

Anaesthetic and Airway Management of Patient with Difficult Airway (Micrognathia and Retrognathia) Posted for Right Mastoid Exploration for CSOM

Dr. Sumith Dhulange¹, Dr. Suprita Suresh Naik², Dr. Bala Bhaskar S³

Abstract: Airway management in patients with retrognathia and micrognathia presents significant challenges for anesthesiologists. These anatomical abnormalities can complicate mask ventilation, laryngoscopy, and intubation, often necessitating advanced techniques for successful airway management. This case report discusses the anesthetic and airway management strategies employed for one such 29-year-old male, who was scheduled for right mastoid exploration for chronic suppurative otitis media (CSOM). Our approach included careful preoperative evaluation, the use of awake fibre-optic intubation, and tailored intraoperative management to ensure patient safety and stability. We highlight the importance of a comprehensive assessment and strategic planning in managing difficult airways to avoid critical scenarios.

Keywords: Difficult airway; Retrognathia; Micrognathia; Awake fibre-optic intubation

1. Introduction

The concept of a difficult airway encompasses a range of challenges faced by anesthesiologists during the management of patients requiring anesthesia [1]. This can include difficulties in mask ventilation, laryngoscopy, transglottic, supraglottic and infraglottic airway access. Difficult airways may be classified as either anticipated or unanticipated and can be anatomical or physiological difficult airway. Anatomical factors, such as retrognathia and micrognathia, are common causes of anticipated difficult airways [2]. Retrognathia refers to the abnormal posterior positioning of the mandible in relation to the maxilla, while micrognathia indicates mandibular hypoplasia. Both conditions can significantly complicate airway management due to restricted anatomical space and altered airway geometry.

In this case, we present adult male patient with retrognathia and micrognathia, scheduled for right mastoid exploration due to chronic suppurative otitis media (CSOM). The presence of these anatomical abnormalities necessitates a careful preoperative assessment and a well-structured airway management plan. We aim to discuss our approach to airway management, highlighting the techniques utilized, challenges faced, and outcomes achieved.

2. Case Report

A 29-year-old male with recurrent bilateral ear discharge posted for right mastoid exploration for CSOM with history of tuberculosis in childhood. Examination revealed micrognathia and retrognathia which was present since birth. (Fig 1) Airway examination revealed protruding upper incisors, modified Mallampatti class 4, inter-incisor distance 2 fingers and thyromental distance 2 fingers. Patient could insinuate 1 finger in temporomandibular joint. Respiratory rate was 16 breaths per minute and room air oxygen saturation was 98%. Cardiovascular and respiratory system examination were normal. Routine investigations as per ISA guidelines were unremarkable including ECG and 2D echocardiography,

advised to rule out subtle associated congenital. He was assessed as American Society of Anesthesiologists (ASA) physical status I and planned for general anaesthesia with endotracheal intubation. Written informed consent was obtained from the patient.

On day of surgery, patient was nebulised with 4ml of 4% lignocaine, with nasal instillation of xylometazoline drops in preinduction room. Intravenous access secured and maintenance fluid was started with Ringer lactate. Patient was shifted to OT and standard monitors were connected and basal vitals were noted. Preanesthetic drill was performed and emergency airway cart was kept ready including iGel®, C-MAC® video laryngoscope and fibreoptic bronchoscope. Inj. glycopyrrolate 0.2mg was administered followed by Inj. dexmedetomidine 1mcg/kg bolus over 10 min. Under aseptic precautions and after explaining to the patient, superior laryngeal nerve block (external approach) (1% lignocaine 3ml) and recurrent laryngeal nerve (trans tracheal block) (4% lignocaine 3 ml) were administered, reinforced by 10% lignocaine as part of spray as you go technique (keeping in mind the total dose of lignocaine). C-MAC® video laryngoscope was introduced and Cormack-Lehane grade was 4 was observed with patient in supine neutral position. With continued co-oxygenation with nasal prongs, successful fibreoptic guided nasotracheal intubation could be performed with 8mm cuffed endotracheal tube. After correct positioning was confirmed by 5-point auscultation and 4-5 consecutive Etco₂ tracings, the endotracheal tube was connected to closed circuit. Inj. Propofol 100mg was administered followed by Vecuronium 4mg and anaesthesia was maintained on Oxygen and Air, with dexmedetomidine 0.5mcg/kg/hr and propofol infusion on TCI pump based on entropy values. Inj. vecuronium 1mg was given intermittently. Infusions stopped at the time of suturing and after dressing patient, was assessed for spontaneous respiratory efforts and inj. neostigmine 2mg and inj. glycopyrrolate 0.4mg were administered. However, due to deep sedation, patient was electively ventilated in post

anaesthesia care and trachea was extubated at 3pm after trial assessment with airway exchange catheter.



