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Difficult Airway Intubation Due to Mouth Opening Limitation Caused by Mandibular Abscess: A Case Report

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Abstract

Appropriate management of difficult airways is imperative, particularly in cases with anticipated difficult airways. It customarily requires deliberate perioperative assessment. In this article, we present a case of limited mouth opening along with restricted mobility of the temporomandibular joint secondary to mandibular abscess which requires surgical intervention. Preoperatively, difficult airway intubation was expected (based on LEMON mnemonic on preoperative evaluation). Therefore, Macintosh video laryngoscope and fiberoptic bronchoscope were prepared to aid in intubation. Due to the patient's anxiety towards the procedure, the intubation was done while the patient was asleep. Preoxygenation was uneventful. Following induction with general anesthesia, several attempts to conduct nasotracheal intubation using a Macintosh video laryngoscope were made but all were abortive. This failed attempt is primarily due to the limited mouth opening and jaw mobility. Hence, fiberoptic bronchoscope-assisted nasotracheal intubation was conducted and was able to achieve airway patency. In conclusion, preoperative management holds great importance in selecting an airway management strategy. In addition, fiberoptic bronchoscope-assisted intubation is a safe option for intubation.

Keywords: difficult airway, fiberoptic bronchoscope, intubation, preoperative

Case Report

INTRODUCTION

Prior to any anesthesia procedure, it is essential for anesthesiologists to assess and recognize difficult airway. A difficult airway itself is defined as a clinical situation in which facemask ventilation and tracheal intubation are arduous to be done by a trained anesthesiologist. It could either be anticipated or unanticipated and contribute to patient morbidity and mortality due to hypoxemia, cardiovascular and cerebrovascular accidents, and other complications (Joffe et al., 2019; Liu et al., 2022; Xu et al., 2018). On the grounds that airway patency must be achieved, the consideration of which assistive device can optimally attain that objective should be weighed carefully (Ellard & Wong, 2020). Morphological and/or pathological changes in the airway make the glottis visibility impossible, hence it presents as a challenge in airway intubation. Asleep intubation procedure in cases with airway passage blockage caused by abscess has a high risk of infectious aspiration and may potentially lead to a failed intubation (Faisal Shamim et al., 2020; Touré et al., 2020). Hence it is best to prepare a proper

airway management strategy for difficult airway conditions (Ahmad et al., 2020; Apfelbaum et al., 2022; Sakles et al., 2020). We hereby report a case of difficult airway management of a 66-year-old man with limited mouth opening due to a mandibular abscess.

CASE PRESENTATION

A 66-year-old-Balinese-Male (height 170cm, weight 80kg) was presented to Wangaya Regional Hospital, using national health insurance Badan Penyelenggara Jaminan Sosial (BPJS), with a history of painful swelling on his left cheek. It started 5 days prior as a painful erythematous area that gradually swelled and reached the size of an egg. The patient experienced fever, dysphagia, nausea, and vomiting. The patient reported a history of infected dental cavities affecting a few of his lower left teeth and poor oral hygiene.

The patient had a numerical pain score (NPS) of 7 out of 10. Physical examination demonstrated a single erythematous mass which was warm, undulated, and poorly defined upon palpation. The mass was estimated to be 7 x 6 cm in size. Laboratory results showed only a slight leukocytosis (11.7x10^3/µL). The patient was then diagnosed with a left mandibular abscess (Figure 1) and was arranged to undergo a surgical abscess incision the day after.

Figure 1. Clinical appearance of left mandibular abscess [source: original].

Preoperatively, the patient was given Ceftriaxone 2 g/b.i.d and Metronidazole 500 mg/t.i.d as prophylaxis. The patient was instructed to fast for 8 hours before the surgery and was prescribed with betadine gargle. Other screening methods for difficult airways, such as MOANS, and SHORT were normal except for RODS and LEMON mnemonics. In RODS, there was restricted mouth opening and slight obstruction in airway passage. In the LEMON mnemonic, an external look (inspection) showed an egg-sized swelling on the left cheek. Mouth opening was limited due to pain upon jaw movement. Evaluation of the limited mouth opening found that only two fingerbreadths fit between the upper and lower teeth, two fingerbreadths fit the thyromental, and two fingerbreadths fit between the base of the mandible and the thyroid notch of the anterior portion of the neck. The patient had a class III Mallampati. There was a slight obstruction due to a large abscess in O mnemonic for Obstruction and obesity. And finally, there was no limitation in neck mobility. The patient is classified as having ASA physical status class III.

On the day of the surgery, the patient was prepared for general anesthesia and was given ondansetron 4 mg, dexamethasone 10 mg, and diphenhydramine 10 mg. Nasotracheal intubation (6 mm endotracheal tube), with additional video laryngoscope and a flexible fiberoptic bronchoscope, was prepared to anticipate difficult intubation. The decision to perform asleep intubation was made due to the patient's anxiety towards the procedure.

