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CASE REPORT

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Anesthetic challenges in difficult airway in a patient with maxillary carcinoma: A case report

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Key Clinical Message

Airway management in patients with maxillary carcinoma presents unique challenges. To ensure safety, a tailored and collaborative approach is essential. This is a case where anesthetic plan of awake fiberoptic oral endotracheal intubation was chosen.

KEYWORDS

airway management, anesthetic, endotracheal, intubation

1 | INTRODUCTION

Airway management is a critical aspect of anesthesia and plays a pivotal role in ensuring patient safety and successful surgical outcomes. The incidence of serious airway complications during general anesthesia has been found to be 1 in 22,000 and ICU admissions due to airway morbidities was 1 in 29,000.[1] We present a case report of a 40-year-old male with maxillary carcinoma, highlighting the complexities encountered during airway management and discussing the strategies employed to optimize patient care.

Maxillary carcinoma is a rare malignancy with a poorly defined prognosis characterized by the growth of tumor cells within the maxillary sinus.[2] In addition to the local invasive nature of the tumor, the proximity of the tumor to vital structures further compounds the challenges in airway management. Addressing the challenges of the difficult airway required a multimodal approach.[3] Evaluation of tongue displacement, assessment of the mandibular space and floor of the mouth, Mallampati grade, anticipated difficulties with intubation as well as examination of the patient's ability to open the mouth and slide the mandible are crucial components in determining the optimal airway management strategy.[4] Although airway management is essential for safe anesthetic administration and often straightforward, it has long been known that airway management occurs with serious consequences.[5]

2 | CASE REPORT

A 40-year-old male presented with swelling and pain in the right side of the facial region for 5 months and difficulty in feeding and swallowing for 1 month. The swelling was insidious in onset and gradually increasing, completely obliterating the facial structures (Figure 1). The pain was insidious in onset, dull aching type, moderate in intensity, slowly progressive, aggravated by chewing, and relieved after taking medicine. Swallowing difficulties gradually got worse, as evident by the

transition from difficulties with solids for 1 month to liquids for 15 days. The patient also complained of weight loss, change in voice, occasional shortness of breath and noisy breathing on lying flat. Additionally, the patient experienced difficulty in vision due to inability to open his right eye.

2.1 | Timeline

The patient's symptoms exhibited an insidious onset and a slow progression over a period of 5 months. The chronological sequence of major clinical events is presented in the following timeline in Figure 2.

FIGURE 1 Facial region shows a large mass on the right side obliterating the facial structures.

2.2 | Diagnostic assessments

On examination, the swelling on the face was found to be 18 × 15 cm and extending up to the right angle of the mouth, orbital cavity, and angle of mandible with an ill-defined margin. There was a change in the color of the skin over the area of swelling. The swollen area had increased vascularity with ulceration on the lateral aspect. The deformities over the face included deviation of nasal septum to the left side, obliteration of the nasolabial groove, and altered infraorbital ridge. There were no relevant findings on systemic examination.

Following were the values of the laboratory investigation during admission: white blood cells (WBC): 12,700/mm^3, hemoglobin (Hb): 10.9 g/dL, platelet: 175,000/mm^3, prothrombin time (PT): 13.8 s, International Normalized ratio (INR): 1.20, random blood sugar (RBS): 114 mg/dL, blood urea: 18 mg/dL, serum creatinine: 0.9 mg/dL, serum sodium: 137 mEq/L, and serum potassium: 4.3 meq/L.

In a plain and contrast CT scan of head, an ill-defined large soft tissue density lesion measuring 12 × 11 × 10 cm in the right side of the face involving the right maxilla with thickened wall with increased vascularity was seen (Figure 3). In CT angiogram, an osteoblastic lesion in the right maxilla supplied by the right facial artery with large enhancing soft tissue was seen with no findings suggestive of intracranial/neck vascular aneurysm/stenosis/malformation (Figure 4). These radiographic findings and associated clinical symptoms led to the diagnosis of maxillary carcinoma. Incisional biopsy of the lesion revealed maxillary sinus squamous cell carcinoma (MSSCC).

