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Case Report

Anaesthesia Section

Blockbuster Laryngeal Mask Airway as a Rescue Device in Paediatric Patient with Retrognathia Posted for Microtia Reconstruction Surgery: A Case Report

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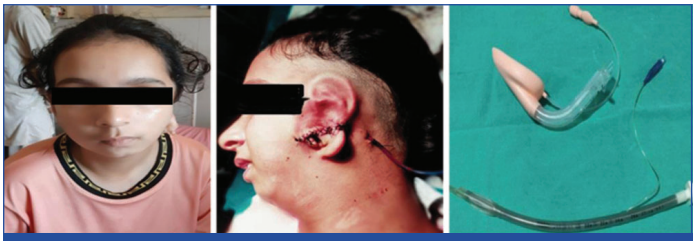
ABSTRACT

The first and second branchial arches, along with the first branchial cleft, contribute to the development of ear and mandible. Children with microtia can have retrognathia or micrognathia and have challenging airway management. Managing the airway in these patients presents a significant challenge for anaesthesiologists as they have the potential for upper airway obstruction and challenging tracheal intubation because of facial deformities. Although awake fiberoptic intubation is a well-accepted method for handling difficult intubations, it can be uncomfortable and stressful for paediatric patients. Moreover, it demands expertise and is unsuitable for patients unwilling to undergo awake intubation. This case report highlights the use of the blockbuster Laryngeal Mask Airway (LMA) in an 11-year-old retrognathic child with microtia with anterior larynx scheduled for auricular reconstruction surgery. There was a failure to secure the airway with multiple attempts at traditional intubation and the supraglottic airway device i-gel, as the child had an anterior larynx and Cormack Lehane (CL) grading of 4 on direct laryngoscopy. The blockbuster LMA, distinguished by its innovative design facilitating both ventilation and intubation through an integrated channel, emerged as a pivotal alternative. The supraglottic device is not the technique of choice, but it can definitely be an alternative and could be life-saving in situations where fiberoptic bronchoscopy and tracheostomy are not available.

Keywords: Anaesthetic challenges, Difficult airway, Supraglottic airway devices

CASE REPORT

An 11-year-old, 35 kg female child with congenital left microtia was posted for auricular reconstruction surgery. Preoperative assessment was done a day prior to the surgery [Table/Fig-1]. The patient had an uneventful birth history. There was no prior history of anaesthesia, chronic illness, or drug allergy. There was no history of upper airway obstruction. Airway assessment revealed Mallampati score III, retrognathia, crowded teeth, and slight buck teeth. The patient had normal neck movements. On chest auscultation, air entry was equal on both sides. The haematological and biochemical laboratory test reports were within the normal range. Written and informed consent was taken from the parents following a discussion on the possibility of a difficult airway.



[Table/Fig-1]: (a) Preoperative image of the patient with left-sided microtia (left); (b) Postoperative image of the patient after auricular reconstruction (middle); (c) blockbuster LMA (right).

The child was fasted for six hours for solids and two hours for liquids prior to surgery. After identification and checking the consent, the patient was shifted on the table. Due to the anticipated difficult airway, a difficult airway cart containing adequately sized endotracheal tubes, bougie, stylet, oropharyngeal airway, nasopharyngeal airway, and LMA was prepared. The expected surgical time was three hours. Standard American Society of Anaesthesiologists (ASA) monitoring was conducted.

Baseline vital parameters showed a regular heart rate ranging from 80-90, oxygen saturation of 99% on room air, and blood pressure of 100/68 mmHg. Intravenous access was secured in the right hand with a 20 G cannula. Ringer lactate was used as the maintenance fluid.

Preoxygenation was initiated with 100% oxygen. Injection glycopyrrolate in a dose of 0.005 mg/kg and fentanyl in a dose of 2 mcg/kg was given. Main aim during the induction of anaesthesia was the preservation of spontaneous ventilation, which was achieved through careful titration of propofol infusion along with the inhalational agent sevoflurane. Check laryngoscopy was performed after ensuring adequate depth of anaesthesia and optimal positioning, and Cormack Lehane (CL) grading was found to be 4 [1]. On giving Back, Upward, Right lateral, Pressure (BURP), the CL grading improved to 3b, and intubation using a stylet was attempted but was unsuccessful. The next intubation attempt was taken with the help of a bougie. Following two unsuccessful attempts at intubation, face mask ventilation was done, aided by a Guedel airway, successfully assisting their spontaneous ventilation. After achieving adequate ventilation and adequate depth of anaesthesia, an I-gel was inserted, but the patient could not be ventilated. Subsequently, a size 3 blockbuster LMA was placed, and the patient was successfully ventilated. A flexometallic tube of size 6.5 was then placed through the LMA, and the patient was ventilated successfully. As the graft was to be harvested from the 6th, 7th, and 8th rib cartilage, and there was a risk of pleural violation, intubation was preferred over LMA.

Subsequently, a loading dose of 0.5 mg/kg and a maintenance dose of 0.1 mg/kg of the muscle relaxant atracurium was administered throughout the duration of the surgery. Anaesthesia was maintained with nitrous oxide, oxygen, and sevoflurane to achieve a minimum alveolar concentration of one. After the completion of the surgery, the patient was extubated once protective airway reflexes and

adequate muscle power returned. The patient maintained stable vitals and room air saturation of 98%. Subsequently, the patient was then shifted to the recovery room and, after two hours of observation, was later on shifted to the burn and plastic ward.

