Archives of Anesthesiology and Critical Care (In Press); x(x): xx-xx.

Available online at http://aacc.tums.ac.ir

Case Report

Challenges and Strategies of Airway Control in Patients Who Underwent Mandibulectomy under Surgical Intervention: A Case Report

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ARTICLE INFO

Article history:
Received 24 December 2024
Revised 08 January 2025
Accepted 22 January2025

Keywords:
Mandibulectomy;
Local anesthesia;
Awake intubation;
Airway control;
Intubation

ABSTRACT

A 68-year-old female patient referred for mandibular reconstruction surgery. He was treated for cancer in the mandible last month. Due to the extent of the mass in the lower jaw area, this patient underwent Mandibulectomy 9 months ago. The patient was admitted to Ba'ath Hospital in Hamadan, his vital signs were stable. Before the surgery, according to his underlying diseases, a cardiovascular consultation was done and no complications affecting anesthesia were reported. The challenge of the anesthesia team in this patient was to establish a safe airway for him. According to the physical condition of the patient's neck and mandible, the patient was intubated using a Fireoptic bronchoscope. The patient's surgery lasted 2 hours and 45 minutes. During the entire period of anesthesia, the patient was under strict respiratory monitoring. After the end of the surgery, the patient was transferred to the recovery room without removing the endotracheal tube, and after ensuring that the patient's condition was stable, he was transferred to the intensive care unit.

Introduction

Airway control in patients with mandibular deformity can be very challenging due to the varying effectiveness of different airway management techniques [1]. The small size of the mandible in these patients often complicates intubation [2]. This challenge is particularly significant for patients who have undergone mandibular surgery or who have lost their mandible due to cancer [3]. Selecting an appropriate anesthesia and airway control method can be lifesaving for these individuals.

Case Report

A 68-year-old female patient was referred to Ba'ath Hospital in Hamadan for mandibular reconstruction. This patient came to the hospital in December 2023 with symptoms of severe pain in the neck and mandible and the feeling of a foreign body in the mouth. According to the condition of the patient and the observation of the mass, the doctor performed the necessary tests, which included a biopsy of the mass. According to the results of the tests and the growth rate of the mass in the mandible space, the doctor included Mandibulectomy in the patient's treatment plan. The patient underwent Mandibulectomy surgery in January 2024 and was monitored in the intensive care unit for 71 days after surgery (Figure 1). According to the patient's condition and lack of regrowth of the mass, the patient was a candidate for mandibular reconstruction surgery in September 2024. The patient was admitted to Baath Hospital for the first stage of mandibular reconstruction and placement of the base plate. A cardiovascular consultation was performed, and no significant

The authors declare no conflicts of interest.

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complications were reported during the anesthesia process.

Figure 1- A view of the patient's mouth and mandible anatomy

An anesthesia consultation was conducted the day before the surgery, and a detailed airway examination was performed. The patient's baseline tests showed: Hb: 10.6, HcT: 36.1, WBC: 7400. The patient's vital signs are as follows: SpO2: 91%, NIBP: 140/92, HR: 62, T: 36.5. The patient's mouth opening was 4 cm, and the oral space was small (Figure 2).

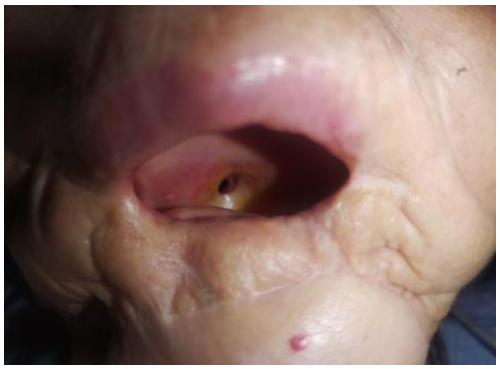

Figure 2- The patient's mouth

What is the best method for intubating the patient? After consulting with the two anesthesiologists present at the patient's bedside, it was decided to use the awake intubation method. The location of the surgical field in the patient's neck, mandible, and cheek area, along with the limited mouth space and the anesthesiologist's experience with Mandiblectomy surgery, influenced the decision to choose nasal intubation using a Fiberoptic bronchoscope for this patient.