The patient was referred for an emergency feeding jejunostomy. On anesthetic examination, the patient had poor mouth opening of 3 cm, Mallampati grade 4 with only limited oral cavity space, deviation of nasal septum to left side, unmaintained right-sided nostril patency, and the difficulty of intubation was anticipated. Following

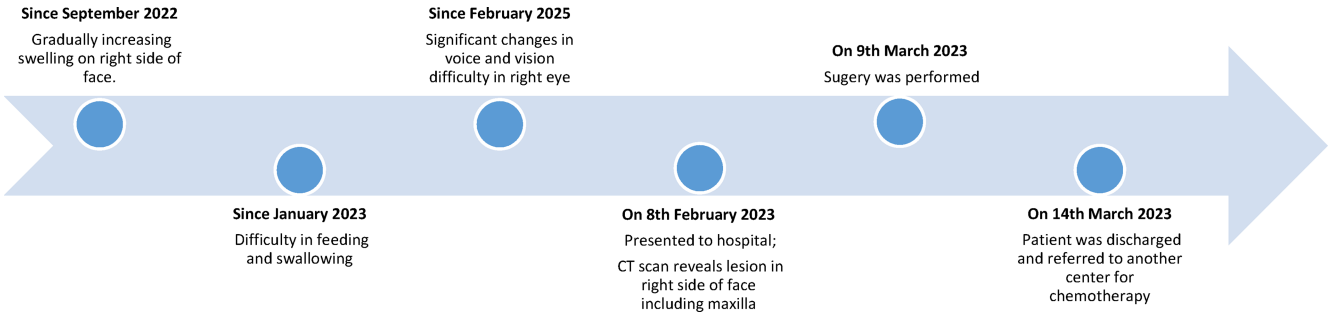

FIGURE 2 Timeline showing major events.

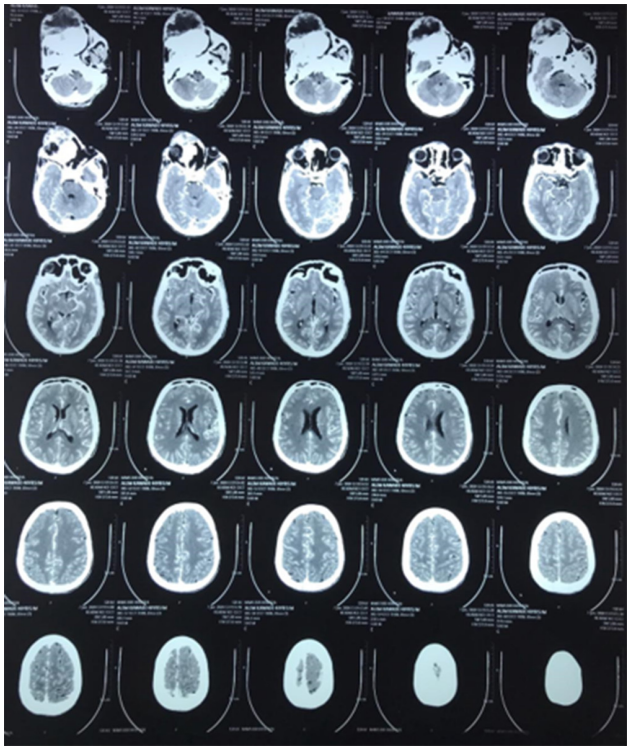

FIGURE 3 Plain and contrast CT scan of head showing ill-defined large soft tissue density lesion on the right side of the face involving right maxilla with thickened wall and increased vascularity.

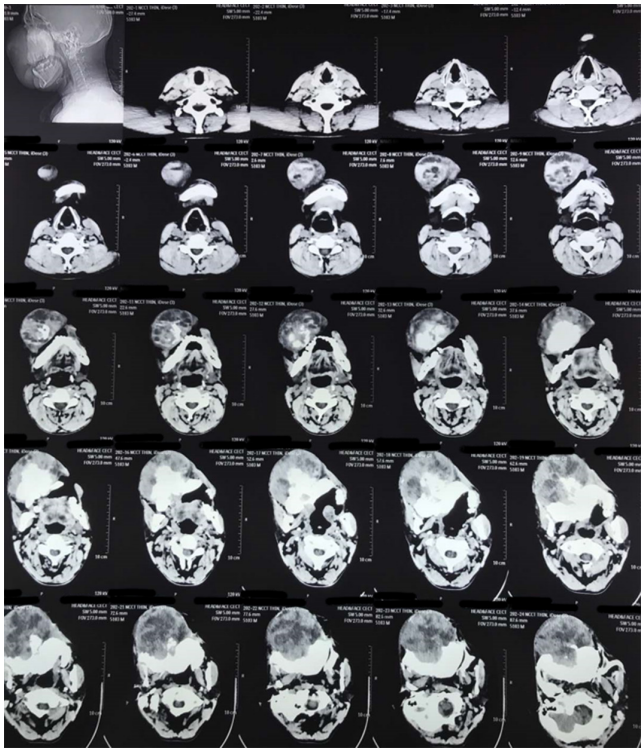

FIGURE 4 CT angiogram of head showing osteoblastic lesion in right maxilla with large enhancing soft tissue supplied by right facial artery.