DISCUSSION

The ear and mandible develop from the first and second branchial arches and the first branchial cleft [2]. Children with microtia can have retrognathia or micrognathia, which may result in a predicted difficult airway. Retrognathia is characterised by an unusual posterior placement of the maxilla or mandible, especially the mandible, in relation to the facial skeleton and soft tissues. This condition results in the posterior displacement of the tongue base, causing a narrowing of the upper airway. Additionally, retrognathia is often linked to a high-arched palate due to the tongue's positioning [3]. The thyromental distance is typically reduced in retrognathia. Retrognathic people can have trouble breathing difficulties due to narrower airways, leading to snoring and potentially obstructive sleep apnoea. Various syndromes associated with retrognathia include Pierre-Robin syndrome, hemifacial microsomia, DiGeorge syndrome, Nager syndrome, Treacher Collins syndrome, Goldenhar syndrome, and Mobius syndrome [4]. People with retrognathia may also have malaligned or crowded teeth [5].

Various congenital syndromes with micrognathia, retrognathia, macroglossia, microsomia, and a short neck can complicate ventilation and intubation [6]. Awake intubation using a paediatric flexible fiberoptic scope may be considered to secure the airway. However, the non availability of paediatric flexible fiberoptic scopes in some institutions and the lack of cooperation from paediatric patients for awake intubation make induction of anaesthesia with the preservation of spontaneous breathing is cornerstone for safe airway management in patients with craniofacial syndromes and suspected difficult airways. This can be achieved through induction with propofol or inhalational induction with sevoflurane. While the patient is breathing spontaneously, a check laryngoscopy should be attempted provided patient tolerates it without resistance. Intubation using a gum elastic bougie or stylet can be attempted. Videolaryngoscopy and fiberoptic bronchoscopy are options, they may not be available in all institutions. If ventilation becomes problematic, immediate insertion of an LMA is recommended [7]. In present case, authors were prepared with both the paediatric fiberoptic bronchoscope and blockbuster LMA. However, the blockbuster LMA was proceeded and were successful on the first attempt.

The surgical process for auricular reconstruction involves rib harvesting. Keeping in view the postoperative pain, an intercostal nerve block was given. Rib harvesting is an important step in auricular reconstruction due to the risk of pleural violation during this procedure. The wound is irrigated and assessed using the Valsalva maneuver by applying pressure up to 40 cm of water to detect any signs of air leakage [8]. In a similar case to present study, Khan TH et al., intubated a child with Pierre Robin syndrome using Air Q, which is a new intubating LMA [9]. In another case, Gharebaghian M intubated a child with Treacher Collins syndrome using an intubating LMA [10].

The blockbuster LMA is a second-generation supraglottic airway device introduced by Professor Ming Tian in 2012. It can serve as a rescue airway device in a "can't intubate, can't ventilate" scenario. It possesses distinct characteristics, such as a four-way connector for simplified securing postplacement. The angulation of the airway tube exceeds 95°, and the short airway tube facilitates easy insertion and alignment with the oropharyngeal curve. Additionally, a guidance device allows endotracheal tube to be directed towards the laryngeal opening at a 30° angle, enhancing the success rate of endotracheal intubation [11,12].

CONCLUSION(S)

Airway management is very challenging in patients with retrognathia, so thorough preoperative evaluation along with preparation for the worst-case scenario is a necessity. The blockbuster LMA, which aids in rescue ventilation and is also equipped with a channel for intubation, can be tried in cases of retrognathia. Its peculiar features enhance the success rate of endotracheal intubation.

REFERENCES

[1] Yentis SM, Lee DJ. Evaluation of an improved scoring system for the grading of direct laryngoscopy. Anaesthesia. 1998;53(11):1041-44.
[2] Larsen W. Human embryology, 2nd ed. New York: Churchill Livingstone; 1997:347-92.
[3] Quo SD, Pliska BT, Huynh N. Oropharyngeal growth and skeletal malformations. Principles and Practice of Sleep Medicine. 2017;1401-22.e7.
[4] Cattano D, Killoran PV, Cai C, Katsiampoura AD, Corso RM, Hagberg CA. Difficult mask ventilation in general surgical population: Observation of risk factors and predictors. F1000Res. 2014;3:204.
[5] Burgaz MA, Eraydın F, Esener SD, Ülkür E. Patient with severe skeletal class ii malocclusion: Double jaw surgery with multipiece le fort I. Turk J Orthod. 2018;31(3):95-102.
[6] Hinton AE, O'Connell JM, Van Besouw JP, Wyatt ME. Neonatal and paediatric fiber-optic laryngoscopy and bronchoscopy using the laryngeal mask airway. J Laryngol Otol. 1997;111(4):349-53.
[7] Apfelbaum JL, Hagberg CA, Connis RT, Abdelmalak BB, Agarkar M, Dutton RP, et al. 2022 American Society of Anaesthesiologists Practice Guidelines for management of the difficult airway. Anaesthesiology. 2022;136(1):31-81.
[8] Cubitt JJ, Chang LY, Liang D, Vandervord J, Marucci DD. Auricular reconstruction. J Paediatr Child Health. 2019;55(5):512-17.
[9] Khan TH, Ghayas A, Ayesha, Khushbakht S, Ahmed A, Khan N. Successful intubation with air-Q in Pierre Robin syndrome. Anaesth Pain & Intensive Care. 2013;17(1):71-74.
[10] Gharebaghian M. Difficult airway management in a patient with Treacher Collin's syndrome with intubating laryngeal mask airway. Acta Med Iran. 2006;44(4):281-84.
[11] Cook T, Howes B. Supraglottic airway devices: Recent advances. Continuing Education in Anaesthesia. Crit Care Pain. 2011;11(2):56-61.
[12] Raiger LK, Sharma B, Gehlot RK, Dhania S, Meena HK. A comparison of tracheal intubation with ambu aura gain tm, fastrach and blockbuster laryngeal mask airway: A randomized clinical trial. J Clin Diagn Res. 2022;16(9): UC14-UC18.

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