Anesthetic Management of Large Tongue Swelling in Neonate and Children: A Series of Four Cases

Nilesh M. Solanki, Jahnavi B. Shah, Rashmita H. Jasoliya
Department of Anesthesia, B. J. Medical College and Civil Hospital, Ahmedabad, Gujarat, India

Abstract

Management of neonatal airway is difficult due to its anatomical and physiological changes. The presence of intraoral pathology causes anticipated difficult intubation during the management of infant and children airway. Bleeding, difficult in visualizing the airway, and enlarged upper respiratory structures make airway management challenging for anesthesiologist. There is a risk in the postoperative period also for airway patency. In these case series, we described the management of difficult airway with large intraoral swelling.

Keywords: Children, difficult airway, intraoral pathology, neonate

Introduction

Difficult airway with intraoral tongue swelling is a rare condition in neonates and children. It may range from simple cyst to malignancy. The airway is most challenging in these type of cases. With large intraoral swelling, respiration can be obstructed after the loss of consciousness and ventilation may not be possible. The upper airway of sedated, spontaneously breathing children widens significantly in the lateral position compared with the supine position. Inhalational or intravenous (IV) induction with spontaneous ventilation is more beneficial and safe while intubating. The management of both the anticipated and unanticipated difficult intubation scenario in children requires forethought and experienced and skilled pediatric anesthetist.

Case Reports

Case report 1
A 5-year-old female child weighing 12 kg born by full-term normal vaginal delivery, presented with swelling below the tongue of 1.7 cm × 2.3 cm in size [Figure 1]. She was not able to take solid food per orally. Both side nostrils were patent, and no other swelling or lymph nodes or other congenital anomalies were noticed. Local examination revealed swelling arising from the ventrum of the tongue. A provisional diagnosis of the dermoid cyst was made and planned for excision of the cyst under general anesthesia. All routine investigations were normal.

In the operation theater, IV line was secured with a 20G cannula. All standard monitors were applied. A difficult airway cart and tracheostomy set were kept ready. Premedication was given intravenously in the form of injection glycopyrrolate 0.004 mg/kg, injection ondansetron 0.15 mg/kg, and injection fentanyl 0.5 mg/kg. Preoxygenation – 6 l/min O₂ through Jackson Rees (JR) circuit was done for 3–5 min. Induction was done with injection propofol 1.5 mg/kg IV, O₂ + sevoflurane. In the supine position, with laryngoscope swelling was pushed laterally with the help of stitched tongue and with the help of stylet, oral intubation was done with 4.5 mm portex uncuffed endotracheal tube. The bilateral air entry was equal and tube was fixed. Throat packing was done. Anesthesia was maintained with injection atracurium 0.5 mg/kg IV (loading dose) + injection atracurium 0.125 mg/kg (incremental dose) + O₂ + N₂O + sevoflurane. Injection paracetamol 180 mg intravenously was given for pain relief.

Address for correspondence: Dr. Nilesh M. Solanki, 44-Devshrusti Bungalows-II, B/H Kena Bungalows, Motera Stadium Road, Motera, Sabarmati, Ahmedabad - 380 005, Gujarat, India. E-mail: nmscbaps@gmail.com

How to cite this article: Solanki NM, Shah JB, Jasoliya RH. Anesthetic management of large tongue swelling in neonate and children: A series of four cases. Bali J Anaesthesiol 2020;4:25-8.
analgesia. Tongue stitch was taken for airway patency due to residual edema of the tongue postoperatively.

The patient was reversed intravenously with injection glycopyrrolate 0.008 mg/kg and injection neostigmine 0.05 mg/kg. After thorough oral, endotracheal suction and adequate breathing efforts endotracheal tube were removed.

Postoperatively, the patient was crying, moving all limbs, and observed for next 24 h.

**Case report 2**

A 2-day-old female child, weighing 2.4 kg was delivered by cesarean section, presented to the pediatric surgery department with large swelling in the tongue with difficulty in feeding [Figure 2]. Nasograde tube was in situ, and the baby was active, moving all four limbs, maintaining oxygen saturation and not in distress. Any other associated congenital anomalies were ruled out. A provisional diagnosis of mucocele was made and planned for excision of the cyst under general anesthesia, and difficult airway was suspected and planned accordingly. The patient was premedicated with injection glycopyrrolate 0.004 mg/kg and injection ondansetron 0.15 mg/kg. Baby was induced with inhalational anesthesia (oxygen and sevoflurane). Laryngoscopy with miller no. 1 blade was done, and the tongue was pushed on side gently and oral intubation with 3.0 mm portex uncuffed endotracheal tube after the visualization of bilateral vocal cords. Throat packing was done. The patient was maintained with injection atracurium, oxygen, N₂O, and sevoflurane. Due to blood loss during operation, 30 ml packed cell volume (PCV) was given. Postoperative tongue stitch was taken. At the end of surgery, the patient was reversed with glycopyrrolate and neostigmine, throat pack was removed and extubated. The baby was conscious and crying, and all vitals were stable. The patient was shifted to the NICU for close observation.

