

# ANESTHETIST EXPERIENCE FOR CLEFT LIP AND CLEFT PALATE REPAIR: A REVIEW OF 172 SMILE TRAIN SPONSORED PATIENTS AT HAYAT ABAD MEDICAL COMPLEX, PESHAWAR

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## ABSTRACT

**Objective:** To evaluate the anesthetist experience of patients undergoing general anesthesia for smile train project for the repair of cleft lip and palate at Hayat Abad Medical complex Peshawar.

**Material and Methods:** This observational study was conducted on 172 patients of Smile Train project undergoing general anesthesia for cleft lip and palate repair from May 2007 to November 2008 at Department of Anesthesia, Post Graduate Medical Institute, Hayat Abad Medical complex, Peshawar. Data regarding patient's, anesthetic management and the anesthesia complications was obtained from computer record of the patients.

**Results:** Out of 172 patients, 106 were male and 63 female with the age range of 6 months to 25 years. Out of 172 patients, 5(2.90%) patients went into hypothermia, 2 (1.16 %) patients had difficult intubation, 1 (0.58%) patient had post operative pulmonary edema, 1 (0.58%) patient had respiratory depression and 1 (0.58%) patient developed postoperative significant bleeding requiring reexploration the next day. There was no death. None of the patient received intraoperative blood transfusion. Total of 99 procedures were undertaken in patients with cleft lip (unilateral & bilateral). A total of 58 procedures were undertaken for cleft palate. Remaining 15 were secondary cleft procedures.

**Conclusion:** Anesthesia for cleft lip and palate is associated with frequent complications. Vigilant perioperative anesthetic management reduces the incidence of such complications.

**Key Words:** Anesthesia, Cleft lip and palate, Smile train Peshawar.

## INTRODUCTION

Clefts of lip and palate are the most prevalent congenital birth defects in human<sup>1</sup> Of all the plastic surgical procedures, correction of craniofacial deformities in children offers perhaps the greatest challenge to anesthesiologists. Ever since John Snow published in the *Lancet* in 1847<sup>2</sup>, the first report of giving ether to a seven year old boy for cleft lip repair' anesthesiologists have been striving to perfect the safety of anesthesia in craniofacial operations. A cleft lip, with or without a cleft palate, occurs in 1 in 600 livebirths.<sup>3</sup>

A cleft palate alone is a separate entity and occurs in 1 in 2000 live births. A recent study

by Elahi et al<sup>4</sup> describing population based data on the incidence of cleft lip and palate obtained from birth registry information in Pakistan revealed an incidence of 1.91 per 1000 live births (one per 523 births). In Asia there is high incidence of clefts; two to three per thousand live births. It is estimated that possibly 300,000 people are waiting for correction.<sup>5</sup> Many classifications have been devised but essentially the cleft can involve the lip, alveolus (gum), hard palate and / or soft palate and can be complete or incomplete, unilateral or bilateral. Cleft lip and palate is also associated with increased incidence of congenital abnormalities in other organs systems which forms important syndromes for anesthetist.<sup>6</sup>

### AGE DISTRIBUTION OF PATIENT

Age	Frequency (n=172)	Percentage
6 month-2 years	96	55.81
2yrs-4 yrs	41	23.87
5 yrs-9 yrs	20	11.62
10yrs-15yrs	10	5.81
15 yrs and above	5	2.90

Table 1

Embryologically, clefts arise because of failure of fusion or breakdown of fusion between the nasal and maxillary processes and the palatine shelves that form these structures at around 8 weeks of intrauterine life. Without repair these children suffer from facial disfigurement and potentially social isolation, feeding problems and abnormal speech. In the international literature many guidelines exist dealing with different timings for cleft lip and cleft palate repair.<sup>7</sup> The timing of cleft palate repair is a balance between poor facial growth with an early repair and poor speech development with a repair after the age of 1 year. It is usually done at about 6 months of age in developed countries. Cleft lips and palates are often done much later in less affluent countries. For surgical repair of clefts to be performed safely requires a team approach. 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!'*<sup>2</sup>

The majority of anaesthetic morbidity related to these procedures relates to the airway: either difficulty with intubation, inadvertent extubation during the procedure or postoperative airway obstruction.<sup>8</sup> The optimum anaesthetic management will depend on the age of the patient, the availability of intraoperative monitoring equipment, anaesthetic drugs and expertise, and the level of postoperative care that is available.

Smile Train project is an international charitable organization that provides training for professionals and free reconstructive surgical services to children in underdeveloped countries.<sup>9</sup> Most procedures are for correction of cleft lip and palate. Financial, logistical and training support to cleft teams in developing countries is likely to lead to more surgeries for children with cleft.<sup>10</sup>

This study was conducted to evaluate the anesthetist experience of patients undergoing general anesthesia for smile train project for the repair of cleft lip and palate at Hayat Abad Medical complex Peshawar.

