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CASE REPORT

Anaesthesia for Reconstruction Surgery Post Mandibulectomy in a Patient with a Predicted Difficult Airway: A Case Report

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ABSTRACT
Introduction: Mandibular surgeries, edentulous mandible, use of dentures, and aging all predispose to residual mandibular ridge resorption and thinning. The edentulous state of the mandible makes the tongue occlude the upper airway. All these, contribute to difficulty in managing the airway. An adequate pre-operative review helped classify this index patient as high risk for difficult airway and adequate steps were taken to facilitate optimal airway management. **Case report**: We present a 53 years old woman with mandibular deformity, anterior neck mass and inadequate mouth opening who has had a segmental mandibulectomy and a soft tissue closure of reconstruction plate. She was scheduled for mandibular reconstruction. She was successfully intubated using a size 4.5 Intubating Laryngeal Mask Airway (ILMA) through which a size 6.0 ID classic endotracheal tube was introduced for ventilation. A gum elastic bougie was then inserted through the endotracheal tube, both the ILMA and classic endotracheal tube were withdrawn. An armored tube size 6.5 ID was then rail roaded. **Conclusion**: The successful anaesthetic management of this difficult airway patient was facilitated by a thorough pre-anaesthetic plan, concise and skilled anaesthetic management strategy with a well organized team work.

KEYWORDS: Anaesthesia, Reconstruction Surgery, Predicted Difficult Airway.

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INTRODUCTION

Mandibular ridge resorption may occur due to old age, previous mandibular surgeries, an edentulous mandible, use of dentures, trauma, tumor excision and others. [1, 2] The resorption of the alveolar ridge influences the anatomical height of the mandible and it is more extensive in patients using dentures. [3] Failure to identify predictable causes of a difficult airway and incorporate the findings in the management strategy can herald a poor anaesthetic outcome. [4] This case report presents a case of mandibular ridge resorption with edentulous mandible which puts the patient at high risk for difficult airway. The steps taken to facilitate optimal airway management and a successful outcome are outlined.

CASE REPORT

A 53 year old known hypertensive female patient was diagnosed with ameloblastoma in 2014. She had segmental mandibulectomy which resulted in her using a nine teeth denture. In 2016, she had soft tissue closure of an exposed mandibular plate. She was admitted for mandibular reconstruction surgery. She was on 5mg amlodipine daily and had 2 loose upper maxilliary incisors. Systemic examination was normal. Thyromental distance was approximately 6.5cm and the inter incisor gap was about 4cm. She had an anterior neck mass which was about 5cm by 5cm and moves with swallowing. She was assessed as American Society of Anesthesiologists (ASA) physical status II.

The blood and radiological investigations were normal.

A likely difficult airway was predicted based on the patient's age, the mandibular defect with exposed plate, edentulous mandible, inadequate mouth opening and an anterior neck mass.

The possibility of a surgical airway intervention was explained and an informed consent was taken.

With the prediction of a difficult air way, alternative airway management devices, accessories and emergency drugs like adrenaline and atropine were provided.

At induction, baseline vital signs were recorded and 0.9% normal saline intravenous infusion was started. Face mask placement was difficult because of the mandibular defect, the edentulous state of the mandible and protrusion of the reconstruction plate. Packs of gauze were placed over the mandible to improve face mask

fitting to aid ventilation. Patient was induced with intravenous propofol 200mg and suxamethonium 100mg for laryngoscopy and intubation. Face mask was held with the jaw thrust technique to keep the upper airway patent.

The first attempt at laryngoscopy with a size 4 blade Macintosh laryngoscope was unsuccessful as the light source of the laryngoscope went off. The faulty laryngoscope was withdrawn, face mask was reapplied, patient was ventilated and oxygen saturation was maintained at 100 %. Then a size 4 straight blade Millers laryngoscope was introduced. Neither the epiglottis nor the larynx was visible (Cormack and Lehane grade 4). The straight blade was withdrawn, patient was suctioned and face mask was reapplied. Patient`s haemodynamic parameters remained stable. At resumption of spontaneous ventilation, intravenous atropine was given. Intravenous propofol at a dose of 150mg and suxamethonium at 100mg was repeated.

Another Macintosh laryngoscope with a size 4 blade was introduced and neither the epiglottis nor the larynx was again visualized (Cormack and Lehane Grade 4). Mouth opening was grossly inadequate and maneuvering the laryngoscope was difficult. With further attempt to adjust the blade of the laryngoscope while trying to manipulate the anterior neck swelling at the same time, the 2 loose maxillary incisors were inadvertently dislodged and retrieved.

The laryngoscope was withdrawn and a size 4.5 ILMA was introduced. Airway patency was confirmed by the synchronous chest movement, a normal end tidal carbon dioxide tracing and oxygen saturation.