discussion and consultation, the decision was made to proceed with the surgery with an anesthetic plan of awake fiberoptic oral intubation without sedation.

2.3 | Anesthetic intervention

The preanesthesia and anesthesia preparations were done, and vitals were constantly noted. Planning for the procedure included fiberoptic intubation while the patient was awake. The intravenous (IV) access was on the left hand through an 18 G cannula. The premedication injections (Ceftriaxone 1 g, Glycopyrrolate 0.2 mg), preloading of normal saline, and preoxygenation were done. For local anesthesia, 10% lignocaine spray was used via oral cavity.

With the aid of flexible fiberoptic, awake intubation was done with flexometallic tube 7.0 mm ID inserted at a depth of 21 cm from the central incisors with the tip of endotracheal tube (ET) maintaining a distance of more than 4 cm from the carina (Figure 5). General anesthesia was induced with titrating dose of Propofol 100 mg IV mixed with Xylocard 20 mg and Vecuronium 7 mg IV. Fentanyl 100 μg IV in running drip was used as analgesic.

The anesthesia was maintained by O_2 at 31/min, isoflurane at 1–1.2 minimum alveolar concentration (MAC), vecuronium 1 mg intermittently at 20-min intervals. Paracetamol 1 g IV was given 1 h after induction. Ondansetron 4 mg IV and Ketorolac 30 mg IV were given 20 min before completion of surgery. The intraoperative period was uneventful. Awake extubation was performed and Injection Neostigmine 2.5 mg and Injection Glycopyrrolate 0.4 mg were given. The total duration of surgery was 1 h and the total duration of anesthesia was 1 h and 20 min. The total blood loss during the entire procedure was around 50 mL. The vitals of the patient were normal.

2.4 | Follow-up

After the surgery, the patient was kept in a propped-up position with oxygen supplementation at 5 L/min via face mask. Pethidine 25 mg IV and Phenergan 12.5 mg IV TDS with Paracetamol 1 g IV QID were used as analgesics postoperatively. Ceftriaxone 1 g BD was also given postoperatively. The patient was infused with Normal Saline 1500 mL and DNS 1000 mL in the next 24 h. The postoperative days were uneventful. The liquid diet was started on the fourth postoperative day. The patient was then referred to another center for chemotherapy.

FIGURE 5 Awake intubation with fiberoptic flexometallic tube.

3 | DISCUSSION

The difficult airway (DA) is described as the clinical situation in which a conventionally trained anesthesiologist experiences difficulty with face mask ventilation of the upper airway, difficulty with tracheal intubation, or both.[6] In the patient's emergency surgery, difficult airways, distorted anatomy, and challenges in airway assessment, the anesthesia team faces significant obstacles in managing the case, particularly with difficult mask ventilation, supraglottic airway insertion, laryngoscopy and intubation, and potential considerations for a difficult tracheostomy.[7] Assessment of difficult airway is done through history, general physical examination, specific tests, and radiologic assessment.

The physical examination of the airway begins by visually inspecting the face and neck, followed by assessing mouth opening and oropharyngeal anatomy, evaluating the patient's neck range of motion for assuming the sniffing position, examining the submandibular space, and finally assessing the patient's ability to slide the mandible.[8] During the assessment of the mandibular space and floor of the mouth, one of the objectives is to evaluate the potential for tongue displacement.[9] This assessment is important in cases of difficult intubation because the tongue can obstruct the airway and impede successful intubation. Assessment of adequacy of the oropharynx is necessary for laryngoscopy and intubation whereas assessment of cervical and atlanto occipital joint function is important to know the optimal position for direct laryngoscopy.

