

ANESTHETIC MANAGEMENT OF CLEFT LIP AND PALATE SURGERY IN CHILDREN- A PROSPECTIVE STUDY

Anesthesia

Article Submitted on: 20
March 2019
Article Accepted on: 28
March 2019

Corresponding Author

Dr. Deepshikha Agnihotri
Associate Professor,
Dept. of Dentistry,
Pacific institute of Medical
Sciences,
Udaipur, Rajasthan

K.S. Bhatia¹, Deepshikha Agnihotri²

¹ - Associate Professor, Depart. of Anesthesiology, MMU Medical College Mullana, Ambala, Haryana

² – Associate Professor, Dept. of Dentistry, Pacific institute of Medical Sciences, Udaipur, Rajasthan

Abstract:

It is challenge to anesthetist to manage the pediatrics age group patients various physical and anatomical challenges are taken into consideration by anesthetist in management of pediatric patients. Hence, cleft lip and palate surgery in children will require meticulous precautions, careful consideration, thorough knowledge and clinical application in preparation by the anesthetist, as they are not miniature version of adults.

Objective:- To assess the anesthetic outcome including preoperative an intraoperative complication in pediatric patients undertaken cleft and palate surgery.

Material and Method:- 20 Patients of cleft lip and cleft palate were included in the study who were operated for surgical repair under general anesthesia at plastic surgery unit of tertiary care teaching hospitals were selected for the study. All patients with age more than 4 months, weight more than 6 kg with hemoglobin level of more than 10 gm% with negative markers for infection were included in this study.

Results: - Patients were divided in two groups with ten patients each group according to induction technique. Group I was induced by inhalation technique with oxygen, nitrous oxide and halothane and group II which were induced by intravenous ketamine and succinylcholine. Intubation was difficult in one patient of group I. Increased intratracheal secretion occurred in one patients of group II. Laryngospasm was found in one patient of group II.

Conclusion:- A favorable outcome can be achieved in cleft lip and palate surgery in children by optimal understanding of anatomy and physiology of pediatrics patients and proper selection and meticulous preoperative evaluation and preparation

Key words:- Cleft lip and palate, anesthetic management, induction.

Introduction

Commonest congenital deformity found in new born is cleft lip and palate (CLP) because of failure in fusion of maxillary and premaxillary processes and palatal processes¹.

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 undetectable². The surgeries for CLP usually performed in the baby of three months of age are more. The anesthesia

technique is dependent on the difficulty of airway. The anesthetists require the knowledge of pediatric airway and of this particular anomaly and skill in the thorough preparation of the equipment used for intubation of a baby for this procedure³. Careful anesthetic management is an essential part for successful surgical management of repair of CLP. But anesthetic procedure in this surgery produced unique complications due to anatomically deformities in patients with CLP. This complication include, difficult airway, inadvertent extubation, kinking of endotracheal tube, aspiration of blood and secretions, laryngospasm, bronchospasm and acute airway obstruction⁴.

Anesthetists are subjected to various anatomical and physiological challenges during anesthetic management of CLP surgery in pediatric age group. Therefore surgery of cleft lip and palate in children will require careful consideration, thorough knowledge and clinical application in preparation by the anesthetists.

Aims and Objectives

The study was performed to evaluate the anesthetic outcome including preoperative selection of cases, intraoperative and post operative complications in children underwent cleft lip and palate surgery.

Materials and Methods

Prospective multicentre study was conducted at tertiary care teaching hospitals after duly approval from institutional ethics committee. Prior written and informed consent of patients were taken for inclusion in the study. 20 Patients of cleft lip and or cleft palate malformation scheduled for surgical repair under general anesthesia at plastic surgery units of hospitals were selected for study. All patients with age more than four months, with weight more than 6 kg with normal preoperative investigations were included in the study. The patients having hemoglobin less than 10 gm percentage were excluded from the study. Meticulous clinical examinations and the concerned investigations were performed to assess the associated congenital abnormalities, congenital heart disease, chronic rhinorrhoea, chronic airway obstruction/sleep apnoea, right ventricular hypertrophy and cor pulmonale, anticipated difficult intubation, hydration etc.

