# Cleft lip and palate surgery in children: Anaesthetic considerations

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## ABSTRACT

**Background:** The Care of cleft patients is very challenging. Team cleft care is usually lacking in many developing countries due to shortage of qualified manpower. This study is aimed at highlighting anaesthetic challenges in the management of cleft in children. **Patients and Methods:** This was a study of cleft lip and palate patients who were managed during team cleft care activities at University of Maiduguri Teaching Hospital and Federal Medical Centre Nguru both in north eastern Nigeria from January to June 2009. **Results:** One hundred and six cleft patients presented for surgical repair under general or local anaesthesia. Fifteen (14%) patients all of whom children were unfit for general anaesthesia due to various medical reasons. Ninety-one (86%) cleft patients comprising 53(50%) children and 38(36%) adults had cleft repair under halothane general endotracheal anaesthesia and local anaesthesia, respectively. There was no anaesthetic complications recorded under local anaesthesia. Fifteen percent of children who received general endotracheal anaesthesia suffered various anaesthetic complications which included hypoxia (3.8%), laryngospasm (1.9%), kinking of endotracheal tube (5.7%), inadvertent extubation (1.9%) and pulmonary aspiration (1.9%). There was no mortality or anaesthesia-related morbidity at the time of discharge in all the cases. **Conclusion:** We conclude that anaesthesia for cleft lip and palate repair in hospital based team-cleft care activities in our environment is relatively safe. We recommend general anaesthesia with controlled ventilation for children and local anaesthesia for adult and older children who can cooperate.


**Key words:** Cleft, Lip, Palate, Surgery, Children, Anaesthesia, Considerations

**DOI:** 10.4103/0189-6725.70420

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## INTRODUCTION

Anaesthesia for cleft lip and palate repair is associated with complications which may include difficult airway inadvertent extubation, kinking of endotracheal tube, aspiration of blood and secretions, laryngospasm, bronchospasm and acute airway obstruction.[1,2] Associated congenital anomalies or medical conditions may further complicate the anaesthetic management.[3] The risk for these complications reduces with increasing age.[4] In recent years there has been a move towards earlier surgical repair during neonatal[5] and early infant period.[6] Many studies[7-9] have been carried out on the epidemiology, aetiology and surgical management of cleft lip and palate, but none made any reference to the anaesthetic problems in our environment. The purpose of this study is to highlight the anaesthetic problems associated with surgical repair of cleft lip and palate in our hospitals.

## PATIENTS AND METHODS

This is a prospective study of 106 facial cleft patients who presented for surgical repair in two tertiary health care centres in north eastern Nigeria, University of Maiduguri Teaching Hospital and Federal Medical Centre Nguru. All children were admitted into the ward for at least a day before surgery. Preoperative assessment for fitness for surgery and anaesthesia was conducted on each patient. The screenings included history of illness, associated medical conditions, general examination and basic investigations such as urinalysis, blood film for malaria parasites, packed cell volume to rule out anaemia, body temperature measurement to rule out fever which may be as a result of malaria or respiratory tract infection. Other screening includes weight and height measurements to rule out malnutrition. Patients with PCV less than 30%, underweight or those with clinical signs of malaria or respiratory tract infection were excluded from the surgery.

Adult patients were admitted on the day of surgery following the same screening and discharged home on the second or third postoperative day. No premedication

was given to patient before coming to theatre. Technique of anaesthesia employed were local infiltration anaesthesia with 2% lignocaine with adrenaline (1:1000) for adult and older children who could cooperate, and halothane general endotracheal anaesthesia with controlled ventilation for children below 7 years. Induction of general anaesthesia was by administration of a mixture of nitrous oxide, oxygen and halothane by face mask. The airway was secured with non-cuffed portex endotracheal tubes facilitated by IV suxamethonium 2 mg/kg. Muscle relaxation was maintained with IV pancuronium 0.1 mg/kg while anaesthesia was maintained with halothane and nitrous oxide in 60% oxygen administered through the paediatric breathing system. Ventilation was manually controlled. In all the patients the throat was packed with 2-3 pieces of gauze to absorb secretions and blood. At the end of the procedure residual neuromuscular block was antagonized with neostigmine and all the patients were extubated wide awake with full airway control before they were returned to the ward. All patients were monitored intraoperatively with electronic monitors which measures the heart rate, blood pressure and arterial oxygen saturation ($SpO_2$) automatically. All anaesthetic complications were documented. The results were analyzed using Microsoft Excel and presented in Tables and Figure 1.