Establishing the patient's airway

Considering that the patient did not cooperate for awake intubation, the anesthesiologist used 2% Lidocaine to reduce painful stimulation. To minimize painful stimuli for the patient while maintaining spontaneous breathing and minimal suppression of airway reflexes, a mesh impregnated with a combination of 60 mg of 2% Lidocaine and 0.5% phenylephrine drops was prepared and placed in the patient's nose. Additionally, 2% Lidocaine (40 mg) was injected intratracheally. First, 10 mg of Lidocaine was injected with an insulin syringe into the subcutaneous area near the cricothyroid membrane. Then, by placing a number 20 cannula in this area, access to the glottis space was established, and Lidocaine was slowly injected into the trachea before removing the cannula. After administering the Lidocaine, the anesthesiologist waited five minutes to ensure that the Lidocaine had begun to take effect.

Next, two puffs of 5% Lidocaine spray were administered in the patient's mouth. After confirming the level of anesthesia, the patient was intubated through the left nostril by the anesthesiologist using a Fiberoptic bronchoscope and a number 7 tracheal tube (Figure 3).

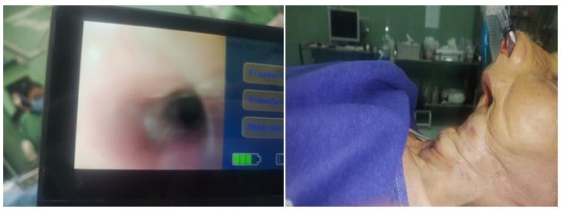

Figure 3- View of the vocal cords when using Fireoptic and Establishing a safe airway in the patient

During the intubation, the patient did not feel any pain, and the procedure was performed without a cough reflex or feeling of suffocation. Correct intubation was confirmed by auscultation of both lungs and capnograph monitoring. After this stage, anesthesia was induced by administering midazolam (1 mg), fentanyl (50 micrograms), Propofol (40 mg), and ketamine (50 mg).

Isoflurane (minimum alveolar concentration 1.2), N2O, and oxygen (each at 3 L/min) were used to maintain anesthesia. During the surgery, the patient was under strict cardiac and respiratory monitoring. After the surgery (2 hours and 45 minutes), the patient was transferred to the recovery department, and after 20 minutes of monitoring during recovery and the return of spontaneous breathing, the patient was transferred to the ICU department with stable vital signs. The patient was discharged from the hospital after a 7-day recovery period.

Discussion

The purpose of this article is to investigate the challenges of airway control in patients who have undergone mandibulectomy surgery. Due to the specific conditions of these patients, the likelihood of intubation failure is very high. Patients who have undergone mandibulectomy or have any disorders affecting the mandible may experience airway control challenges that make direct laryngoscopy impossible [4].

This article aimed to share our experiences in the field of airway management for a patient who underwent anesthesia after Mandibulectomy for reconstruction and whose airway was difficult to control. In addition to the proper evaluation of the patient's airway, it should be

noted that the airway management of these patients, aside from negatively impacting the intubation process, can also present challenges when placing a laryngeal mask (LMA), which is the gold standard in difficult airway management [5].

This problem makes the airway self-control of these patients more challenging and reduces the possibility of error compensation during intubation. Therefore, choosing the intubation method can have a significant effect on reducing injuries and preserving the life of patients who have undergone Mandibulectomy; during various surgeries [6].

According to the evaluations made by the anesthesia team, the awake intubation method was chosen for the patient to maintain spontaneous breathing during the intubation attempt. This approach alleviated concerns about potential brain damage or threats to the patient's life in case of intubation failure by the anesthesiologist [7]. Establishing an airway through the nose can somewhat limit the possibility of intubation failure, and the most appropriate action during awake intubation is to establish an airway through the nose using a Fiberoptic bronchoscope. For this patient, the intubation method utilized a Fiberoptic bronchoscope through the nose to minimize the risk of error and to allow for complete observation of the Glottic space during tracheal intubation [8].

In the awake intubation method, the patient must either cooperate with the anesthesia team or have their movements and reflexes limited by sedative drugs [9]. The case studied in this article did not involve the necessary cooperation to establish an airway, and the use of sedative drugs created the risk of apnea in the patient. Therefore, using sedative drugs was not a wise choice. Consequently, the anesthesiologist decided to use local anesthesia so that the patient could still breathe properly if tracheal intubation failed. Often, during local anesthesia, the local injection of Lidocaine can effectively control the patient's pain and limit the reflexes that hinder treatment [10].

In the present patient, the subcutaneous injection of Lidocaine could not limit the patient's movements regarding the entry of the tracheal tube into the glottis and trachea, and the patient's reactions prevented the tracheal tube from entering the Glottic space. Therefore, the anesthesiologist decided to use an Intratracheal injection of Lidocaine. Lidocaine is one of the few drugs that can be administered Intratracheally to patients without causing complications and without disrupting the drug's effect in the body [11].

