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CASE REPORT

Anaesthetic Management of Patient with Temporomandibular Ankylosis

Emy Maria Eloor[1], Suresh Kumar Nagaiah[2], Abhinaya Manem[3], Arun Seth[4]

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ABSTRACT

Introduction: Temporomandibular joint ankylosis cases serve as a challenge for both surgeons and anaesthesiologists. Trauma is the most common cause of TMJ ankylosis, followed by infection. The management goal in TMJ ankylosis is to increase the patient's mandibular function, correct associated facial deformity, decrease pain, and prevent re-ankylosis.

Case Report: A 9-year-old female presented with difficulty in mouth opening, leading to difficulty in maintaining oral hygiene. The patient had no comorbidities. She was diagnosed with left temporomandibular joint (TMJ) ankylosis and scheduled for left gap arthroplasty.

On preoperative evaluation, vitals were stable, and systemic examination was normal. Airway assessment revealed restricted mouth opening, trismus, left TMJ tenderness. Neck movements were unrestricted, but a Mallampati class IV airway suggested difficulty.

Investigations were normal. She was premedicated .Induction was done using Inj. Propofol 60 mg, followed by Inj. Atracurium 15 mg. After 3 failed attempts with a Macintosh and video laryngoscope, intubation was achieved using a Miller laryngoscope (size 0). Surgery lasted three hours with 150 mL blood loss. The patient remained stable intraoperatively and recovered uneventfully.

Conclusion: Anaesthesia management in patients with temporomandibular joint ankylosis presents unique challenges, particularly in securing the airway and maintaining hemodynamic stability during surgery. A thorough preoperative assessment and careful planning are essential for success. With appropriate preparation and the ability to adapt to unexpected difficulties, the anaesthetic management of TMJ ankylosis can be successfully navigated, minimizing

AUTHOR'S AFFILIATION:

[1] Post Graduate Resident, Department of Anaesthesiology, SDUMC, Sduaher, Kolar, Karnataka 560101, India.
[2] Professor and HOD, Department of Anaesthesiology, SDUMC, Sduaher, Kolar, Karnataka 560101, India.
[3] Assistant Professor, Department of Anaesthesiology, Sdumc, Sduaher, Kolar, Karnataka 560101, India.
[4] Senior Resident, Department of Anesthesiology, SDUMC, Sduaher, Kolar, Karnataka 560101, India.

CORRESPONDING AUTHOR:

Abhinaya Manem, Assistant Professor, Department of Anaesthesiology, SDUMC, Sduaher, Kolar, Karnataka, India, 560101.

E-mail: abhimanem12@gmail.com

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complications and ensuring optimal patient outcomes.

KEYWORDS

• Anaesthetic management • Paediatric airway • Temporomandibular joint (TMJ) disorders • Difficult airway management

INTRODUCTION

Temporomandibular joint ankylosis cases serve as a challenge for both surgeons and anesthesiologists. TMJ ankylosis, though it is not common, is an anaesthetic challenge, as it is a difficult airway situation with a moderate to a severely limited mouth opening. Trauma is the most common cause of TMJ ankylosis, followed by infection.

Diagnosis of TMJ ankylosis is usually made by clinical examination and imaging studies. The management goal in TMJ ankylosis is to increase the patient's mandibular function, correct associated facial deformity, decrease pain, and prevent re-ankylosis.1

Fiber-optic intubation is the gold standard for such cases, but it may not be readily available at all centres. Distressing issues brought on by its ankylosis include functional as well as aesthetic issues such as considerable difficulties in managing the airway, especially in children because of the physiology and structure of their airways being different and also because of their lack of cooperation and diminished lung reserve. Techniques used to secure airways in adults may not be ideal for children. Here we present a case of 9 year old female with temporomandibular ankylosis.

CASE REPORT

A 9-year-old female presented with difficulty in mouth opening for one year. She had a history of self-fall at home, resulting in head trauma and bilateral ear bleeding. Since then, she experienced progressive restriction in mouth opening, leading to difficulty in maintaining oral hygiene. There was no history of loss of consciousness, vomiting, seizures, fever, bronchial asthma, or stridor. The patient had no comorbidities, was not on any regular medications, and had age-appropriate developmental milestones with up-to-date vaccinations. She was diagnosed with left temporomandibular joint (TMJ) ankylosis and scheduled for left gap arthroplasty.

