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ANAESTHETIC MANAGEMENT OF PAEDIATRIC PATIENT WITH FAILED REVISION SURGERY OF CLEFT PALATE UNDERGOING FULL MOUTH REHABILITATION UNDER GENERAL ANAESTHESIA: A CASE REPORT

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ABSTRACT Cleft lip and palate (CLP) is one of the most common congenital deformities found in newborns because of failure in the fusion of maxillary and premaxillary processes and palatal processes. Anaesthetic management in paediatric patients can present anatomical and physiological challenges to the anaesthetics. Therefore, patients undergoing surgery with cleft lip and palate will require careful consideration and thorough knowledge about the associated syndromes and the clinical application in preparation by the anaesthetics for airway management and intra and post-operative management.

KEYWORDS :

INTRODUCTION

Cleft lip and palate (CLP) is one of the most common congenital deformities found in newborns because of failure in the fusion of maxillary and premaxillary processes and palatal processes. Among all congenital anomalies, cleft lip and palate are the most common congenital anomalies amenable to surgery. Surgery aims to restore form and function and modern techniques can leave many defects undetectable. These patients are prone to chronic respiratory infection due to mouth breathing, malnutrition and anaemia due to deficient sucking and there may be an association of other congenital malformations.

The case of a child with CLP coming for non-CLP surgery. The anaesthesia technique is dependent on the difficulty of the airway. The anaesthetics require knowledge of the paediatric airway and of this particular anomaly and skill in the thorough preparation of the equipment used for intubating a baby for this procedure. Careful anaesthetic management is an essential part of the successful surgical management of children with CLP. However anaesthetic procedure in this surgery produces unique complications due to anatomical deformities in patients with CLP. These complications include difficult airway inadvertent extubation; kinking of endotracheal tube; aspiration of blood and secretions; laryngospasm; bronchospasm; and acute airway obstruction.

Anaesthetic management in a paediatric patient can present anatomical and physiological challenges to the anaesthetics. Children are not miniature versions of adults and some of the disease conditions are often exclusively present in them. Therefore, successful surgery of a child with CLP will require careful consideration, thorough knowledge and clinical application in preparation by the anaesthetics.

Case report

A case report of 3yrs 6 months female undergoing full mouth rehabilitation surgery for multiple dental carries (Fig 1) under general anaesthesia with birth history of LSCS (ind-prev LSCS) – Birth weight - 2.39kgs, APGAR @ 5min 8/10, cried immediately after birth with 13 days of NICU stay – Respiratory distress, Low birth weight, with left cleft lip and bilateral cleft palate on expressed breast milk for 3 months. The patient attained adequate milestones at an appropriate age. Incomplete Immunization corresponding to age (only BCG known). The patient has a significant history of failed cleft palate repair twice. The patient underwent cleft lip repair – Primary Chelioplasty (FEB,2020)at 6 months of age, with successful surgical repair (Fig 2). The patient underwent Bilateral cleft palate repair surgery – Primary B/L Bardach's two flap palatoplasty (Jan 2021) at 1yr of age – failed B/L palate repair (Fig 3). The patient underwent revision of B/L cleft palate repair - Revision B/L Bardach's two flap palatoplasty (June 2022) at 1 1/2 years of age – failed B/L palate repair. Patient ECHO – structurally normal heart, normal biventricular function. No history of congenital heart diseases. ECG -NSR (Fig 4). Biochemical investigations are within normal limits (TABLE 1).

