussion**

Emergency department (operating room) is often busy due to emergency cases of airway management. Therefore, it is very important to find a clear process, clarify the thinking, and make the right clinical decisions beneficial to the patient. When the patient was brought to the operating room, the bilateral nasal cavities were obstructed, and the opening of mouth was less than 1 horizontal finger, and he relied only on the gap in the left corner of the mouth to breathe. Due to the active bleeding, the anesthesiologists didn't release gauze bandage to relieve patients' dyspnea, the chances of massive bleeding were more after removal of gauze bandage. Because of the small opening on the left side of the mouth, it was impossible to intubate through the mouth to the trachea and the nasal cavities were blocked by the blood clots. Theoretically, this patient needs tracheostomy to establish an airway from the ENT department in emergency basis. However, when surgeon came to the operating room, the anesthetist checked the patient's photo of the wound from the surgeon mobile, which was taken before gauze bandaging in the emergency department. It was confirmed that the wound did not connect with the patient's nose. The nasal cavity was washed with normal saline to remove blood clots from the right nasal cavity and clear for nasotracheal intubation. Finally, decided to do awake intubation through the left nostril by using a fiberoptic bronchoscope.

During induction of anesthesia, intravenous sufentanil 5 mcg for sedation was given which can reduce patient anxiety and increase intubation tolerance. Drugs, inhibits salivary gland secretion, such as atropine, have not been used. Main reason behind not giving atropine, the patient was in an emergency and bleeding continuously who need to be managed urgently. Atropine could not give effect immediately to control secretion in mouth. In this case, patient was conscious, so the anesthesiologist thinks that patient can splitting out the secretion by himself. In this case, to reduce the risk of bleeding from the nasal cavity, we used 3% ephedrine for constriction of nasal blood vessels, which helps to increase visibility by minimizing blood in the nasal cavity for fiberscope. Hyuk et al. mentioned that to reduce nasal bleeding, can be used technique softening tube by immersing in warm water, applying epinephrine and should be screened the presence of systemic diseases associated with major bleeding disorders [1]. The 2% lidocaine 3 ml each time is used for topical anesthesia. The epidural catheter is used through opening of fiberoptic bronchoscope for topical

anesthesia in nasopharynx, glottis, and sub-glottis. Due to the multiple opening sides by side at the end of the epidural catheter, helps to inject the local anesthetic evenly distributed on the mucosa. There was no obvious discomfort to patient during the procedure, indicates 2% lidocaine can be used as local anesthesia during awake intubation. If awake intubation is unsuccessful then the anterior cervical airway i.e. tracheostomy is the last resort for difficult airway management specially in an emergency like this case report. In this case, the ENT specialist has been called for the preparation of tracheostomy, if failed to do awake nasotracheal intubation. Kati et al. demonstrated that ensuring eye contact and breathing instruction during the procedure seems to reduce patient distress when undergoing awake fiberoptic intubation therefore, in the future most of the patients would not hesitate to undergo awake intubation again if needed [6].

### Conclusion

We demonstrated through this clinical case report that instead of emergency tracheostomy in difficult airway management, awake nasotracheal intubation can be done successfully using fiberscope in patients with facial injury restricting the mouth opening. Our report suggests that awake intubation can be done by using a fiberoptic bronchoscope to minimize the frequency of emergency tracheostomy, which directly benefits in postoperative recovery and reduce postoperative complications.

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