



Total Intravenous Anaesthesia for Fibre Optic-Aided Nasal Endotracheal Intubation in a Toddler with Anticipated Difficult Mask Ventilation

Preethy J. Mathew¹ , Ankit Rimal¹ , Aakriti Gupta¹ , Naresh Panda² 

¹Department of Anaesthesia and Intensive Care, The Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India

²Department of ENT and Head and Neck Surgery, The Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India

Cite this article as: Mathew PJ, Rimal A, Gupta A, Panda N. Total Intravenous Anaesthesia for Fibre Optic-Aided Nasal Endotracheal Intubation in a Toddler with Anticipated Difficult Mask Ventilation. Turk J Anaesthesiol Reanim 2019; DOI: 10.5152/TJAR.2019.41196.

Abstract

Paediatric airway tumours can prove to be quite challenging for anaesthesiologists. We attempted to secure airway in a toddler with a large tongue haemangioma using total intravenous anaesthesia (TIVA) with dexmedetomidine and propofol while preserving spontaneous ventilation.

Keywords: Difficult paediatric airway, tongue haemangioma, total intravenous anaesthesia

Introduction

Anticipated difficult mask ventilation is challenging in children as it involves difficulty in securing the airway and inhalational induction of anaesthesia. Here we present a case of anticipated difficult mask ventilation due to a large tongue mass in a toddler and describe its anaesthetic management. The consent for the publication of this case report was obtained from the child's father.

Case Presentation

A 2-year-old male child weighing 8.5 kg presented with a bluish swelling of the tongue, which was diagnosed as a haemangioma measuring 8.6×4.2×5.5 cm and involving the entire tongue. The swelling appeared at the age of 1 year with a rapid progression in size, which was refractory to oral prednisolone and propranolol. There was a past history of two episodes of spontaneous, non-traumatic bleeding from the haemangioma. Elective resection of the haemangioma was planned. On pre-anaesthetic evaluation, difficult mask ventilation was anticipated due to a gross external protrusion of the large tongue mass (Figure 1). Direct laryngoscopy was risky due to the bleeding tendency of the lesion. Hence, flexible nasal fibre optic intubation using total intravenous anaesthesia (TIVA) with the preservation of spontaneous ventilation was planned. On the day of surgery, airway was topicalised with nebulised lignocaine. No sedative premedication was administered. Two peripheral 24-G intravenous (IV) lines were secured. After attaching standard American Society of Anesthesiologists (ASA) monitors, a dexmedetomidine bolus of 1 µg kg⁻¹ was administered as an infusion over 10 min, followed by continuous infusion at the rate of 0.5 µg kg⁻¹ h⁻¹. The nasopharynx was prepared using adrenaline-soaked wicks; 100% oxygen was administered through nasopharyngeal airway placed in the left nostril, and the right nostril was used for fibre optic intubation. IV ketamine 0.5 mg kg⁻¹ was administered as a bolus along with propofol 10 mg, followed by propofol infusion 200 µg kg⁻¹ min⁻¹. A 4.5-mm ID uncuffed endotracheal tube (ETT) was loaded over the fibre optic bronchoscope for intubation, and the trachea was successfully intubated on



Figure 1. Infantile haemangioma of tongue

second attempt, with the patient on spontaneous ventilation. After securing ETT, propofol infusion was stopped. Anaesthesia was maintained with atracurium and isoflurane in nitrous oxide and oxygen. Subtotal glossectomy was performed with the resection of the anterior two-third of the tongue. The estimated intraoperative blood loss was 50 mL. Endoperatively, the trachea was extubated after the reversal of neuromuscular blockade, and the child was transferred to post-anaesthesia care unit for close observation and monitoring.

Discussion

The challenges in the management of anticipated difficult paediatric airway include the limited number of options and equipment to deal with such an airway as well as the anatomical and functional differences of the paediatric airway from an adult airway. Although awake fibre optic intubation is the gold standard in difficult airway management in adults, securing the airway in an awake, uncooperative child is not safe and practical (1). The roles of videolaryngoscope and laryngeal mask airway in paediatric difficult airway management are well known. However, the large, protruding vascular oral mass in the index patient limited the use of these two options in our case.

The airway patency in the awake state in patients with oral or pharyngeal tumours is maintained by the resting muscle tone of the airway. This patency can be lost under anaesthesia, especially in case of an obstruction at the level of velopharynx, resulting in the loss of the ability to ventilate (2). Such loss of airway patency was possible in our patient on placing the tongue mass intra-orally for mask placement. This precluded the use of inhalational mode of induction and maintenance of anaesthesia until securing the tracheal tube. Moreover, it was considered prudent to preserve spontaneous breathing, muscle tone and adequate airway patency until ETT placement.

Historically, inhalational anaesthesia with preserved spontaneous respiration is the standard technique used for difficult airway management in children (3, 4). The potential benefits of TIVA over inhalational induction in the index case included the ability to help achieve an adequate anaesthetic depth

without being dependent on airway patency and the lack of environmental pollution. TIVA with propofol and remifentanyl has been reported in children for rigid as well as diagnostic flexible bronchoscopy (5, 6). Because remifentanyl was not available in our country at the time of this case, we used a combination of ketamine, dexmedetomidine and propofol infusion during fibre optic-guided intubation. We found this combination safe in maintaining the required plane of anaesthesia while preserving spontaneous ventilation for difficult endotracheal intubation in our paediatric patient.

Conclusion

Total intravenous anaesthesia with dexmedetomidine and ketofol is a safe alternative to inhalational anaesthesia in difficult airway management in children.

Informed Consent: Written informed consent was obtained from child's father who participated in this case.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – P.J.M.; Design – P.J.M., A.R., A.G.; Supervision – P.J.M., N.P.; Resources – P.J.M., N.P.; Materials – P.J.M., N.P.; Data Collection and/or Processing – P.J.M., A.R.; Analysis and/or Interpretation – A.R., P.J.M.; Literature Search – P.J.M., A.G.; Writing Manuscript – A.G., P.J.M., A.R.; Critical Review – P.J.M., N.P.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

References

1. Peiris K, Frerk C. Awake intubation. *J Perioper Pract* 2008; 18: 96-104. [\[CrossRef\]](#)
2. Hillman DR, Platt PR, Eastwood PR. The upper airway during anaesthesia. *Br J Anaesth* 2003; 91: 31-9. [\[CrossRef\]](#)
3. Hajipour A, Javid MJ, Saedi B. Airway management in a toddler with a giant hemangioma of the tongue. *Iran J Pediatrics* 2012; 22: 551-4.
4. Singh PM, Raajeswari S, Borle A, Rangasamy V. Sevoflurane based general anaesthesia induction via nasopharyngeal endotracheal tube prior to definitive airway control in pediatric oral tumours. *Anesth Prog* 2015; 62: 118-21. [\[CrossRef\]](#)
5. Chen L, Yu L, Fan Y, Manyande A. A comparison between total intravenous anaesthesia using propofol plus remifentanyl and volatile induction/maintenance of anaesthesia using sevoflurane in children undergoing flexible fiberoptic bronchoscopy. *Anaesth Intensive Care* 2013; 41: 742-9. [\[CrossRef\]](#)
6. Shen X, Hu CB, Ye M, Chen YZ. Propofol-remifentanyl intravenous anaesthesia and spontaneous ventilation for airway foreign body removal in children with preoperative respiratory impairment. *Paediatr Anaesth* 2012; 22: 1166-70. [\[CrossRef\]](#)