



## Airway challenges in bilateral temporomandibular joint ankylosis with adenoid hypertrophy: a case report

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### ABSTRACT

Temporomandibular joint ankylosis is one of the most challenging airway disorders associated with varying anatomical abnormalities like adenotonsillar hypertrophy, craniofacial malformations, macroglossia, etc. This case highlights the intubation difficulties confronted during the airway management of a 10-year-old girl presenting lately with bilateral temporomandibular joint ankylosis, hypoplastic mandible, and adenoid hypertrophy. This patient was intubated successfully by using a suction catheter assembly to negotiate the endotracheal tube across the adenoid, and an unmatched-size flexible intubation fiberscope through a “separate insertion” technique and external laryngeal manipulation. This case emphasises the significance of a comprehensive preoperative evaluation in preparing the anaesthetic plan of an anticipated difficult airway in a paediatric population, having diverse anatomical hurdles presenting concurrently.

### 1. Introduction

Intubating a patient with temporomandibular joint (TMJ) ankylosis poses a fair challenge for anaesthesiologists, requiring due expertise and ability to deal with any unexpected critical situation. We report a case of bilateral TMJ ankylosis with hypoplastic mandible and adenoid hypertrophy, presenting with intubation difficulties during its airway management.

### 2. Case report

After obtaining written informed consent we would like to report, a 10-year-old girl was posted for bilateral gap-arthroplastic correction of TMJ ankylosis, under general anaesthesia. She presented with a history of fall from height during infancy, which was followed by a gradual and progressive reduction in mouth opening, and snoring while asleep. On clinical examination, she had a hypoplastic mandible, grade II dental relationship, bilaterally fixed TMJ, absent inter-incisor gap, and adequate neck mobility. The computed tomographic scan revealed a disorganised-obiterated bilateral TMJ space and the adenoid hypertrophy (Fig. 1). In view of the difficult airway, she was planned for nasotracheal intubation using a FIF (flexible intubation fiberscope) under conscious sedation. The nasal examination and the radiological evaluation revealed that she could accommodate a maximum 4.5 mm-size

uncuffed endotracheal tube (ET), for nasotracheal intubation. Due to unavailability of an adequate size FIF to railroad through ET, we planned to channelize a FIF (Karl Storz, Outer diameter 4.5 mm) available with us, through the left nostril and the ET through the other nostril, slide both of them via nasal cavity up to the oropharynx, and to intubate the trachea under direct endoscopic view of FIF by external laryngeal manipulation (ELM).

The patient was premedicated with Inj. Glycopyrrolate (4 µg/kg, IM) and 2% Xylometazoline nasal drop (2 drops/nostril). After ensuring a standard anaesthetic preparation including the difficult airway cart, a multipara monitor and intravenous (IV) line were secured. Preoxygenation was initiated with 100% oxygen via face mask at 5 L/minute. For conscious sedation, she was administered a loading dose of Inj. Dexmedetomidine (1 µg/kg, IV) over 15 min, followed by a maintenance infusion (0.5 µg/kg/h) continued throughout surgery. Topical airway anaesthesia was achieved by nebulisation with lignocaine (4%, 2 ml over 15 min), and airway reflexes were blunted with superior laryngeal block (bilaterally) and *trans*-tracheal instillation of lignocaine (2%, 0.5 ml), respectively. Subsequently, we gently introduced a lubricated FIF through the left nostril. On approaching the nasopharynx, we noticed a large adenoid obliterating the passage of FIF, but with a gentle manoeuvre, we could easily pass the FIF into the oropharynx. Then we required to introduce an ET (4.5 size) through the other nostril. However, we anticipated a significant risk of bleed in

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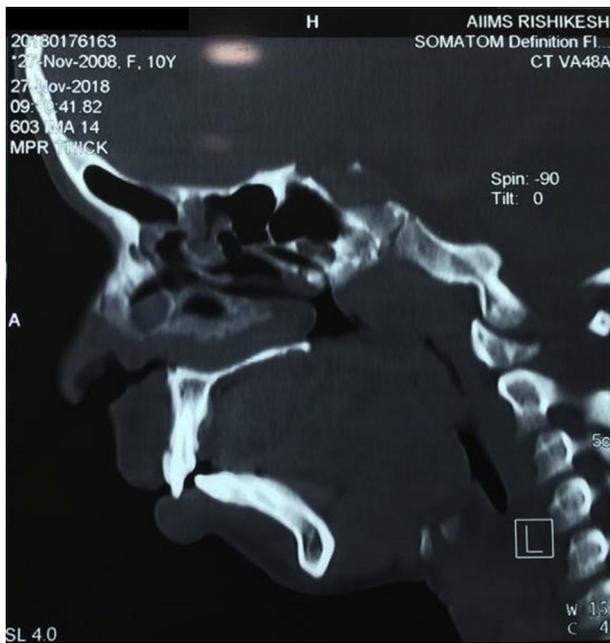


