RESEARCH PAPER

Managing Difficult Airway - Giant Epulis in Pediatric Patient

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ABSTRACT

Congenital epulis is an exceptionally rare benign tumor of the gingiva in newborns, and its occurrence alongside multiple craniofacial and neural anomalies is even more uncommon. We report a 10-month-old female infant (7.5 kg) with large congenital epulis involving both the maxilla and mandible, extending beyond the oral cavity and preventing full mouth closure. Associated anomalies included congenital tongue malformation, cleft soft palate, microcephaly, and spina bifida. On examination, firm intraoral masses measuring approximately 3 × 3 cm (palatum) and 4 × 2.5 cm (mandible) were noted, though feeding was possible by spoon. The diagnosis of congenital epulis was established, and surgical excision was planned. Initial oral intubation was achieved with a Macintosh blade after an unsuccessful attempt with a Miller blade, ensuring airway security while transitioning into nasal intubation to enhanced surgical access. Nasal intubation was attempted but failed with both conventional laryngoscopy and pediatric fiber-optic laryngoscopy. Definitive nasal intubation was successfully performed using a video laryngoscope, which provided superior visualization. The procedure proceeded uneventfully, and the patient was transferred to the ICU postoperatively for observation of potential laryngeal edema. She was extubated successfully within 30 minutes, with stable airway and satisfactory recovery. This case demonstrates that congenital epulis, particularly in the context of multiple anomalies, can pose extraordinary airway challenges, highlighting the importance of adaptive intubation technique to secure the airway and facilitate surgical access. Meticulous preparation with multidisciplinary backup plans is essential for safe airway management in such complex pediatric patients.

Keywords: epulis, airway management, intubation, laryngoscopes, pediatric

How to cite this article: Aditya D, Semedi BP, Andriyanto L, Edward PPM, Bakti RK, Firdaus KM. Managing Difficult Airway - Giant Epulis in Pediatric Patient. Int J Drug Deliv Technol. 2026;16(17s): 478-482. DOI: 10.25258/ijddt.16.17s.56

Source of support: Nil.

Conflict of interest: None

Introduction

Epulis, also known as a congenital gingival cell tumor, is a rare benign tumor that occurs in the gingiva of newborns. First described by Neumann in 1871, fewer than 250 cases have been reported, with an estimated incidence of 0.0006% per live birth. This tumor appears as a mass arising from the gingival mucosa. It may protrude from the infant's mouth and cause respiratory or feeding difficulties. Thus, surgical removal is considered the most effective treatment [1].

Managing a patient with an intraoral mass poses significant challenges for an anesthesiologist, particularly when it occurs alongside multiple craniofacial anomalies. Critical questions arise: Can the patient be intubated? What intubation technique is feasible? How can the airway remain secure throughout surgery? Effective management of a difficult airway is crucial to minimize the incidence rate of perioperative morbidity and mortality [2]. Airway management in such cases, especially in a case of epulis, must be individualized, employing adaptive techniques not only to secure the airway, but also to facilitate optimal surgical access.

This exceptionally rare presentation of congenital epulis with multiple craniofacial anomalies offers novel insights into airway management in complex pediatric surgical contexts. We report the anesthetic management of an infant with a challenging airway who underwent surgical removal of congenital epulis under using general anesthesia at a tertiary care center in Indonesia, emphasizing the successful intubation strategy used. This

case highlights the importance of adaptive intubation techniques to secure the airway and facilitate surgical access. Solid preparation and well-planned backup plans are also crucial in case the previous technique fails to secure the patient's airway. Preoperative multidisciplinary meetings between anesthesiologists, plastic surgeons, and pediatric surgeons ensured coordinated perioperative management.

Care Report

A 10-month-old female infant (weight: 7.5 kg) was diagnosed with congenital epulis. The masses, originating from the upper and lower jaws, were substantial and extended beyond the oral cavity, preventing complete mouth closure. Additional congenital anomalies were found, such as congenital malformations of the tongue, cleft soft palate, microcephaly, and spina bifida. On local examination, a firm mass of around 3 x 3 cm was found on the palatum and an immobile firm mass of around 4 x 2.5 cm was found on the mandibular region. However, the patient could bottle-feed and consume milk porridge when spoon-fed. No audible snoring was noted while the patient was awake or asleep.

Figure 1. Clinical presentation of the patient showing large congenital epulis

Preoperative airway assessment using the MOANS (Mask seal, Obstruction, Age, No teeth, Stiff lungs) and LEMON (Look externally, Evaluate 3-3-2, Mallampati, Obstruction, Neck mobility) criteria revealed a potential for difficult ventilation due to the intraoral mass causing orofacial deformity, as well as a potential for difficult intubation, primarily related to significant external deformity and markedly reduced intraoral space, despite the absence of airway obstruction and the presence of preserved neck mobility.

The patient was kept nil per oral as per ASA (American Society of Anesthesiologists) Guidelines. Maintenance fluid (5% dextrose and 0.45% NaCl at 32ml/h) via a 22G intravenous (IV) line were initiated. Before induction, preoxygenation was done with 100% oxygen. Inhalational induction was commenced using sevoflurane and a size five adult anesthesia mask in the operating room, achieving adequate ventilation with significant chest movement was observed. Fentanyl 10 mcg was administered prior to intraoral intubation. A team of pediatric surgeons was on standby for an emergency invasive airway (cricothyroidotomy) in case any means of intubation failed to secure the patient's airway.