**Case report 3**

A 1-month-old female child weighing 3.1 kg was delivered by Full term normal delivery (FTND) with a history of NICU admission for physiological jaundice admitted in the pediatric surgery department with tongue swelling and difficulty in feeding. On examination, the tongue mass was protruding out of the oral cavity [Figure 3]. Magnetic resonance imaging report shows tongue vascular malformation or tongue hemangioma. Preoperative evaluation baby was active, conscious, crying, and maintaining oxygen saturation. Bilateral nasal patency was checked, and xylometazoline nasal drops 0.05% (2–3 drops) were instilled in both nostrils 30 min before surgery. In the operation theater, preparation for difficult intubation was kept ready. A 20G IV cannula was inserted in the left forearm, and all standard monitors were applied. Preoxygenation was done with O₂ through JR circuit. Injection glycopyrrolate 0.004 mg/kg and injection ondansetron 0.15 mg/kg were given as premedication. Induction was done with sevoflurane up to 6% in 100% oxygen. After adequate depth of anesthesia, direct laryngoscopy was done and nasal intubation done with a lubricated 3.0 mm portex uncuffed ET tube through the right nostril. A throat pack was inserted. The patient was maintained with injection atracurium, oxygen, N₂O, and sevoflurane. Due to blood loss during operation, 30 ml packed cell volume (PCV) was given. Postoperative tongue stitch was taken. At the end of surgery, the patient was reversed with glycopyrrolate and neostigmine, throat pack was removed and extubated. The baby was conscious and crying, and all vitals were stable. The patient was shifted to the NICU for close observation.

**Case report 4**

A 3-day-old male child weighing 2.5 kg was delivered by lower segment cesarean sections and referred to the pediatric surgery department with mass protruding from the mouth and with difficulty in feeding and difficulty to pass nasogastric tube from both nostrils. On local examination, the swelling was arising from the midline of the palate and extended from the lip margin anteriorly [Figure 4]. The surface of the mass was smooth and soft in consistency. In preoperative evaluation, the baby was active, and all blood investigations were in normal limits. Provisional diagnosis was dermoid palatal cyst or duplication of the tongue. Preparation for difficult intubation was kept ready. Preoxygenation was done with O₂ through JR circuit and checked for bag and mask ventilation. Premedication was given in the form of injection glycopyrrolate 0.004 mg/kg and injection
Solanki, et al.: Intraoral swelling

Intraoral swelling causes difficult laryngoscopy because it occupies the oral cavity making glottis visualization difficult. Different techniques are available for the management of airway with complication, infant and children generally do not cooperate for awake fiber-optic intubation, preoperative tracheostomy increases morbidity, blind nasal intubation has been associated with bleeding, and large intraoral swelling where molar space is compromised causes molar approach difficult. Infant and children are not tolerate and safe for the excision of intraoral swelling under local anesthesia with monitored anesthesia.

Lateral position in a child allows the tongue to fall out of the mouth and clears airway obstruction. Sedated children experience less upper airway obstruction and the prevention of aspiration in the lateral position when compared with the supine position.

Proper suctioning is also important along with difficult airway management.

Walker and Ellwood described the current techniques and equipment recommended for the management of the difficult intubation scenario in pediatric practice.

With IV induction agents, it is difficult to manage an adequate depth of anesthesia without compromising spontaneous ventilation. Inhalational induction maintains the airway patency and adequate depth of anesthesia throughout the induction in infant and children. Sevoflurane is the best inhalational agent for use in neonates, infants, and children because of its smooth induction and rapid emergence follow the rapid washout from the body.

As halothane can cause more bradycardia, arrhythmias, and myocardial depression compared to sevoflurane. Hence, we used sevoflurane as an inhalational induction agent with oxygen in our case series.

