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## RESEARCH ARTICLE

### A CASE REPORT ON TEMPOROMANDIBULAR JOINT ANKYLOSIS (PEDIATRIC DIFFICULT AIRWAY)

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#### ABSTRACT

Temporomandibular joint (TMJ) ankylosis is a restriction of movements caused by intracapsular fibrous adhesions, fibrous ankylosis and osseous ankylosis of TMJ joint. Trauma is the main cause of TMJ ankylosis. The anesthetic management of pediatric patient with TMJ ankylosis is highly difficult task because child will be anxious with limited mouth opening. Fiberoptic nasotracheal intubation is the gold standard method of securing airway but in resource limited setting we have described a retrograde intubation with the help of guide wire and bougie for securing airway after giving sedation with dexmedetomidine, ketamine, superior laryngeal and transtracheal block. Spontaneous ventilation was maintained till securing the airway. The airway was secured without any complications and elective extubation was done as per AIDAA (All India Difficult Airway Association) pediatric extubation algorithm.

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#### INTRODUCTION

The American Academy of Orofacial Pain (AAOP) defines TMJ ankylosis as a restriction of movements caused by intracapsular fibrous adhesions, fibrous changes in capsular ligaments (fibrous-ankylosis), and osseous mass formation resulting in the fusion of the articular components (osseous-ankylosis) (Gundlach, 2010). Trauma is the main cause of TMJ ankylosis followed by infection. The anesthetic management of pediatric patient with TMJ ankylosis is highly difficult task because child will be anxious, limited mouth opening, retrognathism, facial asymmetry, large upper incisor teeth, bucked teeth and presence of obstructive sleep apnoea. Fiberoptic nasotracheal intubation is considered as a safest procedure. In this case report we have done a retrograde nasotracheal intubation with airway block by maintaining of spontaneous ventilation due to nonavailability of fiberoptic.

#### CASE REPORT

A 8 year old 22kg female child from low socioeconomic status presented with the chief complaint of difficulty in opening mouth since 1 year.

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She had a history of trauma before 1 year while playing since then she had difficulty in opening mouth not associated with pain, rest of the history was not significant and there was no congenital abnormalities. On examination child was afebrile, active, pulse rate-98/min regular, blood pressure 94/60mmHg. Systemic examination respiratory system, cardiovascular system was found to be normal. All blood investigation were within normal limits. Child was diagnosed to have right TMJ Ankylosis and she was scheduled for gap arthroplasty plus ipsilateral coronoidectomy plus distraction osteogenesis.

#### Airway examination

Nostril patency- both nostril patency present (Right side>Left side). Long upper incisors with bucked alignment of teeth. Mouth opening inter-incisor distance 5mm. Upper lip bite test-class III (not able to protrude mandibular incisor over maxillary incisor).

Mallampati – grade IV

Retrognathism present

Compliance of the mandibular space – reduced

Hyomental and Thyromental distance – decreased

Neck range of motion- extension, flexion, lateral rotation within normal range. Temporomandibular joint- not able to indent 1 finger in TMJ

**Anesthetic procedure:** Since it was a case of anticipated difficulty intubation, procedure was explained to the child and parents of the child. Informed written consent was taken for emergency cricothyroidotomy and tracheostomy with postoperative ventilation. ENT surgeon was made available in OT for emergency tracheostomy during intubation and extubation process. In Operation theater difficult airway cart was kept ready with retrograde intubation set, cricothyroidotomy and tracheostomy set with tracheostomy tube. All ASA standard monitors were attached. Intravenous access 20G was obtained in left forearm. Infusion dexmedetomidine 1mcg/kg loading dose followed by maintenance dose 0.3mcg/kg/hr was started. Inj. Glycopyrrolate 10mcg/kg was given IM for reducing secretions. Xylometazoline nasal drops 0.05% 2 drops was given in bilateral nostrils. Nebulisation lignocaine 2% total dose 6mg/kg was done for 15 minutes. Inj. Ketamine 0.3mg/kg sedation dose was given IV.