Specialists also prescribed Lidocaine to control the pain in this area of the nose. A Lidocaine patch was used to establish appropriate local anesthesia in the patient's nasal passage. For this, a mesh was dipped in Lidocaine. Considering that the nose is a vascular area and the vessels are superficial, there is a possibility of vascular damage and bleeding when using nasal airways and nasal intubation [12]. The use of phenylephrine drops during nasal intubation can promote vascular contraction and reduce vascular damage and bleeding in this area. Therefore, the anesthesiologist used phenylephrine drops to minimize nosebleeds. The use of Lidocaine spray in the patient's mouth also helped make the patient comfortable and establish a secure airway.

After establishing the airway, the anesthesiologist ensured that it was properly maintained by auscultating the patient's lungs and using a Capnograph, a precise respiratory monitor. The patient was continuously monitored using a Capnograph and pulse Oximetry until the end of the surgery.

Conclusion

Mandibulectomy is one of the surgeries used for patients who have cancer in the mandible area. Since patients who undergo Mandibulectomy are candidates for mandibular reconstruction surgery after recovery, establishing an airway in these patients presents a significant challenge for the anesthesia team. Given the special conditions of these patients, it is crucial to evaluate the airway and use appropriate techniques during intubation. The use of awake intubation methods and suitable anesthesia can be lifesaving and help reduce the challenges of airway management in these patients. Proper respiratory monitoring is essential during the surgery so that, in the event of any ventilation issues, the anesthesiologist can quickly identify the problem and mitigate potential risks.

Acknowledgments

The authors would like to acknowledge the patient’s cooperation for permitting photography and allowing this case presentation.

References

[1] Vora J, Leslie D, Stacey M. Awake tracheal intubation. BJA education. 2022; 22(8):298-305.

[2] Benumof, Jonathan L. Management of the difficult adult airway. With special emphasis on awake tracheal intubation. Anesthesiology. 1991; 75(6):1087-1110.

[3] Randell T, Söderholm AL, Lindqvist C. Is nasotracheal intubation safe in surgery for mandibular cancer? Arch Otolaryngol Head Neck Surg. 1992;118(7):725-8.

[4] Tsai CH, Liu YC, Chen PR, Loh CY, Kao HK. Risk factors for postoperative adverse airway events in patients with primary oral cancer undergoing reconstruction without prophylactic tracheostomy. Asian J Surg. 2024; 47(4):1763-8.

[5] Ní Eochagáin A, Athanassoglou V, Cumberworth A, Morris O, Corbett S, Jefferson H, et al. Assessing a novel second generation laryngeal mask airway using the ‘ADEPT’approach: results from the

LMA® Protector™ observational study. J Clin Monit Comput. 2023; 37(2):517-24.

[6] Bhate K, Awate SA, Gandhi DC, Londhe U, Tirupathi S, Bhagat B. Pathways to Airways: Review and Considerations of Different Intubation Techniques in Oral and Maxillofacial Surgery. Curr. Oral Health Rep. 2024; 11(2):118-24.

[7] Canpolat DG, Yasli SO. Does a nasal airway facilitate Nasotracheal intubation or not? A prospective, randomized, and controlled study. J Oral Maxillofac Surg. 2021; 79(1):89-e1.

[8] Cheng T, Wang LK, Wu HY, Yang XD, Zhang X, Jiao L. Shikani optical stylet for awake nasal intubation in patients undergoing head and neck surgery. Laryngoscope. 2021;131(2):319-25.

[9] Gostelow N, Yeow D. Awake tracheal intubation: a narrative review. J Oral Maxillofac Anesth. 2023; 2.

[10] Bahar E, Yoon H. Lidocaine: a local anesthetic, its adverse effects and management. Medicina. 2021; 57(8):782.

[11] Salah HS, Zakria FY. Effect of intratracheal lidocaine spray on recovery from general anesthesia after Eye surgery: A randomized double-blinded study. Minia Journal of Medical Research. 2023; 34(2):66-71.

[12] Patel S, Hazarika A, Agrawal P, Jain D, Panda NK. A prospective randomized trial of xylometazoline drops and epinephrine merocele nasal pack for reducing epistaxis during nasotracheal intubation. J Dent Anesth Pain Med. 2020; 20(4):223-231.