## RESULTS

Out of the 106 facial cleft patients, 91(86%) had surgical repair under local or general anaesthesia. Fifteen (14%) patients, all children, were unfit for surgery and anaesthesia because of various medical conditions which included respiratory tract infection (3.8%), anaemia(5.7%), malnutrition (2.8%) and malaria (1.9%). Male patients were more than female in the ratio of 1: 0.7. Ninety-one (86%) cleft patients comprising 60 (66%) children and 31 (34%) adult had cleft repair under halothane general endotracheal anaesthesia and local anaesthesia, respectively. All patients were ASA 1 or 2 [Table 1]. There was no anaesthetic complications recorded with local anaesthesia. Eight (13.3%) children who received general endotracheal anaesthesia suffered various anaesthetic complications which include hypoxia (3.3%), laryngospasm (1.6%), kinking of endotracheal tube (5.0%), inadvertent extubation (1.6%) and pulmonary aspiration (1.6%) [Table 2]. None of the patient required intraoperative blood transfusion. Only 5(5.5%) patients presented for early repair before 1 year of age. All the patients came for treatment because they wanted improvement in their facial appearances; however free surgical treatment was the major motivation for seeking treatment. Poverty and ignorance were the proffered reasons that hinder early presentation for surgical repair in 70(66%) and 18(20%) patients, respectively [Table 3].

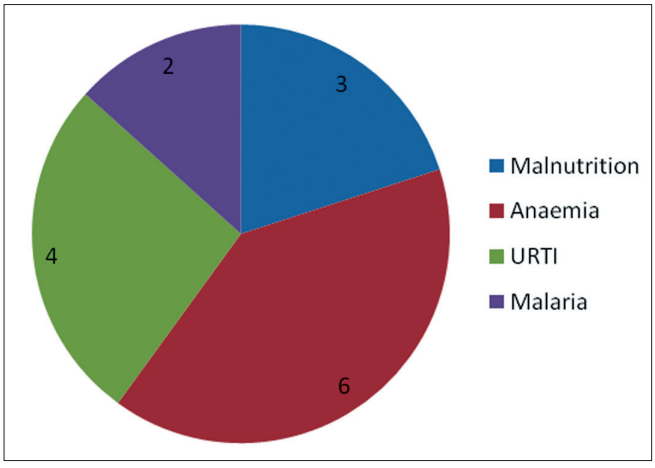



**Figure 1: Associated medical conditions that resulted in exclusion from surgery and anaesthesia.**

Patient selection during preoperative assessment is critical to the safety of general anaesthesia for facial cleft surgery.[1] Associated medical conditions and congenital anomalies may complicate anaesthetic management.[2,3] In this study 15 children were excluded from surgery and anaesthesia due to associated medical conditions, the most common was anaemia followed by upper respiratory tract infection and malnutrition. Malaria fever which is common in our environment resulted in exclusion of two children. Patients with cleft lip and

**Table 1: Age, Sex, Anaesthetic techniques and ASA distribution of patients that received surgical treatment**

| Age | No. of pts (N=91) | Sex (M/F) | Anaesthetic technique(GA/LA) | ASA(I/II) |
|---|---|---|---|---|
| 3-11 months | 5 | 2/3 | 5/0 | 0/5 |
| 1-5 years | 26 | 14/11 | 26/0 | 19/7 |
| 6-10 years | 15 | 8/7 | 15/0 | 13/2 |
| 11-15 years | 11 | 8/3 | 7/4 | 11/0 |
| 16-20 years | 15 | 10/5 | 0/15 | 11/4 |
| >20 years | 19 | 11/8 | 0/19 | 14/5 |
| Total | 91 | 54/37 | 53/38 | 68/23 |
| Percentage | 100% | 59/41 | 58/42 | 75/25 |

**Table 2: Intraoperative complications**

| Complications | No. of patients (N=60) | % |
|---|---|---|
| Difficult intubation | 0 | 0 |
| Hypoxia | 2 | 3.3 |
| Pulmonary aspiration | 1 | 1.6 |
| Laryngospasm | 1 | 1.6 |
| Kinking of tube | 3 | 5.0 |
| Inadvertent extubation | 1 | 1.6 |
| Total | 8 | 13.3 |

**Table 3: Reasons for seeking surgical repair by the patients**

| Reasons | No. of patients (N=91) | % |
|---|---|---|
| Not happy with facial appearance | 91 | 100 |
| Free surgery (poverty) | 70 | 80 |
| Ignorance | 18 | 20 |
| Repeated divorce | 2 | 22 |
| No suitable husband | 1 | 1.1 |

palate have been shown to be at risk of malnutrition, anaemia and repeated upper respiratory tract infection because of feeding difficulties.[10,11] They have inability to develop appropriate negative intraoral pressure for sucking breast milk due to the defect in the lip; the palatal defect also predisposes them to regurgitation and aspiration.[11] Malnutrition and anaemia may delay wound healing in the postoperative period, while respiratory tract infection may predispose the patient to laryngospasm, bronchospasm and hypoxia during general endotracheal anaesthesia because of hyperactivity of the airway.[1,3] It is therefore important to treat medical conditions first before subjecting patient to surgery and anaesthesia in order to avoid such complications.

