Anesthetic Challenge in Cleft Lip Surgery: A Case Report

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Airway management of a child with cleft lip and palate can be challenging to the anesthesiologist due to their distinct anatomy and physiology. Here we report a case of 3 months old boy with bilateral cleft lip and palate with anticipated difficult airway posted for cheiloplasty under general anesthesia which couldn't be managed due to unavailability of modern airway equipment.

Keywords: cheiloplasty, cleft lip, cleft palate, difficult airway, failed intubation, smile train.

Cleft lip and Palate are one of the commonest congenital deformities, affecting 1 in 700-800 live births worldwide; among them 25% are bilateral and 85% are associated with cleft palate.[1] The incidence is higher in Asian countries, 1 in 500-600 live birth. [1-3] In 2008, World Health Organization included cleft lip and palate in their Global Burden Disease, as these birth defects lead to significant infant mortality and childhood morbidity.[2]

A surgeon wrote in 1912 that "The difference to the surgeon, between doing a cleft palate operation with a thoroughly experienced anesthetist and an inexperienced one, is the difference between pleasure and pain!".[4] This clearly indicates that providing anesthesia for cleft surgeries is a challenging task. Most of the anesthetic morbidity related to these procedures relates to the airway management, either difficult intubations or postoperative airway obstruction, as assessment of degree of difficulty of intubations before surgery is not always possible in small children.[4]

More than 150 syndromes have been associated with clefts which may further complicate the anesthetic management, but fortunately all are very rare.[5] Out of these, Pierre Robin Sequence (micrognathia,

glossoptosis, cleft palate), Treacher-Collin's syndrome (hypoplasia of maxilla, zygoma and mandible), Goldenhar syndrome (Hemifacial and mandibular hypoplasia, Abnormalities of the cervical spine) are of anesthetic significance.

We present a case report of failed intubation in a young baby who was planned for cheiloplasty highlighting the challenges we faced during the management of this patient.

Case Report

3-month-old male weighing 5kgs, diagnosed of having bilateral complete cleft lip and palate, was planned for cheiloplasty. History, clinical examination and laboratory reports revealed no other abnormalities except for chronic rhinorrhea. Grossly, his airway looked adequate. The Mallampati classification couldn't be assessed preoperatively. He was placed in American Society of Anesthesiologists (ASA) II group.[6] After his nil per as (NPO) status was confirmed, he was taken inside the Operation Theatre (OT). Standard monitors (Non-Invasive Blood Pressure, Electrocardiogram, Pulse oximetry) were attached and anesthetic induction was done by inhalation with Isoflurane 1% (increment done by ½% with every 3-5 breaths to 3%) and oxygen (@5L/min) via facemask, using Jackson-Rees modification of Ayre's T-piece. Afterwards, intravenous access was secured with 24G canula on left hand and Intravenous (IV) Cefazolin (25mg/kg), midazolam (0.05mg/kg), pethidine (1mg/kg), ketamine (1.5mg/kg) and hydrocortisone (2mg/kg) were given. After confirming the adequacy of facemask ventilation, IV succinylcholine (1.5mg/kg) was given. With the knowledge that intubation might be difficult in this patient, available alternative airway devices were prepared for a possible difficult airway, such as appropriately sized airways and endotracheal tubes [Ring Adair and Elwyn (RAE) tubes], Miller and Macintosh laryngoscope blades, laryngeal masks. A gauze piece was rolled and placed over the left alveolar gap and laryngoscopy was done with Macintosh blade (size 2) after 45 secs. Direct laryngoscopy proved to be difficult, as the epiglottis could not be visualized (Cormack-Lehane grade IV).[7] External laryngeal pressure did not improve the view. As a result of failed laryngoscopy, intubation with Miller blade size 1 was re-attempted. After two intubation attempts, we failed to visualize the vocal cord. Third attempt was done by our senior most anesthetist using Miller's blade after ramping the patient with a towel along with cricoid pressure. Despite optimal positioning and external laryngeal pressure, the epiglottis was hardly visible. Intermittent facemask ventilation was continued to prevent hypoxia. We didn't have McCoy's blade, pediatric bronchoscope or pediatric gum elastic bougie. Hence, after 3 unsuccessful attempts by 2 experienced anesthesiologists, the procedure was abandoned and surgery was postponed. The baby was mask ventilated until spontaneous efforts resumed and shifted to recovery ward after he was fully awake.