Figure 1: Retrognathia and Micrognathia

3. Discussion

Retrognathia and micrognathia pose significant challenges in airway management due to the altered anatomy of the upper airway. These conditions can be congenital or acquired, resulting from trauma or prior surgical interventions. These two findings often coexist. The most familiar syndromic form featuring an abnormal mandible is in the Pierre Robin sequence. Other clinical entities include the Treacher Collins, Stickler, and DiGeorge syndromes^[2]. There may be additional challenges associated as part of the broader syndromes, often involving systemic complications. While this patient did not present with any syndromic associations, it is critical for anesthesiologists to be aware of potential comorbidities that may complicate airway management and overall anesthetic care.

In our case, the anticipated difficult airway was primarily due to the anatomical features of retrognathia and micrognathia (congenitally), without any associated identifiable syndromic complications. The presence of these abnormalities along with macroglossia often leads to difficulties in laryngoscopy and glottic view making endotracheal intubation challenging. In the current patient anticipating the difficult airway we decided to go ahead with the awake fibre optic intubation in order to prevent the loss of airway during the attempts of intubation.

Awake fibreoptic intubation is regarded as the gold standard for managing anticipated difficult airways, particularly in patients with significant anatomical challenges^[3]. This technique allows for direct visualization of the airway, facilitating safer intubation in cases where traditional methods may fail. In our case, the decision to perform awake fibreoptic intubation was crucial, given the patient's anatomical limitations. Additionally, the application of video laryngoscopy (Check laryngoscopy) provided enhanced visualization, which can be especially helpful in patients with a challenging anatomy. The use of local anesthetic techniques, such as a superior laryngeal nerve block and transtracheal block, helped to minimize discomfort and anxiety during the procedure. Co - oxygenation with nasal prongs at 6 L/min was continued during the procedure with intense monitoring.

The intraoperative management further emphasized the importance of maintaining hemodynamic stability and ensuring adequate ventilation. The use of dexmedetomidine provided sedation along with opioid sparing effect allowing the patient to maintain protective airway reflexes, which is particularly beneficial in cases of difficult airway management. TIVA in addition avoids use of nitrous oxide and other inhalational anaesthetic gases resulting in reduced risk of post operative nausea and vomiting, commonly associated with middle ear surgeries.

Overall, this case underscores the necessity for a structured approach to airway management in patients with difficult anatomy. A comprehensive preoperative evaluation, combined with advanced techniques and vigilant intraoperative monitoring, can significantly reduce the risk of complications and enhance patient safety. Training and education for anesthesiologists should emphasize the importance of recognizing and appropriately managing anatomical challenges to optimize outcomes in similar cases.

4. Conclusion

Careful preoperative evaluation of airway and management of difficult airways with proper planning avoids the risk of can't intubate and can't ventilate situations.

Conflict of interest: There are no conflict of interest.

References

- [1] Kumar R, Kumari P, Kandrakonda PK, Singh S. Awake fibreoptic intubation in an adult with retrognathia: An anaesthetic challenge. *Airway*.2022 May 1; 5 (2): 94.
- [2] Wong J, Lee JS, Wong TG, Iqbal R, Wong P. Fibreoptic intubation in airway management: a review article. *Singapore medical journal*.2019 Mar; 60 (3): 110.
- [3] Fropa G, Sorbello M. Algorithms for difficult airway management: a review. *Minerva Anesthesiol*.2009 Apr 1; 75 (4): 201 - 9.
- [4] Xu Z, Ma W, Hester DL, Jiang Y. Anticipated and unanticipated difficult airway management. *Current Opinion in Anesthesiology*.2018 Feb 1; 31 (1): 96 - 103.0