Miyoshi et al. reported a case in which fiber-optic nasal intubation was successfully performed with topical anesthesia without sedation.

Diaz et al. reported the case of newborn pharyngeal teratoma in which nasal intubation was done by using inhalational induction with halothane and with cocaine topical anesthesia. Fiber-optic intubation is the best choice for establishing tracheal intubation in the difficult pediatric airway despite its limitations.

In the case of nonavailability of sophisticated fiber-optic equipment, blind nasal intubation has been tried with a gum-elastic bougie and retrograde transtracheal intubation in pediatric patients with bilateral temporomandible joint ankylosis with spontaneous breathing under general anesthesia.

Pediatric fiber-optic bronchoscope is not available in our institute, and hence we kept preparation for tracheostomy.

**Discussion**

Intraoral swelling causes difficult laryngoscopy because it occupies the oral cavity making glottis visualization difficult. Different techniques are available for the management of airway with complication, infant and children generally do not cooperate for awake fiber-optic intubation, preoperative tracheostomy increases morbidity, blind nasal intubation has been associated with bleeding, and large intraoral swelling where molar space is compromised causes molar approach difficult. Infant and children are not tolerate and safe for the excision of intraoral swelling under local anesthesia with monitored anesthesia.

Figure 3: Hemangioma

Figure 4: Hamartoma

Ondansetron 0.15 mg/kg IV. Inhalational induction was done with sevoflurane with oxygen. After the adequate depth of anesthesia, laryngoscopy was done with miller blade no. 1 and pushed tongue on the side but not able to visualize the vocal cord and failed to intubate. Again preoxygenate, the patient and we used ureteral catheter with stylet size 4.0 Fr (Manish medi innovation, I ISO-13485-2012 certified company) like a bougie and 3.0 mm portex uncuff ET tube was inserted and confirmed with equal bilateral chest expansion and the presence of ETCO2. The ureteral catheter is smaller in diameter, malleable, and it is easier to introduce blindly into the trachea. We did not encounter any difficulty in passing the tracheal tube over the bougie. Throat packing was done, and anesthesia was maintained with injection atracurium, oxygen, and sevoflurane. After excision of the mass, tongue stitch was taken, and nasogastric tube was inserted. The patient was reversed with injection glycopyrrolate 0.008 mg/kg and injection neostigmine 0.05 mg/kg IV. The patient was extubated after throat pack removal and oral suction. The patient was shifted to NICU for observation. Histopathology was confirmed to be nonmalignant mass which is known as hamartoma. The baby was discharged on the 6th postoperative day without any untoward event.

As halothane can cause more bradycardia, arrhythmias, and myocardial depression compared to sevoflurane. Hence, we used sevoflurane as an inhalational induction agent with oxygen in our case series.

Miyoshi et al. reported a case in which fiber-optic nasal intubation was successfully performed with topical anesthesia without sedation.

Diaz et al. reported the case of newborn pharyngeal teratoma in which nasal intubation was done by using inhalational induction with halothane and with cocaine topical anesthesia. Fiber-optic intubation is the best choice for establishing tracheal intubation in the difficult pediatric airway despite its limitations.

In the case of nonavailability of sophisticated fiber-optic equipment, blind nasal intubation has been tried with a gum-elastic bougie and retrograde transtracheal intubation in pediatric patients with bilateral temporomandible joint ankylosis with spontaneous breathing under general anesthesia.

Pediatric fiber-optic bronchoscope is not available in our institute, and hence we kept preparation for tracheostomy.
ready in case of failed intubation. We confirmed the ease of bag and mask ventilation and attempted endotracheal intubation using sevoflurane inhalational agents with preservation of the spontaneous ventilation in three cases. In case of a 5-year-old child, we had also used propofol for IV induction with sevoflurane.

The dermoid and epidermoid cysts occur due to aberrant ectodermal tissues during a fetal period or acquired aberrant epithelial tissue by trauma or surgery. A cystic malformation in the oral cavity caused by fluid collection is rare benign developmental disorders and grow slowly.[11]

Congenital epidermoid cyst of the oral cavity, prenatal diagnosis by sonography shows carefully planned perinatal management using a team approach.[12]

Congenital mucocele of the tongue is a very rare condition in the infant. Patients present with airway obstruction and feeding difficulty. Mucocele commonly arises due to alterations in the minor salivary glands, occurring in approximately 2.7% of patients under the age of one.[13]

Infantile hemangiomas (IHs) are the most common benign soft-tissue tumors of childhood.