Induction drugs given include fentanyl 150 mg, propofol 150 mg, and atracurium 30 mg. Preoxygenation and ventilation were given adequately and were followed by intubation. Video laryngoscope-aided intubation was attempted three times (Figure 2) but was unsuccessful. Due to the many attempts of intubation, the patient had an increment in blood pressure. After re-ventilation with an oxygen bag mask, the anesthesiologist changed the course of intubation to utilization of a fiber

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optic bronchoscope (Figure 3) which fortunately enabled a successful ETT insertion (Figure 4). The surgery was executed well. Awake extubation was uneventful. Postoperatively, the patient was given oxygen supplementation using the non-rebreathing mask and was monitored for 2 hours in the Post-anesthesia Care Unit (PACU). The patient was stable with non-threatening complications (just a slight pharyngitis with no airway compromise) until the patient was sent home on the 3rd day.

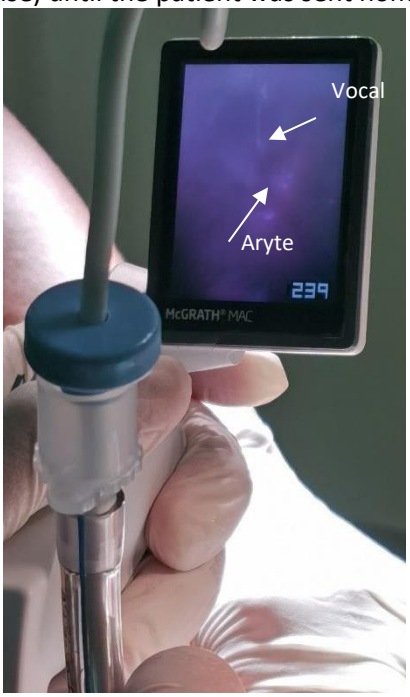

Figure 2. McGrath Video Laryngoscopy view on vocal cord [source: original].

Figure 3. Nasotracheal flexible Fiberoptic Intubation (FOI) [source: original].

Figure 4. Fixed nasotracheal tube after bronchoscopy intubation [souce: original].

DISCUSSION

Airway disorders, which in this case is due to a mandibular abscess, pose a risk of serious complications and may even lead to mortality during anesthesia induction. Despite that fact, there is no consensus or guidelines for its management (Ismail et al., 2021). Difficult airway is a clinical situation that may be anticipated but may also be missed, particularly in cases with a lack of predictive factor evaluation or with inadequate perioperative assessment (Ahmad et al., 2020; Wong et al., 2019). Bedside airway examination is designed as a screening tool with high sensitivity expectations, but most of the tests have relatively low sensitivities. Nevertheless, it is used as routine and has been proven to be helpful at least to force the anesthesiologist to think about the airways (Pujari, 2023). A thorough preoperative assessment, planning, and evaluation in patients with high suspicion of a difficult airway is therefore strongly recommended (Cai et al., 2020). According to Sharma et al., an inter-incisor distance of 3 cm was the most sensitive predictor of the difficult airway which in this patient 2 fingerbreadth, followed by Mallampati class-3, the neck circumference of more than 40 cm and a subluxation grade-2 (Sharma et al., 2023).

Fiberoptic bronchoscopy is one of the most used auxiliary means in managing a difficult airway and also the gold standard for assessing a difficult airway (Liu et al., 2022; Touré et al., 2020). Awake fiberoptic intubation is the safest great rescue option for securing the airway in an anticipated difficult airway and also the most appropriate for orofacial infections (Kostyk et al., 2021; Sakkas et al., 2023). Nevertheless, it is often associated with the risk of nasal bleeding, oversedation, airway hyper-reactivity, and complete airway obstruction (Ahmad et al., 2020; Alhomary et al., 2018; Wong et al., 2019). In our case, the use of awake fiberoptic intubation might provoke gag reflex and distress if the topical anesthesia is inadequate yet it offers several advantages, such as the preservation of muscle tone and spontaneous breathing which lessen the risk of “can’t ventilate can’t intubate” event (Kim & Kim, 2020; Ran et al., 2022; Tsukamoto et al., 2018). In addition, the patient is able to swallow the secretions along the intubation passage which aids in better visualization and prevents the risk of developing descending infection such as pneumonia. Patient cooperation is required in awake fiberoptic intubation (Kim & Kim, 2020). In spite of the advantages of awake fiberoptic intubation mentioned above, asleep fiberoptic intubation was opted in this case due to the patient’s anxiety towards the procedure tends to cause uncooperativeness (Kostyk et al., 2021). In a sedated patient or even asleep procedure, there is movement of the base of the tongue, soft palate, and epiglottis backward disturbing the advancement of the fiberoptic bronchoscope. A study about the comparison of head positions (neutral, sniffing, and extension) showed that the Extension position (using a 7-cm firm pillow under the shoulders) helps tighten the muscles and tissues in the front neck and the oropharyngeal moves anteriorly (Laferrière-Langlois et al., 2023).

