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ANAESTHESIA
Case Report

Anesthesia Induction Using the Air-Q™ Supraglottic Airway Device in a Neonate with Suspected Difficulty of Facemask Ventilation due to Large Oral Tumor Masses

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Abstract

Introduction: This case report describes the use of a Supraglottic airway device, air-Q™ as a substitute for facemask ventilation in the induction of anesthesia in a neonate with oral tumors.

Case presentation: A 6-day-old female with large oral tumors extruding from her mouth was scheduled to undergo surgery, but difficulty using the facemask ventilation was predicted. Therefore, we planned assisted ventilation using the air-Q™ laryngeal mask airway for anesthesia induction before tracheal intubation.

Conclusion: Replacing facemask ventilation with the use of the air-Q™ to induce anesthesia led to successful ventilation and oxygenation of the neonate; subsequent tracheal intubation could be performed safely after intravenous administration of a muscle relaxant.

Keywords: *Congenital oral tumor; Difficult airway management; Mask ventilation; Neonatal anesthesia; Supraglottic airway device.*

Abbreviations: CICV: Cannot intubate cannot ventilate; DAM: Difficult airway management; JSA-AMA: Japan Society for Anesthesiologists airway management algorithm; NICU: Neonatal intensive care unit.

Introduction

To date, many Supraglottic airway devices are available for pediatric patients; however, their use is not yet clinically established. Herein, we report a case in which the traditional facemask ventilation approach was deemed impractical for a neonate with two large tumor masses extruding out of her mouth. Successful anesthesia induction was perform educing a disposable Supraglottic airway device, air-Q™ (Mercury Medical, Clearwater, Florida, USA), as a substitute for facemask ventilation.

Case Report

Despite having no abnormality during fetal life, a female neonate was delivered normally at 38 weeks 5 days of gestation, weighing 2.96 kg and measuring 50 cm in height, presented at our hospital. From birth she had two large tumors extruding from her mouth, one (approximately 2 × 1.5 × 1 cm) connected to the upper jaw gingival area, and the other (approximately 5 × 4 × 3 cm) connected to the lower jaw gingival area (Figure 1A). The two tumors made breastfeeding difficult, and therefore she was transferred to the neonatal intensive care unit (NICU) of our hospital 6 days after birth to undergo surgical resection of the tumor. She had no other malformations or abnormalities and her nutritional state was maintained by feeding milk through a nasogastric tube.

Because the two oral tumors were both highly vascularized with a tendency to bleed easily, anesthesia induction using facemask ventilation was not possible. Therefore, as a substitute we decided to use the air-Q™. Anesthesia was induced using intravenous administration of 1.7-mg/kg ketamine hydrochloride. Just after the patient entered a sedative state, the air-Q™ (size 1.0) was intubated in her oral cavity from the right corner of her mouth without touching the two tumors, and supraglottic mask ventilation was started (Figure 1B). After ensuring the patient's safety through assisted ventilation, oxygenation, and anesthesia depth, we administered an intravenous muscle relaxant (0.8-mg/kg rocuronium bromide). Following which, we placed a reinforced spiral endotracheal tube (inner diameter 3.5 mm with a cuff; Mallinckrodt Pharmaceuticals, Hazelwood, MO, USA) entering from the right corner of her mouth, under direct vision using a laryngoscope with a straight blade (Miller blade size 00). Anesthesia was maintained under controlled ventilation using a mixture of air, oxygen, and sevoflurane, with small doses of intravenous fentanyl. The surgery was performed with no problems and the two tumors were successfully removed. The patient was extubated in the operating room after recovery from the anesthesia because there was no bleeding in her jaw gingival area and she showed adequate spontaneous breathing. She was returned to the NICU.

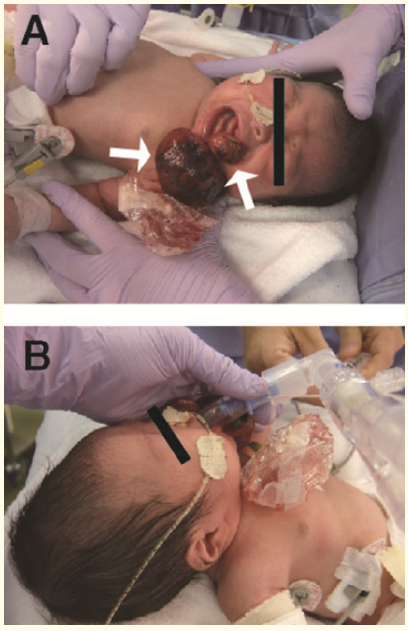

Figure 1: *A) Two large tumor masses (arrows) extruding from the neonate patient's mouth.*
B) Airway management of the neonate patient using the supraglottic airway device, air-Q™, during anesthesia induction.