General anaesthesia for cleft lip and palate repair is known to be associated with anaesthetic complications which may be life threatening if not recognized promptly and managed properly.[1-3] Anaesthetic complications are more common in neonates and infants than older children and adult due to the peculiar anatomy and physiology of neonates and infants.[4] In this study there was no anaesthetic complications recorded under local anaesthesia which agrees with the findings of Ugboko *et al.*[12] who reported safe and cost-effective facial cleft repair without complications under local anaesthesia in older children. However, eight (13%) children suffered anaesthetic complications under general anaesthesia which were managed successfully without adverse consequences. Edomwonyi *et al.*[13] reported 22% intraoperative anaesthetic complications in children below 3 years in Benin which were mainly respiratory and cardiovascular complications. The lower incidence of complications recorded in this study may be due to the older age group (3 months to 15 years) of our patients which carry less anaesthetic risks. In addition, the use of relaxant anaesthesia with manual ventilation in our patients is known to offer the advantage of quick detection of complications such as kinking of tube or inadvertent extubation of endotracheal tube during surgical manipulation.

There was no failed intubation recorded, probably because every patient was considered a potentially difficult airway by the anaesthetist and therefore preparation for difficult intubation was made in anticipation well ahead of time. In addition, suxamethonium which is known to provide good intubating condition was used as muscle relaxant to facilitate intubation in all the patients. The kinking of endotracheal tube recorded in three patients could have been prevented through the use of armoured tube which does not kink or the use of preformed tube which allows better operative field and surgical access. The inadvertent extubation which occurred in one patient during cleft palate repair was attributed to the inappropriate use of mouth gag which exerted too much traction on the endotracheal tube. The use of specially designed mouth gag with provision for endotracheal tube will minimize both kinking and inadvertent extubation. Hypoxia which is a common perioperative complication in children was recorded in only one patient due to laryngospasm which was recognized and treated promptly without consequences. The low incidence of hypoxia recorded may be due to the adequate level of intraoperative monitoring with a pulse oximeter which allows for quick detection of hypoxia.

Various anaesthetic techniques have been used successfully for facial cleft repair which include general endotracheal anaesthesia with controlled or spontaneous ventilation, local anaesthesia, total intravenous anaesthesia with ketamine or propofol.[14,15] The choice of anaesthetic techniques depends on several factors such as level of cooperation by patients, the environment, availability of equipment, drugs and trained anaesthetist.[15,16] This study was hospital based where facilities such as anaesthetic machine, airway equipment, drugs and trained anaesthetists were relatively available.

In recent years especially in advanced countries, there has been a move towards earlier surgical repair of both cleft lip and palate with cleft lip repair being performed in the neonatal period.[1,5,6] In contrast, this study showed that 60(66%) patients presented late for surgical treatment after 5 years of age, a situation which may be of advantage in terms of safe delivery of anaesthesia but of negative effect on healthy growth and development of the patient in terms of speech, psychology, social behaviour and performance at school. The reason for this late presentation was poverty and ignorance as proffered by the patients in this study. Similar studies[8,17] in northern Nigeria

have also reported significant number of cleft lip and palate patients presenting late in late childhood due to poverty, ignorance and long distance from cleft care surgical facilities.

## CONCLUSION

We conclude that anaesthesia for cleft lip and palate repair in hospital-based team-cleft care activities in our environment is relatively safe and recommend general anaesthesia with controlled ventilation for children and local anaesthesia for older children who can cooperate. However, there is the urgent need to provide cleft care service that is affordable and accessible to patients to reduce the incidence of late presentation for surgical repair. This can be done by providing well equipped primary health care centres with adequate facilities, trained manpower and adequate information about cleft care services. Poverty alleviation and collaboration with non-governmental organizations such as smile train will also help in reducing the incidence of late presentation.

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**Source of Support:** Nil, **Conflict of Interest:** None declare.