On preoperative evaluation, vitals were stable, and systemic examination was normal. Airway assessment revealed restricted mouth opening (half a finger in length), trismus, left TMJ tenderness, deviation of the mouth to the left side, and bony projections in the left preauricular region. Neck movements were unrestricted, but a Mallampati class IV airway suggested difficulty. Investigations were normal, and the patient was fit for surgery. She was premedicated with Inj. Glycopyrrolate 0.1 mg and Inj. Fentanyl 50 mcg. Induction was done using Inj. Propofol 60 mg, followed by Inj. Atracurium 15 mg. After failed attempts with a Macintosh and video laryngoscope, intubation was achieved using a Miller laryngoscope (size 0). Surgery lasted three hours with 150 mL blood loss. The patient remained stable intraoperatively and recovered uneventfully.

DISCUSSION

Temporomandibular joint (TMJ) ankylosis in paediatric patients presents a unique challenge for anaesthesia providers, particularly with respect to airway management. Children who have TMJ ankylosis may develop mandibular retrognathism, which can lead to functional and aesthetic deficiencies. This can result in limited movement of the jaw and difficulty with activities, such as speaking, eating, and opening the mouth. In addition to having symptoms of severe obstructive sleep apnoea (OSA), patients with bilateral TMJ ankylosis frequently experience micrognathia and retrognathia.[2]

As observed in this case, limited mouth opening due to fibrous or bony fusion of the TMJ can make conventional laryngoscopic intubation extremely difficult. This can increase the risk of airway complications, including failed intubation and trauma to the oral and airway structures. Successful anaesthetic management requires careful planning, knowledge of alternative airway techniques, and preparation for unexpected complications.

Fibreoptic video laryngoscope is the gold standard for access of airway, since blind nasal intubation can damage the middle or inferior epistaxis, nasal mucosal damage, infection, and turbinate. Patient's cooperation, local blocks for the laryngeal nerves, and topical anesthetic for the upper airway are required during awake intubation.[3]

Airway Challenges in TMJ Ankylosis:

TMJ ankylosis is often caused by trauma, infection, or systemic diseases, and in this case, the patient had a history of trauma that led to the condition. One of the hallmark features of TMJ ankylosis is restricted mouth opening (trismus), which leads to difficulties in airway management. This restriction can significantly impair the ability to perform a standard intubation using traditional laryngoscopy.

As noted in this case, the patient's mouth opening was restricted to approximately half a finger width, and despite attempts using the Macintosh laryngoscope (with size 1 and 0 blades), intubation was unsuccessful. This scenario is a common challenge faced by anaesthesiologists when dealing with paediatric patients with TMJ ankylosis. The limited mouth opening reduces the ability to pass an endotracheal tube (ETT) and may also obscure the view of the glottis, complicating the intubation process.

Other considerations that contribute to the complexity of airway management in TMJ ankylosis include:

Deviated mandible and facial asymmetry due to the fusion of the joint. TMJ tenderness and bony projections in the preauricular area, which may interfere with proper laryngoscopic positioning.

Limited cervical mobility in some cases, although this patient did not show restriction in neck movements, it can be an additional factor in more severe cases.

Fiberoptic Intubation: The Gold Standard Fiberoptic intubation is often considered the gold standard for managing difficult airways in patients with restricted mouth opening, including those with TMJ ankylosis. This technique is beneficial for several reasons:

It allows direct visualization of the airway even with limited mouth opening. It can be performed awake or under general anesthesia. The procedure is less traumatic compared to direct laryngoscopy, which can be difficult due to the restricted space in the oropharynx.

In theory, fiberoptic intubation would have been the optimal choice in this case, as it would allow for a more controlled and less traumatic intubation. However, fiberoptic intubation is technically challenging, particularly in pediatric patients, and requires a skilled operator. It also necessitates specialized equipment and preparation, which may not always be immediately available in every clinical setting.

Potential limitations of fiberoptic intubation include:

Equipment availability and skill: While fiberoptic scopes are the gold standard, not all anesthesia departments have them readily available, especially in smaller or less equipped centers. Additionally, performing fiberoptic intubation requires a high level of expertise and experience.

Patient co-operation: For awake fiberoptic intubation, the patient must be cooperative and able to tolerate the procedure. In this case, the child would likely need sedation, which might complicate the process and require more advanced techniques.

Airway secretions and blood: In patients with significant airway edema or blood from the surgical site, fiberoptic intubation can become technically more difficult.