Herein we present a case of a successful intubation with the aid of a fiberoptic bronchoscope in a patient with limited mouth opening due to a mandibular abscess. One of the most prevalent causes of maxillofacial diseases is infection of the teeth and/or its surrounding tissue. It frequently generates consequential and fatal complications (Katoumas et al., 2019) such as mandibular infection, which often results in mouth opening disorder (Tajrin, 2021).

Further perioperative assessment in this patient found other factors that aggravate the existing airway difficulty: short neck, obesity, and Mallampati score III. Owing to the patient's condition, both video laryngoscopes and fiberoptic bronchoscopes were prepared to anticipate this condition (Wong et al., 2019). *American Society of Anesthesiology* (ASA) stated that their recommendation on difficult airways is not intended as a standard or absolute, instead, it may be adopted, modified, or rejected according to clinical needs (Apfelbaum et al., 2022). In addition, a study of ultrasonography (anterior neck soft-tissue thickness at the level of vocal cord (ANS-VC)) in assessing a difficult airway can refine the identification of a difficult airway especially if combined with the clinical assessment (hyomental distance ratio (HMDR)) (Yadav et al., 2020).

There was no difficulty in preoxygenation during anesthesia induction. Atracurium was given but unfortunately did not allow sufficient mouth opening nor increase the mobility of the temporomandibular joint. Multiple attempts to perform nasotracheal intubation were abortive due to the unobservable larynx.

Some studies comparing the video laryngoscope and fiberoptic laryngoscope intubation for difficult airway showed that faster airway security in video laryngoscope with nearly the same success rate and provides satisfaction, the video laryngoscope can be useful (Moore & Schricker, 2019). In this case, we tried to use the McGrath video laryngoscope with the fiberoptic intubation on standby. Several case reports demonstrated that fiberoptic bronchoscope-assisted intubation is a useful procedure both as a primary and as a rescue option for definitive airway management in various difficult airway cases (Hariharasudhan et al., 2016; Lim & Wong, 2019; Maeda et al., 2020; Pang et al., 2015; Sung et al., 2014). Sung *et al*. reported a case of successful fiberoptic nasotracheal intubation in temporomandibular ankylosis with minimal mouth opening (Sung et al., 2014). A few important things should be considered, such as epistaxis in nasotracheal intubation which can lead to poor visibility (Ahmad et al., 2020).

In our case, a fiberoptic bronchoscope was utilized to guide the endotracheal tube via the nasal route. The patient was positioned to improve the view and achieve the goal flat chest, enough room for head extension, tragus in line with the sternum. Standard pre-oxygenation and standard IV induction were done. Following the pre-oxygenation, several attempts of Macintosh video laryngoscope-assisted intubation weren't able to expose the larynx (Moore & Schricker, 2019; Soria et al., 2021). Following the re-oxygenation, the fiberoptic bronchoscope was used lubricated, and loaded with a wire-reinforced endotracheal tube to ensure smooth slide insertion. The bronchoscope was inserted through the nasal passing the oropharyngeal under the tongue until the vocal cord was identified. The bronchoscope was projected over the vocal cord about 1-2 cm above the carina and the endotracheal tube was inserted along the bronchoscope. Intraoperatively, the endotracheal tube was connected to the breathing system with fully controlled ventilation and was ongoing uneventfully during the surgery procedure. Post-operatively, awake extubation was preferred because multiple attempts of failed intubation and difficult airway had an increased risk of laryngospasm (Apfelbaum et al., 2022). Post-extubation, the patient was sent to the Post-Anesthesia Care Unit for further hemodynamic monitoring and any potential complications. The patient was transferred back to the ward after achieving Aldrete's score of 10. He was stable with slight pharyngitis without airway compromise until the patient was sent home on the 3rd day. As has been demonstrated, our case represents the significance of preoperative evaluation in the screening of patients with difficult airways.

Preoperative management holds great importance in selecting airway options for patients with difficult airways. Alternative or rescue plans should be considered before undertaking the patient's airway. Flexibility and good decision-making are required in managing unexpected situations during perioperative.

CONCLUSION

Fiberoptic bronchoscope-assisted nasotracheal intubation proved to be a safe procedure, as a rescue airway management course when a video or conventional intubation failed or could not be performed.

CONFLICT OF INTEREST

All authors declare that there is no conflict of interest in this study

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None

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