To foretell a difficult airway, several independent bedside tests like Mallampatti Samson Young classification, the sternomental distance, the upper-lip bite test, the mouth openness, etc. have been described.[10–12] However, no independent test has been able to consistently predict the difficult airway.[13] Wilson score, which is a combination of many independent tests, has recently gained popularity.[14]

In this case of maxillary carcinoma, the patient presented with facial swelling, deviation of the nasal septum, obliteration of the nasolabial groove, and altered infraorbital ridge due to the invasive nature of the tumor. These deformities can cause distortion of the upper airway and reduce mouth opening, making conventional intubation challenging. Possible blocks in the airway could include tongue displacement, limited oral cavity space, supraglottic obstruction, and difficulty in mask ventilation.

Fiberoptics are of two types: flexible and rigid. In our case, awake flexible fiberoptic intubation was chosen since the safest approach to difficult airway management is to secure the airway while the patient remains awake. Awake intubation is chosen for preservation of pharyngeal muscle tone, patency of upper airway, and protective airway reflex as well as to maintain spontaneous ventilation and safeguard against aspiration. Flexible fiberoptic is indicated in limited mouth opening that eliminates the need for three-axis alignment, can be performed in multiple positions, has less chances of airway and dental trauma, and is well tolerated in awake patients decreasing chances of tachycardia and hypertension. The patient tolerated the procedure well, without significant hemodynamic changes, which can sometimes occur during awake intubation procedures using other devices.

The simplest, yet most crucial, technique in airway management is mask ventilation (MV). Prior to tracheal intubation or the placement of any airway device, it is the main method of ventilation. Difficult mask ventilation can be attributed to factors such as inadequate mask seal, obesity (BMI > 26 kg/m^2), advanced age (>55 years), edentulism (lack of teeth), and underlying conditions including stiff ventilation due to asthma, COPD, ARDS, or term pregnancy.[14,15] Difficult laryngoscopy and intubation can be influenced by factors such as injury to the airway, presence of large incisors, a large tongue, or a beard.[16] Furthermore, the evaluation of a "3-3-2" finger-width measurement and a Mallampati

score of 3 or higher can indicate potential difficulties. Additionally, any condition causing airway obstruction and limited neck mobility can contribute to challenging laryngoscopy and intubation. Difficult cricothyrotomy may be attributed to factors such as prior neck surgery, significant midline neck hematoma, obesity (BMI > 26 kg/m^2), prior neck radiotherapy, and a history of head and neck cancer.[17] Restricted mouth opening, upper airway obstruction, disrupted or distorted airway anatomy, and conditions that increase airway resistance or decrease pulmonary compliance (such as severe asthma or pulmonary edema), contribute to the difficulty encountered in using extraglottic devices for airway management.[18]

The difficult airway algorithm involves assessing the likelihood and clinical impact of basic management problems, including difficult ventilation, difficult intubation, difficulty with patient cooperation or consent, and difficult tracheostomy. Additionally, supplemental oxygen should be actively delivered throughout the process of difficult airway management. The relative merits and feasibility of basic management choices should be considered in choosing between awake intubation or intubation attempts after induction of general anesthesia, noninvasive or invasive procedures for general attempt of intubation, preservation or ablation of spontaneous ventilation.

4 | CONCLUSION

Complete evaluation of airway and knowledge of difficult airway predictors allow for appropriate anesthetic plan. The timely recognization of difficult airways is paramount. However, no single test has been successful to predict difficult airways accurately.

AUTHOR CONTRIBUTIONS

Kamala Karki: Conceptualization; data curation; formal analysis; investigation; supervision; validation; visualization; writing – original draft; writing – review and editing. **Prashant Pant:** Formal analysis; investigation; supervision; validation; visualization; writing – review and editing. **Suchit Thapa Chhetri:** Formal analysis; validation; visualization; writing – original draft; writing – review and editing. **Sumit Kumar Sah:** Formal analysis; validation; visualization; writing – original draft; writing – review and editing. **Kanchan Bogati:** Formal analysis; validation; visualization; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

No conflict of interest.

DATA AVAILABILITY STATEMENT

All the findings are present within the manuscript.

CONSENT

The written informed consent form was obtained from the patient to publish this report in accordance with the journal's consent policy.

PATIENT PERSPECTIVE

The patient and his family members were anxious about the surgery. They were properly counseled and assured that he would get better after the operation. The patient was positive and hopeful toward the surgery.

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