Bilateral Superior laryngeal nerve block 2% lignocaine 2ml each side and transalaryngeal nerve block 2% 3 ml was given. Continuous 10L/min of oxygen was given nasally throughout the retrograde procedure by maintaining spontaneous ventilation. Retrograde intubation started by putting 16G needle in larynx by piercing cricothyroid membrane, guide wire inserted which was taken nasally right side, then 5.5mm cuffed ID tube was inserted nasally through the guide wire after lubrication but intubation unsuccessful due to kink in guide wire. 2<sup>nd</sup> attempt tried for blind nasal intubation after removing of guide wire but it was also unsuccessful. In 3<sup>rd</sup> attempt again retrograde intubation tried with new guide wire, adult vented bougie was passed through the guide wire followed by 6mm ID PVC cuffed ETT was rail roaded through the bougie and intubation was successful cuff inflated, position of tube checked with equal bilateral air entry, capnography and tube secured.

Inj. propofol and inj. Vecuronium intubation dose was given according to body weight. The child was put on controlled mechanical ventilation. Intraoperative adequate depth of anesthesia was maintained with isoflurane, oxygen, air and intermittent vecuronium. Inj. Hydrocortisone 80mg IV, inj. Paracetamol 500mg iv given. After completion of surgery isoflurane stopped, patient was reversed inj. Neostigmine 40mcg/kg and glycopyrrolate 10mcg/kg Patient kept in T-piece for 2 hours for elective extubation due to difficult intubation. After 2 hours extubation was done uneventfully.

### Difficulty faced in this case

Peripheral operation theater, unwillingness of child's parent to go to higher referral center so we have proceeded to do the case for child safety after getting informed written consent, 8 year old anxious child even after explaining the procedure, Mallampati grade IV, bucked teeth, long upper incisor teeth, retrognathism present, reduced submandibular space compliance. Non availability of fiber optic, difficult mask ventilation due to facial asymmetry. Kinked guide wire during first intubation attempt, total 3 intubation attempt

### DISCUSSION

TMJ ankylosis is due to fusion of mandibular condylar process and glenoid cavity because of fibrous or bony union. TMJ in

pediatric age group causation are trauma, local or systemic infection, autoimmune disorders. TMJ ankylosis is classified based on type of tissue involved( osseous, fibrous or fibroosseous), location (intracapsular or extracapsular) and based upon fusion (complete or incomplete).



Fig.1. Shows limited mouth opening with bucked teeth



Fig.2. Shows facial asymmetry with bilateral TMJ ankylosis



Fig. 3. Shows retrognathism

TMJ result in limited mouth opening, poor oral hygiene, malnutrition, facial deformity, retrognathism, psychological problem. The treatment available for TMJ ankylosis is stretching exercises to surgical intervention. In this case report the child was planned for right side gap arthroplasty, ipsilateral coronoidectomy, distraction osteogenesis. The anesthetic choice available for airway management in this case after securing airway blocks are blind nasotracheal intubation, retrograde nasotracheal intubation, awake nasal fiberoptic nasotracheal intubation, tracheostomy. Due to non-availability of fiber optic, standard procedure awake nasal fiberoptic which is considered as gold standard (Williamson, 1989) was ruled out. In our case the child was anxious so we have sedated the patient with dexmedetomidine and ketamine followed by airway block (Mohan *et al.*, 2012). Our main aim is to preserve the spontaneous ventilation (Kawasaki *et al.*, 2002). We have planned to proceed the case with retrograde intubation with 5.5mm cuffed PVC ETT after lubrication through right nostril via guide wire but it was unsuccessful due to kinked guide wire.

2<sup>nd</sup> attempt with blind nasal intubation was also unsuccessful. 3<sup>rd</sup> attempt done with 6 mm PVC ETT with vented adult bougie (due to non-availability of pediatric bougie) with new guide and this attempt was successful. The 6mm ETT was used because adult bougie will pass freely only with  $\geq 6$ mm ETT not with 5.5mm. Anesthesia maintained with isoflurane and oxygen. Intra operative events went smoothly, the child was reverted back from anesthesia and elective extubation was done after 2 hours of surgery according to AIDAA extubation algorithm (Kundra, 2016). Managing pediatric airway with TMJ ankylosis is very challenging which requires expertise and it requires proper difficult airway planning since the scenario can convert into “cannot ventilate cannot intubate situation”, bleeding, hypoxia and larygospasm. To prevent unwanted complications resource appropriate institutional protocols with clearly labelled difficult airway trolley should be established and strictly follow the difficult airway algorithm.

## Conclusion

The pediatric case with difficulty airway is really a challenging procedure for anesthesiologist. Know your limitations, anesthesia equipment availability, patient condition, availability of experienced person, explaining the alternative options available for securing the airway to the child parents reducing their anxiousness is an important role of an anesthesiologist. Despite resource limited setting standard of care should be followed.

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