Fig. 1. Computed tomographic scan showing hypoplastic mandible and adenoid hypertrophy.



Fig. 2. ET tube with in-situ suction catheter assembly.

negotiating an ET blindly across the adenoids. So, at first, we inserted a lubricated suction catheter (10F) through the other nostril and with minimal manipulation, glided it easily up to the oropharynx. To increase the working length of this catheter, its nasal end was cut-down and sutured to the end of an identical suction catheter, to form an assembly (Fig. 2). Now the lubricated ET could be smoothly railroaded over the suction catheter assembly up to the oropharynx. Thereafter, the suction catheter assembly was withdrawn, and the ET was threaded into the trachea through optimal ELM, under the direct endoscopic

view. We observed no signs of any airway injury or overt bleed while withdrawing the FIF. It was followed by a standard general anaesthesia induction, and the intraoperative period remained uneventful. At the end of surgery, the patient was extubated in a fully-awake state and shifted to the post-anaesthesia care unit with no further complications.

### 3. Discussion

Awake FIF guided intubation is a gold standard technique for difficult airway management, but still it has a failure rate of as high as 11%.<sup>1</sup> The common causes include a distorted or obstructed airway, the presence of excessive airway secretions or blood, the inappropriate size difference between the FIF and ET, inexperienced operator, and insufficient anaesthesia.<sup>1–3</sup> Among the above, an inappropriate size difference makes a significant impact on the success of the procedure. A smaller gap between the FIF (outer diameter) and ET (internal diameter) makes it difficult to slide a scope within the ET; may even end-up in irreversible entrapment. A larger gap, however, results in ET-tip getting stuck at the anatomical landmarks like nasopharynx, arytenoid cartilage, and vocal cords, etc.<sup>3</sup> In addition, the standard “scope within tube” technique though allows a direct view of the laryngeal inlet, intubation is still “blinded” while ET is channelled over the scope.<sup>4</sup> In our patient, adenoid hypertrophy and the paediatric age group held us in a situation to use a smaller size ET, together with the unavailability of an appropriate size FIF to slide through it. So, we introduced the ET and the available FIF through the separate nostrils to intubate the trachea. The separate insertion technique allowed us a complete endoscopic view of ET while manoeuvring it through the laryngeal inlet, thus minimizing the risk of injury to the adjacent airway structures. We, however, acknowledge that directing an ET by ELM could be difficult at times, especially if airway anatomy is altered. The other options including blind nasal intubation, retrograde intubation, etc., were not feasible due to the presence of a large adenoid obliterating the nasopharynx.<sup>5</sup>

The other concern in this patient was to pass the ET across the adenoid. To minimise the associated risk of bleed, we required a guiding adjuvant like a nasogastric tube, suction catheter, infant feeding tube, etc., to negotiate through the adenoid and then to slide ET over it. We picked a suction catheter considering its favourable calibre, greater malleability, and an appropriate firmness befitting that situation, to allow greater manoeuvrability but to minimise the risk of injury. The only limitation of the working length was dealt upon by ligating the two suction catheters.

In conclusion, this case highlights the importance of a meticulous preoperative evaluation and anaesthetic preparation in managing an anticipated difficult airway of a paediatric population, which presents with varying anatomical hurdles like TMJ ankylosis, and enlarged adenoid occurring concurrently.

#### Source of support

Nil.

#### Conflicts of interest

Nil.

#### Contributions of the authors

1st author: conducted the case, concept, literature research and final editing.

2nd author: conducted the case and written the article under the guidance of the first author.

3rd author: conducted the case, kept the patient under follow up, and literature research.

4th author: conducted the case, literature search.

5th author: conducted the case, literature search.

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