All the patients were given injection glycopyrrolate in dose of 0.01mg/kg intravenously 10 minutes before intubation. Patients were induced by either inhalation technique with oxygen; nitrous oxide and halothane are by intravenous ketamine and succinylcholine. In inhalation technique anesthesia was induced by using Jackson-Rees modification of Ayre's T-Piece system with Rendell –Baker facemask of suitable size, for the child. The gas flow maintained at 2.5 to 3 times the minute volume of the patient. Initially gas flow of mixture of 70% nitrous oxide and 30% oxygen was given. Halothane was then started at 0.5% concentration and gradually increased by 0.5% up to a concentration of 2-0-2.5%. This was maintained till Jaw & other muscles were relaxed. Respiration was regular, conjunctival and eye reflexes were absent and the eyeball was central in position with fixed pupils. In intravenous technique, venepuncture was done using an intracath of appropriate size and intravenous infusion line was set up. Titrated dose of injection ketamine was given in a dose of 1-2 mg/kg body weight slowly until the child was asleep, followed by injection succinylcholine chloride 1 mg/kg body weight. IPPV was given with 100% oxygen using Jackson Rees modification of Ayer's T piece for children below 20 kg weight with an appropriate size of facemask.

Then endotracheal intubation was done using Macintosh laryngoscope in younger patients and Magill's laryngoscope with small blade in older children. RAE tubes were used in all 20 cases. Correct size of endotracheal tube for the age was selected from the following formula –

$$\text{No. of tube} = [(\text{Age} \times 3) + 3.5] \pm 0.5.$$

Other two tubes one smaller & the other bigger than the calculated, size for the patient were also kept ready. They were lubricated with 2% oxycaïne jelly.

For intubation, head was slightly raised over folded towel to flex the neck and extend the head to give satisfactory position for intubation. In some cases larynx was depressed by an assistant in order to visualize the glottis. In children with complete cleft of the alveolus, laryngoscope was made easier by placing a pad of gauze piece in the cleft to prevent slipping of laryngoscope blade in to the cleft. Tube was fixed in the mid line by taking a stitch with sterilized silk below the lower lip. A moist peritubal pack was inserted, under direct vision, Neosporin eye ointment was applied to both eyes, after the patients was draped and Doll's mouth gag was inserted in palate repair, air entry was checked

again.

General anesthesia was maintained in both the groups with oxygen, nitrous oxide and halothane with assisted ventilation. Monitoring of ECG, Pulse, BP and respiratory rate were done at frequent intervals. In both palate and lip, procedures were given injection fentanyl 1 microgram/kg for analgesia. Blood loss was measured in suction bottle and gauze soaked and adequately replaced by appropriate fluid/blood. Fluid replacement was done in all patients according to Holiday and Segar's formula:-

- i. For 0-10 kg: 4 ml/kg/per hour.
- ii. For 11-20 kg : 40 ml per hour +2 ml/kg/per hour for each kg over 10 kg; and
- iii. 21-70 kg : 60 ml/per hour +1 ml for each kg over 20 kg

Extubation was done in all patients after 100% oxygen, removal of pack and return of consciousness with protective reflex intact. The children were transferred in semiprone or lateral position. Vitals were checked at regular intervals all information related to patients and all the pre intra and post operative events as well as complications are recorded in a case record form.

Results

20 Children between age of 4 months to 13 years undergoing surgical repair of cleft lip and cleft palate deformity under general anesthesia by plastic surgery units were included, in this study. 9 patients (7 Males & 2 Females) were lip repair and 11 Patients (5 Males & 6 Females) were for palate repair of (Table I) out of 20 patients majority of patients (15,60%) belonged to less than 3 years of age. No patients was suffering from any other congenital malformation. Out of 20 patients 10 patients were induced by inhalation technique with oxygen, nitrous oxide & halothane (Group I) and remaining 10 patients were induced, by intravenous injection ketamine and succinylcholine (Group II) Intubation was difficult in one patients of group I. Obstruction due to kinking of tube or by pressure of gag or tube displacement (endobrochinal or extubation) while giving position was not observed, in any patients. Changes in the heart rate & rhythm were checked after infiltration of adrenaline in palate surgery. None of the patient required blood transfusion as there was not significant blood loss.

Average duration of anesthesia in cleft lip was 47 minute and in cleft palate repair was 82 minute. During anesthesia increased intratracheal secretion occurred in one patient of group II while, post operatively laryngospasm was found in one case of group II. Patient with laryngospasm responded well to conventional treatment intravenous hydrocortisone & 100% oxygen (Table-2)

Table 1: distribution of patients according to gender (N=20)

| Surgical procedure | Male | Female | Total |
|---------------------|----------|---------|-----------|
| Cleft lip repair | 7 (35%) | 2 (10%) | 9 (45%) |
| Cleft palate repair | 5 (25%) | 6 (30%) | 11 (55%) |
| Total | 12 (60%) | 8 (40%) | 20 (100%) |

Table 2: Complication in both the groups

| | Group I (N=10) | Group II (N=10) |
|----------------------------|----------------|-----------------|
| Difficulty in induction | 0 | 0 |
| Difficulty in intubation | 1 | 0 |
| Intra-tracheal secretion | 0 | 1 |
| Postoperative laryngospasm | 0 | 1 |
| Any other complications | 0 | 0 |

Discussion

Anesthesia management of pediatric patients during surgical repair of congenital deformities of lip & palate offers great challenges to anesthetist. These children, present problems during anesthetic management specifically related to the nature & site of lesion. In present study out of 20 patients, 12 patients were males while 8 were patients were females. Cleft lip was more common in males while cleft palate was more common in females. In a study done by Nooro Ilhain at all in Iran, it was observed that the incidence of cleft lip alone & cleft palate alone, is higher in males and females respectively⁵. similar pattern were also observed in one of the, Japanese study⁶.