On examination, the patient - conscious, oriented, afebrile, active and playful. Vitas: Pr:109bpm Bp- 100/60mmhg SPO2- 100% In room air. Height -100 cm weight- 12.5 kg with a BMI - 12.37. Airway – MPC grade1 - BL cleft palate(Fig 2), with adequate mouth opening, no neck restrictions, multiple dental carries and no missing tooth. Posted for full mouth rehabilitation surgery under GA taken under ASA II- PS. Parents were counselled for the above-mentioned procedure and informed written consent was obtained. The patient was on NPO – solids and liquids as per guidelines. The operating room was made ready for paediatric procedures. A difficult airway cart was set up. The patient shifted to the Pre-operating room. Under anaesthetist supervision, mandatory monitors connected - Pulse oximetry and pre-operative vitals noted. The patient was premedicated with Inj. Ketamine 65mg IM, Inj. Glycopyrolate 0.1mg IM when the child was with the mother. Once sedated, the child was shifted into the operating room and IV lines were secured. The patient, in the supine position, adequately pre-oxygenated and Inj. Fentanyl 30mcg IV given. Patient induced with Inj. Propofol 40mg IV. Patient paralysed with Inj. Atracurium 6mg IV. The patient was intubated with ET 4.0 cuffed tube with difficulty due to cleft palate, the patient was intubated on 2nd attempt Oral – CL 1b grade and fixed at 15cm after checking B/L airway entry. Throat and cleft palate packing done. Plane of Anaesthesia maintained: O2/N2O/Sevoflurane/Inj. Atracurium. The case was handed over to the surgeons. After the surgeons completed the procedure on one side, thorough suctioning was done, throat and palate packs were removed and the ET tube was repositioned and fixed on the other side. Throat and palate repacking was done. Intra-op Analgesics - Inj. Fentanyl 20mcg IV, Suppository Neomol 400mg PR given. Duration of procedure - 4hrs. Total blood loss - 40ml, Total IV fluids given – 600ml, Total urine output – 100ml.

Post-procedure - After adequate respiratory efforts, using Inj Glycopyrolate 0.1mg IV + Inj. Neostigmine 1mg IV as reversal. After adequate tidal volume, thorough suctioning was done, oral packing was removed, thorough oral suctioning was done and the patient was extubated. Good power and tone maintained. Vocalization present, cough reflex present. The patient was hemodynamically stable. The patient was shifted to the post-operative ward and accompanied by the mother. Post-operative monitoring was done.

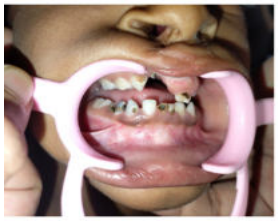

Figure 1 Dental carries

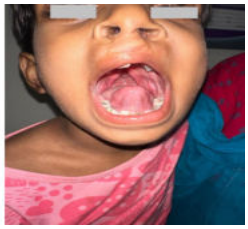

Figure 2 Primary chelioplasty

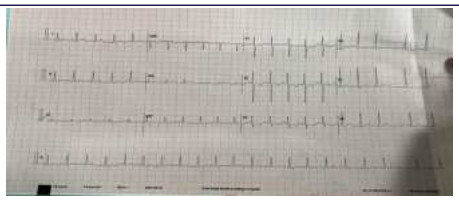

Figure 3 : ECG

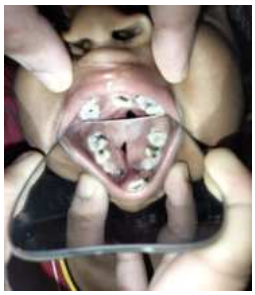

Figure 3 Failed Primary palatoplasty

Table 1 :