Discussion

Anesthesiologists Closed Claims Database have demonstrated that respiratory events (airway obstruction, difficult intubation, inadequate ventilation) were more common in the pediatric population (</=5 years of age) than in the adult population (34% vs 23%) due to their peculiar anatomy and physiology.[8] Moreover, these challenges are further compounded by a cleft lip or palate. Factors like large head relative to their torso, large tongue, high and anterior larynx (C3-C4), long & stiff epiglottis that flops posteriorly, narrowest part at the level of the cricoid contributes to the difficult airway.

Gunawardana, in a prospective study of 800 infants without syndromes, reported 7.38% of difficult intubation and the rate decreased with the increase in the age of the babies. 86% of those who had a difficult intubation were associated with a Cormack and Lehane grade (C-L grade) III-IV; only 2% were associated with a lower grading.[9] Kulkarni et al. reported 1.6% of difficult intubation and 0.3% of failed intubation out of 1000 patients.[10] In a study conducted in Eastern Nepal among 570 patients, total 21 cases recorded as a difficult intubation and 1 case of failed intubation.[2] Maharjan SK in his study reported 3 difficult intubations out of 400 patients.[1] Bilateral cleft lip and palate, retrognathia, micrognathia, infants under six months and to a lesser extent left-sided cleft lip and alveolus were the factors that were associated with difficulty.[9]

Since the patients come to us through channeling (outreach team→ Surgeon→ Pediatrician→ Anesthetist), those with facial disfigurement, associated syndromes, probable difficult ventilation and intubation, often don't make it up to our OT. Moreover, we have more than a decade of experience in providing anesthesia for cleft patients. We have frequently experienced difficulty in laryngoscopy but rarely witnessed difficult intubation cases. This was the first time we had to wake up and send a patient from operation table after failed intubation.

Difficult airway was anticipated in our patient as the baby was under 6months of age with bilateral cleft lip and palate. So, we had followed the difficult airway algorithm with the available resources in our hospital. Despite trying different measures, we failed to intubate his trachea. Fortunately, facemask ventilation could be continued with ease. Pediatric fiberoptic bronchoscope, pediatric gum elastic bougie, intubating Laryngeal Mask Airway, McCoy blade, video laryngoscopes aren't available in our hospital. We could have continued the procedure under Total Intravenous Anesthesia (TIVA) or secured the airway using Laryngeal Mask Airway (LMA) or even have opted for surgical airway. But there were already 3 unsuccessful attempts that might have led to airway edema or injury. Moreover, Cleft repair surgery is not a lifesaving surgery. Taking patient's safety into consideration, we thus decided to abandon the procedure and postponed the case.

Kuş Alparslan et al. had reported a case of difficult intubation in 6-month-old male infant scheduled for cleft palate surgery. After 4 unsuccessful attempts, they secured

the airway first with Pro-Seal LMA (PLMA) then used a pediatric fiberoptic bronchoscope to intubate the patient's trachea through the PLMA.[11] Khatavkar SS et al. had used fiberoptic bronchoscope to intubate trachea in a 11 months old male with bilateral complete cleft lip and cleft palate with features of Treacher Collins syndrome.[12] If we had fiberoptic bronchoscope in our setup, maybe we could have also succeeded in intubating this baby's trachea.

Using a video laryngoscope improves the glottic view and facilitates tracheal intubation in patients who have a grade 3–4 C-L view by Macintosh blade. Cooper et al. reported that in 35 patients with C-L grade 3 or 4 views by direct laryngoscopy, the view improved to C-L 1 in 24 and C-L 2 in three patients, and intubation with the Glidescope was successful in 96.3% of 133 patients. Nevertheless, despite a good glottic view, failed intubation using a video laryngoscope has been reported in 6–14% of patients.[13]

The key point is, if tracheal intubation fails, DO NOT simply repeat what has just failed as it will traumatize the airway, making it impossible to intubate. Intubation attempts must be limited to a maximum of 3 or 4. Attempts at intubation must not exceed 30 seconds. An awake flexible fiberoptic intubation is the gold standard technique and is highly effective in securing a documented and compromised difficult airway. In the event of being unable to secure the airway, consideration should be given to wake up the patient and deferring surgery to when they are older, have more structural and neuromuscular maturity, and when the airway may be easier to manage. Surgical airway (cricothyrotomy or tracheostomy) is a difficult option in this group, but may be needed to secure and subsequently maintain the airway.

Conclusion

Anesthesia for cleft lip and cleft palate surgery can be rewarding when the parents see the dramatic improvements after surgery. However, it carries a great challenge to the anesthesiologist due to its peculiar site and association of variety of developmental anomalies and perioperative complications. Skilled personnel, meticulous monitoring and post-operative care in an intensive care unit setup is crucial to minimize complications, which might be a challenge in resource limited country like Nepal.

Acknowledgement

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Conflict of Interest

None.

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