Miller Laryngoscopy: A Practical Approach

In this case, Miller's laryngoscope was used successfully to intubate the patient. Miller laryngoscopes are often preferred in pediatric patients because they have a straight blade that provides direct visualization of the glottis. Unlike the Macintosh laryngoscope, which relies on the "sniffing position" and the use of the epiglottis as a lever, the Miller blade lifts the epiglottis directly, making it easier to view the vocal cords in a restricted mouth opening.

Despite the success in this case, Miller's laryngoscopy does have limitations in patients with severe trismus and limited mouth opening:

Limited visibility: If the mouth opening is severely restricted, even a Miller laryngoscope might not provide adequate exposure of the glottis, making it difficult to pass the endotracheal tube.

Trauma risk: In cases where mouth opening is severely limited, forceful attempts to open the mouth or manipulate the laryngoscope can result in dental or airway trauma. This risk was mitigated in this case by careful handling and the use of the appropriate-sized laryngoscope (size 0).

Anatomical distortion: The restricted mouth opening, along with possible facial asymmetry and TMJ tenderness, can make it difficult to position the laryngoscope effectively and visualize the airway.

Other Airway Techniques:

Aside from fiberoptic intubation and direct laryngoscopy, several other techniques can be employed to manage difficult pediatric airways in patients with TMJ ankylosis:

Video Laryngoscopy: Video-assisted laryngoscopes (e.g., Glidescope or C-MAC) provide an alternative to conventional laryngoscopy by offering a high-definition view of the airway on a screen. This technique can be useful in cases where the mouth opening is restricted but is not as challenging as fiberoptic intubation.

Advantages: Video laryngoscopes offer improved visualization of the glottis, even in cases of limited mouth opening.

Limitations: Despite better visualization, the limited mouth opening may still prevent passage of the endotracheal tube.

Supraglottic Airway Devices (SGA): In some cases, when intubation is not possible, the use of a supraglottic airway device (such as the LMA) might be considered as a temporary measure to secure the airway. This is generally used in patients who do not require prolonged mechanical ventilation or in emergencies where intubation is not feasible.

Advantages: Easier to insert than an endotracheal tube and can be used for maintenance of anesthesia during shorter procedures.

Disadvantages: It does not provide the level of protection against aspiration as an endotracheal tube and is not suitable for surgeries requiring controlled ventilation or prolonged periods of anesthesia.

Pre-oxygenation and Muscle Relaxation: In pediatric patients with difficult airways, optimal pre-oxygenation is crucial to ensure sufficient oxygen reserves before intubation attempts. Additionally, adequate doses of muscle relaxants, as used in this case with atracurium, can improve conditions for intubation by relaxing the laryngeal muscles and reducing the risk of spasm or resistance.

Management Strategy for Difficult Airway in TMJ Ankylosis:

Managing difficult pediatric airways requires a through understanding of potential complications and a stepwise approach:

Complications related to pediatric tracheostomy are mentioned in this article, although the death rate from tracheostomies is quite low, the total death rate from tracheostomized patients is not insignificant.[4] For pediatric patients, awake fiberoptic intubation is rarely possible; instead, deep sedation or general anesthesia may be necessary.[5]

Operative Planning: A careful assessment of the patient's airway should include evaluating mouth opening, Mallampatti classification, and neck mobility. Preparing for a difficult airway scenario with multiple intubation techniques (e.g., direct laryngoscopy, video laryngoscopy, fiberoptic intubation) is crucial.

Equipment Preparation: Ensure that fiberoptic scopes, video laryngoscopes, and other backup devices (e.g., supraglottic airway devices, rescue blades) are available.

Experienced Team: A team with expertise in pediatric airway management should be available to manage any challenges that arise during the procedure.

Postoperative Monitoring: Given the difficulties encountered during intubation, postoperative observation should be thorough, particularly in the recovery room, to monitor for signs of respiratory compromise.

CONCLUSION

Anesthesia management in patients with temporomandibular joint ankylosis presents unique challenges, particularly in securing the airway and maintaining hemodynamic stability during surgery. Given the restricted mouth opening and potential for difficult intubation, a thorough preoperative assessment and careful planning are essential for success. As demonstrated in this case,

the use of advanced airway techniques, along with multimodal analgesia, allowed for a safe and effective perioperative course. With appropriate preparation and the ability to adapt to unexpected difficulties, the anesthetic management of TMJ ankylosis can be successfully navigated, minimizing complications and ensuring optimal patient outcomes.

Conflict of Interest: NIL

Support: NIL

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