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Original Article

Experience with Anaesthesia for Cleft Surgery in a Smile Train Partner Hospital in a Low- and Middle-Income Country.

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Abstract

Background: Patients with cleft lips and palate (CLP) pose a high perioperative risk. Specialized anaesthesia is therefore required to improve outcomes. The experience with anaesthesia for patients scheduled for cleft surgeries at the University of Port Harcourt Teaching Hospital, a Smile Train partner hospital in Nigeria-West Africa (a low- and middle-income country-LMIC), from January 2020 to June 2023 is hereby presented.

Methodology: Data on demography, clinical and perioperative characteristics of patients billed for CLP surgery from January 2020 to June 2023 were collected, using records from patient's folders, anaesthetic and theatre registers. SPSS v.22 was used for analysis and results presented as frequencies and percentages.

Results: A total of 94 patients were anaesthesized during the study period, including 10(10.6%) preoperative cancellations that were optimized. The mean age was 54.7±73.8 months, M:F ratio was 1:1.2, paediatric patients were 90(95.7%) and general anaesthesia (GA) with controlled ventilation was 93(98.9%). Surgeries were CP-49(52.1%), CL-42(44.7), and palatal fistula repair-3(3.2%). Preoperatively, 4 (4.3%) each had anaemia and upper respiratory tract infection which were treated. Mandatory monitoring included non-invasive blood pressure 94(100%), pulse oximetry 94(100%), ECG 94(100%) and end tidal CO_2 93(98.9%). Intraoperatively, difficult intubation 6(6.4) and hypoxaemia 4(4.3%) were encountered; and postoperatively there was respiratory obstruction in 4(4.3%). All complications were successfully managed with full recovery.

Conclusion: With specialised perioperative care, anaesthesia for cleft surgeries can be associated with good outcomes in low- and middle-income countries (LMIC).

Keywords: Anaesthesia; Cleft Surgery; Outcome.

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Introduction

Cleft lip and palate abnormalities are common craniofacial abnormalities which are congenital in nature, result in different forms of incomplete development of the lip and palate and can be repaired through surgical intervention. The disturbances in physical function and psychosocial stability that occur with delayed surgery (especially in the indigent) can be avoided [1,2].The associated problems preoperatively include respiratory and ear tract infections, malnutrition, anaemia, dehydration, obstructive sleep apnoea, speech defects and co-existing congenital anomalies [1].Malnutrition, a consequence of difficulties with suckling and swallowing can lead to growth retardation, aspiration and nutritional deficiencies with resultant anaemia, dehydration, electrolyte imbalances and hypoproteinaemia [1,3]. These all have perioperative implications as the oxygen-carrying capacity of haemoglobin and vascular volume are reduced, and electrolyte abnormalities (especially hypokalaemia) can occur affecting neuromuscular blockade and predisposing to arrythmias. Hypoproteinaemia can affect the drug pharmacokinetics leading to delayed onset and offset. Passage of food through the abnormal connections with the ear cavity and recurrent aspiration predisposes to ear and respiratory infections which cause a reactive airway and reduces the respiratory reserve. They must be screened for congenital abnormalities involving the heart (septal defects) and lungs (cysts), as these may lead to suboptimal cardiorespiratory function. Of significance are those syndromic abnormalities such as Pierre Robins, Goldenhare, Treacher Collins etc which are associated with CLP micrognathia, receding mandible, large tongue, etc; causing difficult mask ventilation and intubation[1,3].Besides these challenges, the peculiarities of the paediatric patient associated with reduced reserve from immature organ development must be borne in mind, as most cleft surgeries are conducted in that age group. The need for specialized Anaesthesia care therefore cannot be overemphasized for improved outcome [4,5,6]. Multispecialty approach to care and indeed the role of the Paediatrician in preoperative assessment when applicable [1,5], is the recommended practice with Comprehensive Cleft Care (CCC) where the patient is reviewed by all stakeholders in a one-stop preoperative care session [1,7]. The study centre is not left behind as it adopts CCC for cleft patients for improved care.

Intra and postoperatively, there may be difficulties with airway management with risks of hypoxia and aspiration. The already narrowed airway is also shared between the Surgeon (who may introduce mouth gags to aid viewing); and the Anaesthetist (who introduces airway maintenance devices (endotracheal tubes) for ventilatory support and airway protection to prevent spoilage with blood and tissue debris) [1,8,9].