Intubation was performed using a sleep non-apnea technique. Oral intubation with a size 2 Miller blade failed due to poor glottic visualization; a second attempt with size 2 Macintosh blade and a 4.0 mm non-cuffed endotracheal tube (ETT) was successful. A conversion from intraoral to nasal intubation was necessary to facilitate the surgical access. Multiple attempts with both size 2 Miller and Macintosh blades failed. A pediatric fiber-optic laryngoscope (FOL) was employed, but visualization was hindered due to the absence of a suction port. Manual suction was attempted but did not improve visualization. Definitive nasal intubation was achieved successfully with a 4 mm uncuffed endotracheal tube using a video laryngoscope with a Miller blade, which provided excellent visualization. Ventilation was maintained via oral ETT until the glottis was visualized, at which point oral ETT was removed and the nasal ETT directly inserted. Following successful intubation, atracurium 5 mg injection was given, followed by 100 mg of paracetamol and dexamethasone 4 mg injection. Anesthesia was maintained with sevoflurane (1 MAC) and fentanyl 5 mcg/hour.

Figure 2. Successful mask ventilation using a size 5 adult anesthesia mask

Postoperatively, the patient was transferred to the ICU due to multiple intubation attempts and concern for laryngeal edema. Adequate spontaneous respiration was observed upon ICU admission. After 30 minutes, the patient was awake, and extubation was successfully performed. The airway remained clear with no abnormal breath sounds, and the patient displayed strong crying and active movement.

Figure 3. Attempted nasal intubation using a pediatric fiber-optic laryngoscope (FOL) while maintaining ventilation via the oral endotracheal tube, illustrating the staged oral-to-nasal intubation approach.

Discussion

In this case we elected to secure the airway under general anesthesia using an initial oral intubation followed by conversion to nasal intubation to enable intraoral surgical access. This strategy was to provide optimal airway protection, ensuring adequate ventilation and oxygenation without compromising surgical access throughout the procedure. Given anticipated difficulty based on preoperative airway assessments, our approach prioritized airway security from induction to emergence while incorporating contingency plans for potential failure at each stage.

Congenital epulis, first described by Neumann in 1871, remains rare, with fewer than 250 cases reported [1]. When large masses arise from both the upper and lower jaws, as seen in our case, they can obstruct the airway and pose significant perioperative, particularly in airway management. Previous reports have noted that large intraoral masses may cause mask ventilation and intubation difficult for anesthesiologists [1,3]. In our case, the presence of multiple congenital anomalies -- congenital tongue malformation, cleft soft palate, microcephaly, and spina bifida, further compounded the complexity of our anesthetic plan. In such cases, individualized, patient-specific strategies are essential, as

the combination of anatomical distortion and pediatric physiology narrows the margin of error.

Literature supports the use of general anesthesia for large and obstructive lesion, as it provides better airway protection while minimizing blood loss, stress, and pain accompanying the surgery. Although excision under local anesthesia is also an option for small, non-obstructive lesions, this was unsuitable here due to the lesion size and the need for secure airway protection throughout surgery [3,4]. Our decision to proceed with inhalation induction using sevoflurane allowed maintenance of spontaneous ventilation while assessing mask ventilation feasibility before committing to intubation attempts.

As difficult intubation was anticipated due to significant external deformity and markedly reduced intraoral space, immobility of the masses further compounded the challenge. Previous case reports stated that a mobile mass can facilitate airway management after slight manipulation [3,5]; however, this advantage was absent in our patient. Thus, we used a sleep non-apnea technique – sedation without neuromuscular blockade to avoid apnea-induced desaturation and loss of airway tone before securing the airway [6]. This approach maximizes the available time for intubation attempts, particularly important in small children with high oxygen consumption and limited functional residual capacity. Despite adequate preoxygenation and successful mask ventilation with a size-5 adult face mask. Our first attempt with a Miller blade failed due to poor glottic visualization Success was achieved on the second attempt using a Macintosh blade, highlighting the importance of adapting blade choice to the specific anatomy encountered. Successful intubation was confirmed with bilateral auscultation and end-tidal CO2.

Nasal intubation was required to facilitate cases requiring intraoral surgical access. Literature describes two main approaches; primary nasal intubation and staged conversion from oral to nasal [7,8]. Given the anticipated complexity, we opted for initial oral intubation to secure the airway before attempting nasal intubation. This provided a safety margin where ventilation was maintained via the oral ETT throughout nasal intubation attempts, minimizing risk of hypoxia. As predicted, nasal intubation proved more technically demanding. Multiple attempts with Miller and Macintosh blades failed, as did FOL due to the absence of suction port. The eventual success with video laryngoscope underscores the value of having advanced airway tools readily available in complex pediatric cases. Nonetheless, our team prepared for an emergency invasive airway, with pediatric surgeons ready to perform a cricothyroidotomy if needed. This multidisciplinary preparedness is a cornerstone of safe management in such high-risk scenario.

The combination of maintaining spontaneous ventilation maintenance, staged oral-to-nasal intubation, and multidisciplinary preparedness ensured continuous airway security throughout the procedure. The availability of advanced airway devices proved decisive and the ability to adapt blade choice were pivotal, while equipment limitation reminded us that challenges can arise even in well-prepared plans. However, by tailoring the approach to the patient's anatomy and clinical context, safe airway management was achieved.

In conclusion, meticulous preoperative planning, adaptive intraoperative decision-making, and multidisciplinary collaboration were essential to the successful anesthetic management of this rare and complex case. Flexibility in technique selection, guided by real-time conditions proved critical in securing the airway and ensuring an optimal surgical outcome. Well-structured preparation with reliable backup plans is essential for safe airway management in such complex pediatric patients.

Figure 4. Array of airway devices prepared prior to induction, reflecting the contingency planning for difficult airway management.

Acknowledgement
None.

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.

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