### PRIMARY SURGICAL PROCEDURES AMONG 172 PATIENTS PROCEDURE

Operations	Frequency (n=172)	Percentage
Primary Lip Nose Unilateral	76	44.18%
Primary cleft Palate	41	23.83%
Primary lip Nose Bilateral	23	13.37%
Secondary Cleft Palate	15	8.72%
Lip Nose revision	14	8.13%
Fistula repair	4	2.32%
Alveolar bone graft	1	0.58%

Table 2

### MATERIAL AND METHODS

The anesthesia protocols and complications for 172 patients with cleft lip/palate undergoing Smile Train surgery at our centre in the period of eighteen months (April 2007 till November 2008) were reviewed. All anesthesia and surgical complications were evaluated on the basis of medical records. A group of six anesthesia providers (Anesthesiologist & Anesthesia Technician) developed the perioperative anesthesia sheet, a one page form that documents all preoperative, intraoperative and post operative events during anesthesia care. Each sheet was reviewed.

#### Anesthetic management

Anesthesia management was entirely at the discretion of individual anesthesia provider but in accordance with Smile Train protocols. The perioperative monitoring included pulse oximetry, ECG, measurement of the end expiratory carbon dioxide, blood pressure, rectal measurement of temperature and auscultation using precordial stethoscopes. Performed south polar endotracheal tubes (RAE, south polar tubes named after the inventors, Ring Aldere, & Elwin) were used. After tube fixation and monitor application all patients received paracetamol suppositories. The body temperature was stabilized by using warm

### ASSOCIATION OF LIP/PALATE REPAIR AND ANESTHESIA COMPLICATIONS

Operation (n=172)	No Complication (n=154)	Complications (n=18)
Lip Closure (n=99)	95(95.95%)	4(4.05%)
Palate & Others (n=73)	59(80.82%)	14(19.18%)

Table 3

## ASSOCIATION OF ANESTHESIA COMPLICATIONS (MINOR & SEVERE) WITH CLEFT LIP/ PALATE SURGERY

Operations	Minor Complications	Major Complications
Lip Closure (n= 99)	3/99(3.03%)	1/99(1.01%)
Palate & others (n=73)	9/73 (12.32%)	5/73(6.84%)
Total (n=172)	12/172 (6.9%)	6/172 (3.49%)

Table 4

blankets. The monitoring was continued in the recovery room. The patients returned to the plastic surgery ward after they were stabilized.

The complications were classified as minor or severe based on the classification of Cohen et al<sup>11</sup>. Complications were recorded as minor when the heart rate exceeded 20% or dropped below 50% at the beginning or if the loss of intraoperative body temperature was about 1°C above or 2.5°C below starting level. Decreased oxygen saturation lower than 85% and disconnection of the endotracheal tube were also considered as minor complications.

Anesthesia difficulties like tube dislocation, oxygen saturation below 85% exceeding one minute, an increasing heart rate above 50% of the baseline level or lower than 80 beats per minute were recorded as severe complications. Increased body temperature by more than 2.5°C was considered as hyperpyrexia. Other severe complications were laryngospasm and pulmonary edema.

### Data Analysis

For the purpose of analysis patients were

grouped into five age groups, 6 months- 2 years, 2-4 years, 5-9 years, 10-14 years, 15years or older. Data were stored in Microsoft excel and Smile Train express. Tabulations and analysis were performed using SPSS 12. Chi- square test was used to assess the relation of age to occurrence of complications.

## RESULTS

During the 18 month study period Smile Train team operated on a total of 172 patients under general anesthesia. Age range of the patients was from 06 months to 25 years. Details of age distribution is given in Table 1. All patients had intravenous access secured. Anesthesia was induced by face mask induction with halothane inhalation in 137/172(79.65%) patients. Endotracheal intubation was the chosen method for airway management. In 20/172 (11.62%) of the patients intubation was performed after the patient was in deep sleep with halothane through mask ventilation. Muscle relaxants were used for tracheal intubation in 152/172 (88.37%) of cases. (Succinylcholine in 4/172 (5.55 %) and nondepolarizer Norcuron in 168/172 (97.67 %). The combination of mask induction with halothane and norcuron was used in all intubated patients. Other intravenous adjuvant, such as lignocaine and diprivan was used to facilitate intubation in 15/172 cases (8.72%). Opioids were given in operation room to all the patients.

157/172 (91.27%) of surgeries were for primary cleft lip and palate deformities. Other frequent operations i.e 15/172(8.72%) cases were lip nose revision, fistula repair and alveolar bone graft (Table2).