All the highlighted problems individually constitute risks; therefore, surgery and anaesthesia must be performed by skilled staff to facilitate a favourable surgical outcome [5,7]. Moreover, it is crucial to ensure safe practice (safety) at all stages, as this may be easily compromised in the bid to generate high patient turnover during surgical outreaches aimed at alleviating the sufferings of affected individuals [4,6]. A great emphasis is placed on patient safety in all Smile Train sponsored facilities with a clear policy that no child should die from any cleft surgery since none is an emergency [7].

This is an account of the anaesthetic experience with the Cleft Lip and Palate (CLP) corrective surgeries sponsored by Smile Train International at the study institution.

Methodology

All patients scheduled for cleft lip and palate surgeries from January 2020 to June 2023 and belonging to the American Society of Anaesthesiologists (ASA) Physical Status I and II were retrospectively studied. Data on demography such as age, sex, clinical and perioperative characteristics that included types of cleft anomaly, preoperative status, anaesthestic management, intraoperative occurrences and outcome were collected from records in patient's folders, anaesthetic and theatre registers, and the anaesthetic record charts in the theatres. In addition to that from the cleft lip and palate surgery electronic database, data analysis was subsequently conducted using SPSS v.22. and results were presented as frequencies and percentages.

Results

A total of 94 patients were anaesthetised during the study period. The demographic characteristics are shown in Table 1 with most patients being of paediatric age and female gender.

Table 1: Demographic characteristics of patients

Characteristics	Results
Total patients anaesthetized	94
Paediatric patients anaesthetized	90 (95.7%)
Mean age	54.7±73.8 months
Male: Female ratio	1: 1.2

Table 2 shows the clinical characteristics of patients with preoperative cancellations seen more in patients with anaemia and upper respiratory tract infections (URTI). Types of anaesthesia (which was predominantly general anaesthesia), surgery types, perioperative monitoring and complications are also shown. The perioperative Outcomes are listed in Table 3 showing full recovery and discharge from the recovery room.

Table 2: Clinical characteristics of patients

Characteristics		N/%
Optimized preoperative cancellations		
Congenital cardiac abnormalities		2 (2.1)
Anaemia		4 (4.3)
Upper respiratory tract infections		4 (4.3)
ASA category		
I		84 (89.4)
II		10 (10.6)
Types of anaesthesia		
General anaesthesia	Local anaesthesia	93(98.9) 1 (1.1)
Types of surgical repair		
Cleft palate		49 (52.1)
Cleft lip		42 (44.7)
Palatal fistula		3 (3.2)
Intraoperative monitoring		
Non-invasive blood pressure		94 (100)
Pulse oximetry		94 (100)
Electrocardiogram		94(100)
End tidal CO_2		93(98.9)

Table 3: Perioperative Outcome in Patients

Outcome	N/%
Intraoperative complications	
Difficult intubation	6(6.4)
Hypoxaemia	4(4.3)
Postoperative complications	
Upper respiratory tract obstruction	4(4.3)
Outcome (Recovery Room Discharge)	94(100)

Discussion

This study showed most patients operated on were in the paediatric age group with similar age ranges, and of both genders as found in previous studies [5,8,10]; although Gupta et al [5] and Akitoye et al [10] recorded more males, whereas the index study and that of Kolawole and Awoniyi [8] recorded more females. There were no reasons adduced by the authors except Gupta et al [5] who stated that more attention was given to males in their local community. Similarly, ASA categories were mainly I and II in keeping with safety standards as CLP surgeries are not emergencies. Diverse types of CLP deformities were also treated in keeping with these other studies, but cleft palates were more.

Meticulous screening and preparation ensured patients were optimized, infection free and not anaemic (PCV not less than 30%), though physiological anaemia of infancy may occur in those less than 1year. Preoperative review by the Paediatrician was required particularly for those with respiratory infection and congenital heart diseases. The types of preoperative cancellations that were eventually optimised before surgery in this study confirm that CLP can be associated with respiratory infections and other congenital abnormalities (especially cardiac), and more so when there are syndromic associations like Down's syndrome known to be associated with septal defects [1,3,5]. Consultation with the Paediatrician ensured those with infections received antibiotics and documented atrial septal defect and patent ductus arteriosus in this study were stabilized pre-anaesthesia. Minimum laboratory tests were haemoglobin, electrolytes/urea, and platelets/clotting profile in palatal clefts only to rule out clotting abnormalities. Radiologic and ECG tests were conducted with presence of suggestive cardiorespiratory findings in patients.