Identify risk factors for the development of infantile hemangiomas, particularly in relation to placental abnormalities and other known risk factors such as low-birth weight and prematurity, with a reported incidence of approximately 5%. [14]

IH occurs at a higher frequency in female than male infants. The common oral locations include lips, buccal mucosa, tongue, and rarely the palate and uvula.[15]

Hamartoma is the rarest oral cavity swelling usually located on the tongue near the foramen cecum or on the anterior hard palate near the incisive papilla.[16]

Nasogastric airway and tongue stitch decrease the postoperative airway obstruction which may occur due to postoperative tongue or oral cavity edema.[17]

Kasirajan concluded that extubation is more important and should be done after the baby is fully awake.[17]

CONCLUSION

Anesthesia for a child with intraoral swelling requires adequate preparation, vigilance, and knowledge of the diseases with all necessary equipment of difficult intubation keeping ready.

If possible intubation is done under a deep plane of anesthesia with spontaneous respiration, tongue stitch and lateral position in the postoperative period can be preferred to overcome airway obstruction due to edema of the oral cavity.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Laberge JM, Puligandla PS, Shaw K. Teratomas, dermoids, and other soft tissue tumors. In: Holocomb GW 3rd, Murphy JP, editors. Ashcraft’s Pediatric Surgery. 5th ed. Philadelphia: PA: Saunders Elsevier; 2010. p. 915-35.
2. Litman RS, Wake N, Chan LM, McDonough JM, Sin S, Mahboubi S, et al. Effect of lateral positioning on upper airway size and morphology in sedated children. Anesthesiology 2005;103:484-8.
3. Kumar N, Bindra A, Kumar N, Yadav N, Sharma S. Anesthetic concerns in a huge congenital sublingual swelling obscuring airway access. Saudi J Anaesth 2015;9:202-3.
4. Walker RW, Ellwood J. The Management of difficult intubation in children. Paediatr Anaesth 2009;19:77-87.
5. Ramani MN, Shah SK, Parikh U, Mehta P, Vakil SD. Infant with a palatal swelling an anaesthetic challenge. Indian J Anaesthesiol 2002;46:217-8.
6. Lerman J, Sikich N, Kleinman S, Yentis S. The pharmacology of sevoflurane in infants and children. Anesthesiology 1994;80:814-24.
7. Miyoshi E, Kitamura S, Kinouchi K, Fukumitsu K, Nagai S. Anesthetic management for newborn pharyngeal teratoma. Masui 1999;48:884-7.
8. Diaz JH, Stedman PM, LeTard FX. Perioperative management of newborn pharyngeal teratomas. Anesthesiology 1984;61:608-10.
9. Arora MK, Karamchandani K, Trikha A. Use of a gum elastic bougie to facilitate blind nasotracheal intubation in children: A series of three cases. Anaesthesia 2006;61:291-4.
10. Borland LM, Swan DM, Leff S. Difficult pediatric endotracheal intubation: A new approach to the retrograde technique. Anesthesiology 1981;55:577-8.
11. Sugata K, Muramatsu K, Uchiyama T, Takano N, Shibahara T. Congenital epidermoid cyst arising in soft palate near uvula: A case report. Bull Tokyo Dent Coll 2010;51:207-11.
12. Park SW, Lee JJ, Chae SA, Yoo BH, Kim GJ, Lee SY. Congenital epidermoid cyst of the oral cavity: Prenatal diagnosis by sonography. Clin Exp Otorhinolaryngol 2013;6:191-3.
13. Gatti AF, Moreti MM, Cardoso SV, Loyola AM. Mucus extravasation phenomenon in newborn babies: Report of two cases. Int J Paediatr Dent 2001;11:74-7.
14. Munden A, Butschek R, Tom WL, Marshall JS, Poetlter DM, Krohne SE, et al. Prospective study of infantile haemangiomas: Incidence, clinical characteristics and association with placental anomalies. Br J Dermatol 2014;170:907-13.
15. Barnes L, editors. Surgical Pathology of the Head and Neck. 2nd ed., Vol. 2. New York: Marcel Dekker; 2001.
16. Napier SS, Devine JC, Rennie JS, Lamey PJ. Unusual leiomyomatous hamartoma of the hard palate: A case report. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1996;82:305-7.
17. Kasirajan G. A neonate with large oral cavity teratoma – An anesthetic challenge. J Integr Health Sci 2019;7:25-7.