Out of 172 operations 154 patients had no complications and only 18 patients had some major or minor complications. Association of lip/palate

## MAJOR AND MINOR COMPLICATIONS

Complications		Frequency n=172	%age
<b>Major (n=12, 6.9%)</b>	Difficult intubation	2	1.16%
	Pulmonary edema	1	0.58%
	Laryngospasm	1	0.58%
	Respiratory depression	1	0.58%
	Low oxygen	1	0.58%
<b>Minor (n=6, 3.48%)</b>	Hypothermia	5	2.90 %
	Tube disconnection	3	1.74%
	Reintubation	2	1.16%
	Low oxygen	1	0.58%
	Tube dislocation	1	0.58%

Table 5

repair and anesthesia complications is given in table 3. Association of anesthesia complications (minor & severe) with cleft lip/ palate surgery is given in table 4. We had minor complications in 12/172 (6.97 %) patients and major complications occurred in 6/172(3.48%) patients (table 5). Two of these severe complications appeared in the group of syndromic cleft palate patients (2/2 Pierre Robins sequence). Both minor and severe complications occurred mostly intra-operatively. Temperature variation was found to be more frequent complication (n=5). Other minor complications included tube disconnection (n=1), low oxygen saturation (n=1), tube dislocation etc. Difficulty during intubation occurred in 2 patients and was the most frequent major complication. Laryngospasm and pulmonary edema occurred in one patient each.

## DISCUSSION

The current study represents the first analysis of anesthetic outcomes during a Smile Train sponsored project for cleft lip and palate repair at Peshawar, Pakistan. We were able to develop a profile of Anesthetic techniques in use and identified important morbidities for further attentions. Compliance with voluntary reporting of data varied among the anesthesia providers, as has been found in other studies that relied on self reporting.<sup>12</sup>

During the 18 month study period, there was no death among Smile Train sponsored patients. Fisher et al<sup>9</sup> studied general anesthesia techniques and outcome in large international voluntary surgical program and reported 4 deaths, because the patient population, surgical procedures and perioperative resources differ. Triet et al<sup>13</sup> studied 40,240 cases of anesthesia use in infants and children and reported 1 death (0.025 per 1,000). He concluded that most of the incidents were avoidable.

The incidence of difficult intubation (laryngoscopy) Lehan grade III- IV was 2/172 (1.16%) in patients with syndromic cleft palate associated with Peirre Robins sequence. Peirre Robins association is the most common associated airway abnormality.<sup>14</sup> A thorough evaluation of the airway before surgery is imperative for a successful outcome<sup>16</sup> Laryngoscopy and intubation may become difficult and more predisposed to post operative obstructive ventilation in patient with Pierre Robin sequence.<sup>17</sup> Gunawardana<sup>18</sup> has reported the occurrence of difficult laryngoscopy Lehan grade III and IV, was found to be 3.0% in patients with unilateral cleft lip, 45.8% in patients with bilateral cleft and 34.8% in patients with retrognathia. The difficult intubations observed in our study were managed successfully by the

Anesthesiologist experience in pediatric anesthesia along with appropriate intra and postoperative monitoring essential in such cases, as reported by Van Boven.<sup>17</sup>

Most of complications were observed in age group 6 months-2 years. Hypothermia was observed frequently (2.9%) in this age group. Hypothermia is an indirect consequence and is related to the duration of cleft surgery. Hypothermia was most commonly seen in patients on whom bilateral cleft repair was done. Therefore shortening of duration of cleft surgery is an important step to prevent hypothermia and blood loss.<sup>18</sup>

Laryngospasm and pulmonary edema was a problem which was managed successfully by early identification and active treatment. These patients had preoperative upper respiratory tract infection. Infants and small children with cleft palate frequently have cold and upper respiratory tract infection which may predispose to perioperative respiratory complications.<sup>19</sup> In such cases elective surgery should be deferred for 2-3 weeks so that airway reactivity returns to normal<sup>20</sup>. Olsson and Hallen<sup>21</sup> found that laryngospasm was more common in infants than in older children and in those with preoperative respiratory infections.

Reintubation in inadvertent extubation was associated with manipulation of placing retractor for palate surgery and was seen most commonly in patients with young age. In the pediatric closed claim study<sup>22</sup> inadvertent extubation accounted for 3% of claims. Immediate reintubation was performed without any adverse effects.

Tube dislocation was found to be common in cleft lip and palate repair. As well selected RAE south polar tube for tracheal diameter may be too long for short stature and malnourished patients. One should be careful if the head is flexed after intubation as the tube tends to advance into the right main bronchus. If head is extended tip of the tube will be withdrawn in the trachea and a leak may occur if a tube with Murphy eye is placed<sup>23</sup>

## CONCLUSION

Anesthesia for cleft lip and cleft palate repair is associated with number of complications, which can be avoided by the vigilance, experience of specialized anesthesia staff and mutual understanding between surgeon and anesthesiologist.

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