Recommended fasting guidelines were adhered to and younger patients were operated earlier than older ones in the daily duty schedules, as prolonged fasting resulting in hypoglycaemia is counterproductive.

Due to difficult airway risks in them, equipment for difficult intubation was prepared to include Magill's laryngoscope, different size tracheal tubes, bougies, stylets, video laryngoscopes etc, skilled assistants as well as drugs such as gycopyrrolate -drying agent and atropine, adrenaline, etc. Basic monitoring must be ensured in patients and drugs with rapid recovery profiles are desirable to ensure early recovery and return of airway reflexes [1,3,7].

Being mainly paediatric patients, GA with tracheal intubation and controlled ventilation was offered due to their reduced respiratory reserve, and to protect the airway from soiling (being a shared airway. The use of fast onset, early recovery profile anaesthetic agents was adopted and wide bore intravenous access was secured with the administration of crystalloids (0.9% normal Saline adjusted to calculated needs). Venous access was secured following inhalational induction with sevoflurane when available in paediatrics; or IV induction using propofol in the older child after excluding the likelihood of a difficult airway**.** Airway management protocol ensured tracheal intubation using non-linkable, cuffed endotracheal tubes (including occasional use of the recommended preformed-south polar Ring Adair Elwyn-RAE variants), and insertion of pharyngeal packs to create a seal around the tubes preventing blood, etc., trickling down the sides of the tube into the trachea; thereby further protecting the airway. Maintenance of Anaesthesia continued with isoflurane. Infiltration of the surgical site by the surgeon with injection adrenaline -1 in 200,000 was employed (to reduce bleeding and thereby improve surgical access, under close monitoring of the cardiac variables to ensure these are within acceptable limits.

Adequate analgesia is essential with short-acting choices like paracetamol, suppository diclofenac and fentanyl which were utilized to ensure quick recovery. Remifentanyl and ketorolac suppositories are preferred ideals [1], but these are not readily available in the study centre. Subanaesthetic doses of ketamine were used to supplement intraoperative analgesia both intra and postoperatively, a practice also employed by Kolawole and Awoniyi [6]. The latter is particularly a better agent that will not enhance increased bleeding[1,5]. Muscle paralysis with short-acting agents was with atracurium, but pancuronium and stronger opioid analgesics (pethidine) which last longer were utilised for palatal surgeries.

Vecuronium is a better option which has been used elsewhere [1,7], but it is unavailable in the study centre. Globally recommended mandatory monitoring was observed for all patients with the use of non-invasive blood pressure (NIBP), ECG, temperature (T^0C), end-tidal CO_2 monitors and pulse oximetry[1,7].Thermal care is very crucial especially as they are more of paediatric age whose temperature regulation mechanisms are not well developed, and hypothermia slows down drug metabolism thereby delaying recovery.To help conserve heat, the warming mattress was used, and IV fluids and draping's were warmed.

Intraoperative complications of difficult intubation, hypoxaemia; and postoperative respiratory obstruction encountered in the index study, have been reported by previous workers [9,11,12]. Cleft palate repairs have been mostly implicated in these complications and various causes have been attributed. Intraoperative tube disconnection, compression, displacement and laryngo-bronchial spasms etc. do occur. The abnormal anatomy and micrognathia make laryngoscopy difficult. However, all complications were successfully managed due to the presence of skilled anaesthesia staff, close monitoring, their early identification and intervention. Awake extubation was preferred in all patients to ensure good airway control and prevent aspiration, which is more likely with deep extubation, as airway reflexes are still depressed (patient not very much in control of airway). Close monitoring, drugs and equipment for airway maintenance and resuscitation were also made available in the recovery room to manage postoperative incidences till full recovery and safe discharge to the wards.

Conclusion

Although some essential drugs and equipment may not be available, with specialised and meticulous pre, intra and post-operative care, anaesthesia for cleft surgeries is associated with favourable outcomes in low- and middle-income countries.

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