

# Safe and Successful Management of Difficult Airway in a Child with Keyhole Mouth Opening

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**Abstract:** *Successful airway management of difficult airway is formidable task to any experienced anaesthesiologist. Task is more compounded if difficult airway scenario exists in paediatric patient. Some of factors which make situation more challenging are awake uncooperative child, fear of losing airway, risk of bronchospasm, desaturation, bleeding. It is essential to have back up plans to manage difficult and challenging situation. The various plans to be put into action are based on experience of anaesthesiologist, availability of advanced airway gadgets; mental status of patient. The case report mentioned here is to highlight safe and successful method of securing airway in a child with keyhole mouth opening following multiple reconstructive surgeries around the oral cavity in the past.*

**Keywords:** Paediatric Airway Management, Keyhole Mouth Opening, Difficult Airway, Tracheostomy

## 1. Introduction

The first and foremost task while providing general anaesthesia is to ensure establishment of safe airway in order to provide adequate ventilation of lungs so as to maintain oxygenation levels within normal limits. The situation becomes more complex and challenging if various anatomical and pathological factors within patient cause hindrance in securement of definitive airway for safe conduct of general anaesthesia.<sup>[1]</sup>

## 2. Case History

A Nine year old girl who is a known case of Canrum Oris presented with miniature mouth opening for correction of Microstomia and restoration of Oral Orifice Sphincter mechanism. She had undergone multiple surgeries in the past like Parascapular Functioning Muscle Transfer Flap for correction of Scarring and Cheek defect secondary to Canrum Oris.

On general physical examination she was moderately built and nourished weighing 24 kilograms. Vital parameters were found to be in normal range. She was thriving only on liquid feeds in view of her keyhole mouth opening.

Airway examination revealed mouth opening to be keyhole size barely allowing tip of little finger through opening due to previous surgery around the oral cavity. Neck movements were normal, thyromental distance was adequate and Mallampatti Scoring was not possible due to greatly restricted mouth opening.

## 3. Anaesthetic Management

Detailed anaesthetic plan highlighting various methods of securing airway including surgical tracheostomy were discussed with surgeon and informed written consent obtained from patient attenders.<sup>[2]</sup> The Child was wheeled into operation theatre and a twenty-two gauge intravenous line was secured on the dorsum aspect of right hand. Routine monitors like, ECG, SpO<sub>2</sub> and NIBP were connected and baseline values were recorded. Difficult

airway cart and suctioning apparatus were kept ready. Surgeons were on standby for emergency surgical tracheostomy in any eventuality.

The initial plan was to take the child deep with Oxygen, Nitrous and Sevoflurane with minimal sedation. Preparations for Fibre Optic Nasal Intubation with Xylometazoline Nasal Drops & Oral Atropine as per weight were administered prior to the procedure.<sup>[3]</sup> Difficulty was encountered with fibre optic nasal intubation as there was bleeding from nasal cavity leading in turn to bronchospasm and desaturation. It was decided to abandon procedure and wakeup child.

Oxygen supplementation along with Asthalin nebulization improved the oxygen saturation and child shifted to recovery unit.

The events were discussed with surgeon and it was decided to proceed with surgery next day with prior widening of mouth opening under sedation and local infiltration and later elective surgical tracheostomy for the rest of the surgical procedure.

On the following day child was wheeled into operation theatre. Routine monitors including SpO<sub>2</sub> ECG, NIBP were connected. Minimal sedation with midazolam 0.5 mg and Fentanyl 30 microgram intravenous were administered and perioral infiltration with 2% lignocaine done. Small incisions were made at each angle of mouth which just made possible enough to insert LMA size two.

Anaesthesia was deepened with increasing concentration of Sevoflurane and titrated doses of Propofol. LMA size 2 placed smoothly and ventilation confirmed with adequate chest rise and ETCO<sub>2</sub>. Patient was then given Injection Vecuronium 2mg Intravenous. Child was then positioned for surgical tracheostomy and six size cuffed Portex tracheostomy tube was inserted uneventfully. Adequate chest rise was observed along with appropriate end tidal Carbon di-oxide pattern. Bilateral equal air entry auscultated at lung bases. Child was connected to Pressure control mode and anaesthesia maintained with 0.8 -1.2% Isoflurane and Vecuronium appropriately.

At the end of surgical procedure, neuromuscular blockade was reversed with neostigmine and Glycopyrolate. Child was shifted to High dependence unit for further management.

#### 4. Discussion

Managing airway with greatly restricted mouth opening (Keyhole Mouth Opening) more so in paediatric age group is most challenging and fearsome task as failure to ventilate would swiftly lead to multi organ hypoxia and its dreaded sequels.<sup>[4]</sup>

Therefore the anaesthesiologists and major organizations across the world are constantly evolving, updating the difficult airway algorithm so as to make these ever challenging tasks safer and fool proof.<sup>[5]</sup>

Never the less each case has to be dealt differently depending on the case at hand, confidence and experience of the anaesthesiologist, availability of the modern airway gadgets, institution protocols and so on.

But the fundamentals in any difficult airway management must be very clear, which is safety of the patient and do no harm further. While planning to anaesthetise kids with anticipated difficult airway it is very essential to have back up plans to handle difficulty or crisis situations.<sup>[6]</sup>

Our initial plan was to secure airway with awake fibre optic nasal intubation using 3.6 mm bronchoscope with 5.0 mm cuffed endotracheal tube since we encountered bleeding, bronchospasm and desaturation, procedure had to be abandoned.

Child had to be stabilised with Asthalin nebulisation, oxygen supplementation till vital parameters were normalised. We decided to proceed with surgery subsequent day by adopting more safer and definitive airway technique. Various possibilities were discussed with surgeons. Options were to take child deep under Sevoflurane with oxygen and nitrous oxide and or with minimal sedation along with titrated doses of Ketamine so as to enable surgeon to perform tracheostomy.<sup>[7]</sup>

But there were many drawbacks like risk of bleeding, risk of bronchospasm, desaturation and finally risk of losing airway. Hence it was decided to insert LMA provide adequate depth of anaesthesia and then to proceed with Surgical tracheostomy.<sup>[8]</sup>

We took advantage of fact that perioral area with flap in situ was relatively insensitive and this was further enhanced by local anaesthetic infiltration and minimal sedation so as to keep the spontaneous breathing intact. This allowed the surgeon to widen the mouth opening by small incision made at each angle of mouth. The widened mouth gave us enough confidence and ability to manoeuvre Guedals airway and LMA which in turn made the whole exercise of achieving airway very safe and fool proof

In view of certain anticipated problems like oropharyngeal bleeding, airway oedema, possibility of re exploration,

difficult re intubation if required, surgical tracheostomy was considered a more safer and definitive method of securing airway in this scenario.

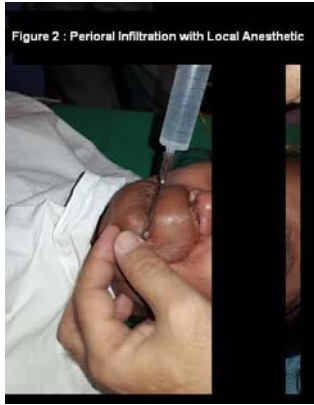
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#### Figures with Legends



Figure 1: Child with Miniature Mouth Opening



**Figure 2:** Perioral Infiltration with Local Anesthetic



**Figure 3:** Slightly enlarged Mouth Opening



**Figure 4:** LMA with Tracheostomy Tube