

# Anaesthesia for TMJ Ankylosis with the Use of TIVA, Followed by Endotracheal Intubation

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## ABSTRACT

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. Fiber-optic intubation is the gold standard for such cases, but it may not be readily available at all centres. Blind nasal intubation, retro-grade intubation and tracheostomy are the other alternatives, but they require patient co-operation and

are associated with considerable morbidity. We are presenting a case of unilateral TMJ ankylosis in a 12 years old boy who was posted for condylectomy and interpositional arthroplasty. He was maintained on TIVA for condylectomy and was then intubated for the remaining procedure. The procedure and the recovery were uneventful.

**Key Words:** TMJ Ankylosis, TIVA, Difficult intubation, Ketamine

## INTRODUCTION

The Temporomandibular Joint (TMJ) is a synovial joint which is formed between the mandibular condyle and the articular fossa of the temporal bone, whose function is mastication and speech. TMJ Ankylosis is defined as the loss of joint movement which results from the fusion of the bones which are within the joint or from the calcification of the ligaments around it [1].

The bony fusion is painful and it limits the jaw movement than the ligament calcification. The causes are maxillary-mandibular fixation, infection, trauma, degenerative joint disease and prior gap arthroplasty [2,3]. Thus, TMJ ankylosis may occur post-trauma or post-surgery. The more unusual causes include rheumatoid arthritis,[4] sickle cell anaemia [5] and fibrodysplasia ossificans progressiva [6]. The treatment is stretching exercises in the early stages of the cartilaginous calcification and later, surgery, to restore the jaw movement [7].

The surgical corrections include gap arthroplasty and interpositional surgery [8]. An anaesthetic management is challenging because of the difficult airway. It could be a difficult airway to ventilate as well as to intubate. Fiberoptic intubation [9,10] is considered as a gold standard in a difficult airway. Here, we are presenting the case report of a 12 year boy with unilateral TMJ ankylosis, wherein total intravenous anaesthesia [11] was used safely and successfully for the endotracheal intubation.

## CASE REPORT

A 12 year boy presented with inability to open the mouth, which was there since 2 years. There was a past history of swelling of the left jaw two and a half years back, from which pus was drained. Since then, the mouth opening had decreased more on the left side. His condition was diagnosed as TMJ ankylosis of the left side.

The airway assessment showed Mallampatti class IV, an atlantooccipital angle of >350 and an interincissor distance of 5mm. It was

a case of a difficult intubation. As a small size fiberoptic bronchoscope was not available in our hospital, an alternative technique was planned. He was posted for condylectomy and interpositional arthroplasty. As condylectomy was an extra oral approach which would take 20 minutes, we decided to maintain him on Total Intravenous Anaesthesia (TIVA) with spontaneous breathing till the condylectomy was done. Later, an intubation would be carried out with direct laryngoscopy. The tracheostomy was kept ready in case of an emergency.

On the day of the surgery, an informed written consent was taken from him. An intravenous cannula of 20 G was secured. He was premedicated with glycopyrolate 0.005mg/kg(0.1mg) and midazolam 0.05mg/kg(1.5mg) . He was shifted to the OT and monitors (pulse oximetry, NIBP, ECG and capnography ) were attached. He was induced with Fentanyl 1mcg/kg(25mcg) and propofol 0.5mg/kg(10mg). He was maintained with an infusion of propofol 50mcg/kg/min(1.2ml/min).

He was kept on spontaneous breathing with nasal prongs. The local infiltration of the surgical site was done with 25ml of 1% Xylocaine and 0.25% Bupivacaine (50:50). The condylectomy was completed in 20mins and the interincissor distance was 25mm. He was induced with propofol 2mg/kg(50mg).

He was intubated with a 5.0 cuffed endotracheal tube under direct laryngoscopy with bougie. The endotracheal placement confirmation was done with auscultation and capnography. Muscle relaxation was done with Vecuronium bromide 0.1mg/kg(2.5mg).

### Anaesthesia was maintained with Oxygen:

Nitrous oxide (50:50) Halothane 1MAC and Vecuronium bromide [1/4th the loading dose(0.5mg)]. The intraoperative period was uneventful. The neuromuscular blockade was reversed with Glycopyrolate 0.005mg/kg(0.1mg) and Neostigmine 0.05mg/kg(1.5mg). The patient was extubated awake after through suctioning. He was shifted to the PACU. His further hospital stay was uneventful and he was discharged on the 10th postoperative day.

## DISCUSSION

The TMJ ankylosis surgery falls in the category of difficult intubation, as a direct vocal cord visualization is difficult, due to an inability in opening the mouth. There is associated retrognathia with a relatively large tongue, and a pseudomacroglossia in a confined space that narrows the pharyngeal passage [12,13]. All of these factors make a laryngoscopic intubation much more difficult or impossible.

The other options for securing the airway include a fibre optic assisted intubation [9], semi blind technique of nasal intubation [14] binasopharyngeal airway [15,16], a fluoroscope-aided retrograde placement of the guide wire for the tracheal intubation [17], retrograde endotracheal intubation with the use of a pharyngeal loop [18], and a tracheostomy [20].

Fibreoptic intubation is the gold standard for a difficult airway [19,20,21]. At many centres, a small sized fibreoptic scope may not be available, as in our institute. In such situations, a blind nasal intubation [13] or a retrograde intubation [17,18] are recommended. A blind nasal intubation can lead to bleeding, oedema and further airway complications on repeated attempts [22]. Any airway compromise would be detrimental in a paediatric patient. The retrograde intubation was originally described in 1960, with several modifications which have been since then.

The basic principle behind this is an adequate regional airway blockade with the patient's co-operation. A retrograde transtracheal puncture and guidewire, can be difficult [23] and it has its own complications like tracheal bleeding, which could become occasionally fatal [23,24]. These complications can be minimized with the co-operation of the patient. Patient co-operation is difficult in paediatric patients.

Tracheostomy [25] is an invasive procedure with a post operative morbidity and so it was reserved for emergency [25] in our case. As external gap arthroplasty [26] approach was used in our case. We planned to give TIVA with adjuvant local anaesthesia till the condylectomy was done. TIVA was given with a propofol [27] infusion 50mcg/kg/min.

Once the mouth opening was adequate, the patient was induced and intubated. Other combinations which can be used are ketamine [28], propofol [27], propofol with fentanyl, propofol with remifentanyl [29], etc. Each has its own positive and negative points. We chose propofol alone to avoid a respiratory depression which could be caused by opioid and hallucination and arousal which could be caused by ketamine. So, TIVA can be used as an alternative technique in paediatric patients safely.

## CONCLUSION

In case of paediatric unilateral temporomandibular joint ankylosis, an extra oral approach condylectomy can be maintained initially, with total intravenous anaesthesia. Later, an intubation can be done under direct laryngoscopy and the operation can be continued with interpositional arthroplasty intraorally. This is a safe and an effective technique which can be used when a fibreoptic bronchoscope is not available.

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