Majority of patients (60%) belongs to less than 3 years of age who were underwent surgical procedure for CLP repair in the present study. A similar finding was recorded in different studies⁷⁻⁸.

The optimal timing of surgical repair can vary based on surgeon preference, and perceived psychological impact on the family⁹. Most surgeons repair the cleft lip around^{10,12} weeks of age. According to "The Rule of order 10" by Millard, the repair of cleft lip should be done in patients

with: weight 10 lbs, hemoglobin 10 g/dl and white blood cells count <10,000 mm³ ¹⁰ Intubation was difficult in one patients of group I.

During anesthesia increased intra-tracheal secretion occurred in 1 patients of group II.

Anesthesia for this type of surgery carries high risk of adverse respiratory events¹¹. Post operative larygospasm was found in 1 case of group II. Early complications of primary cleft lip and palate surgery in one plastic surgery unit in U.K., there was and over all postoperative complication rate of 26.2%. the life threatening complication were all related to the respiratory system but one of these occurred within 2 days of operation¹². Complications rate in the present study is comparatively less may be due to small sample size.

Conclusion

Both the inhalation and intravenous induction technique can be used for cleft surgeries and there is no significant differences during induction, maintenance and complications. After analyzing the results, it can be concluded that favorable outcome can be expected in cleft lip and palate surgery in children by adequate understanding of anatomy & physiology of pediatric patients, thorough clinical examination and preoperative assessment and preparation.

References

1. Smarius B, Loozen C, Manten W, Bekker M, Pistorius L, Breugem C. Accurate diagnosis of prenatal cleft lip/palate by understanding the embryology, *World J Methodol* 2017;7(3):93-100.
2. Nahati FR, Williams JK, Burstein FD, Martin J, Thomas J. The Management of Cleft lip and Palate: Pathways for Treatment and Longitudinal Assessment. *Semin Plast Surg* 2005; 19(4):275-285.
3. Hardcastle T. Anaesthesia for repair of cleft lip and palate. *J Perioper Pract* 2009; 19:20-23.
4. Tremlett M. Anaesthesia for cleft lip and palate surgery. In *current anaesthesia and critical care* 2004; 15:309-316.

5. Noorollahian M, Nematy M, Dolatian A, Ghesmati H, Akhlagi S, Khademi GR. Cleft lip and palate and related factors; A 10 years study in university hospitalized patients at Mashhad – Iran. *Afr J Paediatr Surg* 2015; 12(4):286-90.
6. Nagase Y, Natsume N, Kato T, Hayakawa T. Epidemiological Analysis of cleft lip and/or Palate by Cleft Pattern. *J Maxillofac Oral Surg* 2010; 9(4):389-395.
7. Rai SM, Nakarmi K, Basnet S, Shakya P, Nagarkoti K, Ghartimagar M et al. Age of individuals undergoing cleft lip and cleft palate surgeries in Nepal, *JNMA J Nepal Med Assoc* 2013;52(192):591-595.
8. Kirschener RE, Randall P, Wang P, Jawad AF, Duran M, Duran M, Huang K, et al. Cleft palate repair at 3 to 7 months of age. *Plast Reconstr Surg* 2000; 105(6):2127-2132.
9. Shkoukani MA, Chen M, Vong A. Cleft Lip- A Comprehensive Review. *Front Pediatr* 2013; 1:53.
10. Millard Dr., Jr. A primary camouflage of the unilateral harelook, In: Skoog T, Ivy RH, editors, *Transactions of the international Society of Plastic Surgeons*. Baltimore, Md, USA: The Williams & Wilkins; 1957.p. 160.
11. Adenekar AT, Faponle AF, Oginni FO, Anesthetic challenges in ora-facial cleft repair in Ile-Ife, Nigeria. *Middle East J Anaesthesiol* 2011; 21(3):335-359.
12. Lees VC, Pigott RW. Early postoperative complications in primary cleft lip and palate surgery—how soon may we discharge patients from hospital? *Br J Plast Surg* 1992; 45(3):232-234.