Discussion

The difficult airway management (DAM) guidelines for adults were announced by the American Society for Anesthesiologists in 1993, and have since been updated twice, in 2003 and 2013 [1-3]. The DAM guidelines in the United Kingdom were also reported in 2004 [4,5]. A review draft of the Japanese Society for Anesthesiologists Airway Management Algorithm (JSA-AMA) was also announced in 2013. The basic points of these guidelines can be summarized as follows:

1. Allowing the continuation of spontaneous breathing during intubation is a basic strategy for cases in which airway obstruction is suspected.

2. Surgical or percutaneous tracheostomy is the first approach to be followed by transtracheal jet ventilation or oxygen insufflation in cannot intubate, cannot ventilate (CICV) cases. On the other hand, there are no established guidelines for children, with the exception of the guidelines that are present in Italy [6]. In our reported case, difficulty using facemask ventilation was suspected, owing to the large oral tumors extruding from the mouth. Following a discussion on the induction of the patient's anesthesia, we decided not to attempt awake intubation because of the limited access route for tracheal intubation and the possibility of bleeding from the tumor. Rapid sequence intubation without facemask ventilation was an alternative choice for us, but we thought it might be very dangerous once the trial failed. We finally decided to perform sedation with minimal suppression of spontaneous breath* ing and inserted the air-Q™ airway device before tracheal intubation to secure the airway and ensure adequate oxygenation. One of the major advantages of using the air-Q™ is that tracheal intubation is possible through the air-Q™ as a conduit in cases where intubation using the regular laryngoscope method with direct vision fails.

Since the appearance of the laryngeal mask in 1983, the supraglottic airway device has become increasingly popular for fiberscopic tracheal intubation and airway management in emergency intubation at the time of anesthesia induction [7]. Even in neonates, if there are no obvious lesions of the subglottis and lower airways, supraglottic airway devices are known to be beneficial in cases of difficult intubation and/or mask ventilation [8]. Jagannathan N., *et al*. retrospectively assessed the clinical efficacy of the use of the air-Q™ in 352 children (newborn till 18 years of age) with an ASA physical status of I–III undergoing various procedures, and the device was used successfully as a primary supraglottic airway device in 349 of the cases. They reported the usefulness of the air-Q™ in many situations such as emergent airway rescue [9, 10] and a conduit for tracheal intubation in pediatric patients with an obstructed airway [11-13]. The efficacy of the air-Q™ airway management was comparable with that of the classic LMA Unique™ and Aura-i™ (Ambu, Copenhagen, Denmark) [14]. Sinha R., *et al*. evaluated the air-Q™ (size 1.0/1.5) as a conduit for tracheal intubation in 20 infants, assessing the ease of insertion and ventilation, oropharyngeal leak pressure, glottic view, and complications; tracheal intubation was successful in 19/20 infants in this study [15]. A four-step method for fiberoptic-guided rapid-sequence tracheal intubation through the air-Q™ intubating laryngeal airway, as an organized and controlled approach to safely securing the airway in infants with severe airway obstruction was also recently proposed [16]. In our neonatal case, the tracheal intubation was successfully carried out after secure ventilation and full oxygenation through the air-Q™ during anesthesia induction. We learned that the air-Q™ works well as a supraglottic airway mask in neonates in whom facemask ventilation is not applicable.

Conclusion

We report a case of anesthesia induction in a neonate who had large oral cavity tumors extruding from her mouth. Because difficulty in using facemask ventilation during induction of anesthesia was predicted, we used the air-Q™ to secure ventilation and oxygenation before tracheal intubation. Although there are no established guidelines for neonatal airway management during anesthesia induction, we found the air-Q™ to be a reliable alternative for difficult airway management in such cases.

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