Hb	11.5
TC	8.70
PLT	354
UREA	24.13
CREATININE	0.46
BLOOD GROUPING	O +ve
SEROLOGY(HBsAg,HIV)	Negative

DISCUSSION

Early childhood caries means the severe destruction and premature loss of primary teeth due to caries. It is found more commonly in children below the age of 6 years. They are progressive, rampant and acute in nature of progression [1]. Early childhood caries is a global oral health problem that continues to affect infants and preschool children [2]. The aesthetic appearance of children is nowadays a social concern for the family and if the problem is not treated then it can result in local, psychological, social and aesthetic problems. Hence, it is necessary to treat the early childhood caries. [1,3]. CLP is a congenital deformity, and the malformation occurs in the womb. Normally, palatal shelves draw nearer and fuse in the 5th to 12th week while in utero. The disturbance in mesenchymal and endodermal cell proliferation in embryogenesis guides to disturbances in development that may manifest as clefts [4]. This could be also divided into cleft lip (CL), cleft lip and palate (CLP) and cleft palate (CPO). The cleft palate may influence soft tissue formation and can be also limited to the uvula [4]. The preliminary surgical procedures for patients with clefts are cheilo- and palatoplasty, as well as alveolar bone grafting. In most countries, lip and palatal procedures are separated, with different timings 3–6 months for lip and 6–18 months for palatal closure [5,6]. In these patients, the airway was patent and not compromised, and the larynx was inaccessible and difficult to view because of various anatomical anomalies. The incidence of difficult laryngoscopy was 7.38 %. The use of optimal laryngeal pressure improves the laryngoscopic view and increases the intubation angle in the high anterior larynx. The incidence of grade III view is reduced by routine use of external laryngeal pressure [7]. It is recognized that intubation of infants is more difficult than that of adults [8] because infants have characteristics of macroglossia, i.e., both tongue and the epiglottis near the palate, a long and narrow epiglottis, and the large angle formed by the trachea and vocal cords. Furthermore, intubation becomes difficult with craniofacial deformities or micrognathia[8]. Based on these factors, tracheal intubation is more difficult in infants with cleft lip and palate (CLP) than in those without CLP [9,10]. The surgical notes with details of the cleft repair are required during the pre-operative assessment. These notes will indicate whether the patient has had a simple cleft lip and palate repair or whether more complex surgery such as pharyngoplasty has been required. Pharyngoplasty is required in approximately 25% of cleft repairs, the incidence being related to the nature of the original anatomical defect [11]. If there had been no pharyngoplasty, it was acceptable to proceed with nasal intubation. The side of the cleft is the nostril of choice as the nasal septum will be shifted to the other side. If the patient has undergone pharyngoplasty, nasal intubation should be avoided [12]. Every congenital structural defect in the body represents an inborn error in morphogenesis and may affect one or more systems. Various authors have reported incidence of associated anomalies varying from as low as 4.3% [13] to as high as 63.4% [14]. Many syndromes including Van der Woude Syndrome, Pierre Robin sequence, Velocardiofacial syndrome, Median facial dysplasia etc (TABLE 2), are associated with orofacial congenital abnormalities like CLP. Therefore, a comprehensive preoperative anaesthetic assessment should be completed, being mindful of syndromes associated with orofacial clefts and comorbidities. History and examination should include a systems review, specifically looking to identify any signs of congenital heart disease (15% of patients); upper respiratory tract infection (URTI); obstructive sleep apnoea (OSA); renal disorders; neuromuscular disorders or malnutrition [15,16]. To prevent parental separation anxiety, IM premedication in the presence of parents has helped a lot. Thorough preparation and communication between anaesthetist, surgeon and paediatrician are needed to manage a case of paediatric congenital anomaly. The preparation of a difficult airway cart is essential before proceeding with the case. The ideal form of intubation in this case would be naso-tracheal intubation, but it was deferred due to a recent history of URTI.

Table 2:

Syndrome or Sequence	Clinical Details
Velocardiofacial syndrome (22q11 deletion)	Most common syndrome associated with CLP Cleft palate in ~30%, velopharyngeal incompetence Congenital cardiac disease, immune deficiency
Pierre Robin sequence	Cleft palate in 80% of cases Micrognathia Glossoptosis Intubation becomes easier with age due to mandible growth
Stickler syndrome	Progressive connective tissue disorder (autosomal dominant) Midface hypoplasia, micrognathia, Pierre Robin sequence Retinal detachment and early cataracts, deafness Hypermobility of joints
Treacher Collins	Cleft palate in ~30% of cases Hypoplasia of zygomatic bones and mandible Eye and ear abnormalities, deafness Choanal stenosis or atresia Significant risk of airway obstruction in neonatal period Intubation may become more difficult with increasing age
Downs Syndrome	Macroglossia, microstomia Atlantoaxial subluxation and instability Small stature, mental retardation Congenital cardiac disease
Goldenhar syndrome (Hemifacial microsomia)	Incomplete development of palate, lip, nose, ear and mandible on one side of the face Scoliosis, renal and lung abnormalities Intubation may become more difficult with increasing age
Foetal Alcohol syndrome	Small palpebral fissures, smooth philtrum, thin upper lip Growth deficiency, CNS abnormalities, microcephaly

CONCLUSION

Therefore, Airway assessment is mandatory, including appraisal of syndromic features and any history of chronic airway obstruction or OSA symptoms such as snoring and apnea during feeds. Patients with OSA are at higher risk of airway obstruction at induction, and after surgery, and are more sensitive to sedative drugs, especially opioids. In the non-syndromic patient, difficult direct laryngoscopy (Cormack and Lehane grade III or IV), difficult intubation (between two and four attempts), and failed intubation (1%) in cleft patients <6 months of age, bilateral cleft lips, and retrognathia. Certain syndromes are well known to be associated with difficult intubating conditions. If a difficult airway is anticipated, additional skilled assistants for airway management, optimization of airway positioning, and a clear plan of approach including having the right equipment are essential.

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