Anaesthesia was maintained with halothane 0.5 - 3.5% in 100% oxygen following which a size 6.0 internal diameter (ID) cuffed endotracheal tube was introduced through the ILMA. Tube placement was confirmed. Intravenous atracurium 40mg was then administered. A gum elastic bougie was passed through the classic size 6.0 ID cuffed endotracheal tube (CETT). The CETT was deflated and pulled out. The ILMA was also pulled out and a cuffed armored tube size 6.5ID was rail roaded over the gum elastic bougie. Correct tube placement was confirmed with the ETCO2 and the armored tube was secured to the nasal bridge. Anaesthesia was maintained with Isoflurane at 1-2% in 100% oxygen. Recovery from anaesthesia was uneventful. Patient was taken to the post anaesthesia care unit with stable haemodynamic parameters.

We have presented a 53 year old lady with a predicted difficult airway. Despite several challenges encountered, she was successfully intubated, surgery was performed and she was discharged on the 6th day after surgery.

DISCUSSION

The difficult airway is the clinical situation in which a conventionally trained anaesthetist experiences difficulty with face mask ventilation of the upper airway, difficulty with tracheal intubation or both. [5] Repeated mandibular surgeries, edentulous mandible with abnormal tongue positioning, wearing of dentures and aging all predispose to a difficult airway [1, 3]. A thorough pre operative review and airway assessment predicts patients that are likely to have a difficult airway. Failure to incorporate the findings prompting the diagnosis of possible difficult intubation in the management strategy of the patient may lead to a poor anaesthetic outcome. We experienced difficulty in fitting the face mask to the patient's face because of the mandibular defect and the exposed plate, the edentulous mandible and the abnormal tongue position.

The defective mandible was padded with layers of gauze which improved the fitting of the face mask. The airway patency was further enhanced by a jaw thrust to prevent the tongue from occluding the airway. The jaw thrust technique is said to improve the upper airway patency better than the EC clamp technique. [6]

Faulty equipment even after due checks, is a documented cause of failure to achieve intubation [7]. It is essential to carefully arrange devices and equipment that may be required during the process of intubation while confirming their functionality. We experienced an equipment failure at the first attempt at laryngoscopy when the laryngoscope light source went off. In our case, our level of preparedness helped to mitigate this challenge. The airway tray had a Miller's laryngoscope available. The faulty laryngoscope was withdrawn, the facemask was replaced, patient was ventilated and Millers laryngoscope was seamlessly introduced for a second attempt at laryngoscopy. At the third failed attempt at intubation via direct laryngoscopy, the technique was abandoned and the ILMA was introduced. The insertion of a supraglottic airway device such as the ILMA is recommended in the management of a difficult airway. [5] The use of the ILMA for endotracheal intubation was reported to have about 94% success rate. [8]

Onyekwulu et al. [9] also affirmed the efficiency of the ILMA for airway rescue. An alternative method to our technique will be the use of a video laryngoscope, or the awake fibreoptic intubation. Chalam and colleague [10] reported that the success rate of the ILMA and awake fiberoptic intubation were comparable. When both the ILMA and fiberoptic intubation fails, a surgical airway intervention such as the cricothyrotomy or tracheostomy may be required.

Difficult airway management can be complicated by dental trauma. [11] Patients who are difficult to intubate have 20 times higher risk of dental trauma.[12] Those with pre existing tooth pathology such as loose tooth have about 5 times more risk of injury than others with difficult airway. [13] The incidence of trauma is higher in age 50 – 70 years and 86% of traumas involve the upper incisors. 50 – 75% of injuries occur when a satisfactory view of the glottis is difficult. [11, 13, 14]

Risk factors making the teeth more vulnerable to injury include inadequate mouth opening, limited mandibular mobility, loose tooth, use of dentures and an inexperienced attending anaesthetist. [13, 15] During the 3rd attempt at intubation in our patient, the two loose upper incisors were dislodged. This trauma can be attributed to our patient's age, the loose maxillary incisors, limited mandibular mobility and inadequate mouth opening.

The use of a video laryngoscope would have been of benefit in this patient. This is not readily available in many resource-limited centers like ours. To limit the risk of dental trauma, the performing anaesthetist was a senior anaesthetist skilled in airway management.

Perioperative dental traumas represent about a third of medico-legal anaesthetic challenges. [10] To forestall the

risk of patient dissatisfaction leading to medico-legal challenges, the risk and likely problems that could occur during intubation including the risk of dislodgement of the two loose incisors were explained in clear terms to the patient and her child

CONCLUSION

The anaesthetic management of this patient with a potentially difficult airway presented special challenges to the intubation skills of the anesthetic team. It emphasized the need for thorough pre-operative review and airway assessment, adequate mobilization of human and material resources, careful stepwise outline of management strategy, proper debriefing amongst team members and most importantly team work to achieve a successful anaesthetic outcome.

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AUTHORS' CONTRIBUTIONS

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COMPETING INTERESTS

The authors declare no competing interests with this case.

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PATIENT'S CONSENT

Written informed consent were obtained from the patient for the publication of this case report.

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