PREOPERATIVE LEVEL OF HEMOGLOBIN IN MALE AND FEMALE CHILDREN UNDERGOING PRIMARY CLEFT LIP AND PALATE SURGERIES

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ABSTRACT

Aim: The study aims to assess the difference in the hemoglobin level in male and female children undergoing primary cleft lip and palate surgeries.

Methods: A sample comprising 33 subjects with cleft lip and palate undergoing corrective surgery were selected. The hemoglobin level estimation was done and the mean and standard deviation was evaluated.

Result: The hemoglobin levels were estimated and a mean value of 10+/- 1.61g/dL and 10.42 +/- 1.18 g/dL was obtained for female and male cleft lip and palate patients respectively. A mean value of 9.94+/- 0.93 g/dL, 10.25 +/- 2.06 g/dL, 11.08 +/- 0.69 g/dL was obtained for cleft patients under the age of <12 months, 13 - 24 months, 25-36 months respectively.

Conclusion: The results of this study will help in assessing the fitness of patients undergoing invasive procedures and will also help develop a better postoperative management protocol. Further studies have to be done for a larger population and the results can serve in better diagnosis and treatment planning.

Keywords- cleft patients, cleft lip, cleft palate, hemoglobin

I. INTRODUCTION

Cleft lip and palate is a common congenital defect that has to be promptly diagnosed at birth. The primary surgical repair of cleft lip and cleft palate is routinely performed before nine months of age and often represents the first surgical intervention these children encounter. The treatment and repair of the cleft not only affects the physical health status of the patient but all his or her economic, social, psychological well being. Often children with facial deformities are stigmatized and teased leading to their poor self-confidence. Research has shown that attractive children are seen by others as brighter, as having more positive social behavior and receive more positive treatment than their less attractive counterparts (Dion, 1972). An increased incidence of teasing over facial appearance is reported among those with cleft lip and palate (Bernstein and Kapp, 1981). Among children
and adults with cleft lip and palate, it has been reported that adults may be at risk of impaired psychosocial functioning as a result of the cleft defect, but Ramstad et al reported that this impairment is related to concerns with facial and physical appearance and speech. Children with cleft defects who have normal speech tend to have fewer behavioral problems, as reported by their parents (McWilliams and Musgrave, 1972). The majority of orthodontic and oral maxillofacial surgery patients presenting to the rehabilitation hospital and during outreach visits are suffering from cleft lip and cleft palate. It is therefore important to collect more data on the scope of the problem for purposes of advocating and planning better health services.

Treatment and surgical repairing of the clefts by surgery and orthodontic treatment improves the physical health status, social and psychological well being. Postponing palatal and cleft and craniofacial surgery may create difficulties in the area of speech development and it is advisable to perform palatal surgery at an early stage and would not hinder midfacial development (Ross, 1970). Despite the variability driven by socioeconomic status and ethnic background, the worldwide prevalence of cleft lip and palate is 1:700 live births depending on the methods of assessments that may lead to different prevalence rates (Mosseyet et al., 2003). Asian and Native American populations have the highest reported birth prevalence rates, which are often as high as 1 in 500. European-derived populations have intermediate prevalence rates at approximately 1 in 1,000, and African derived populations have the lowest prevalence rates at approximately 1 in 2,500. These observations suggest that the relative contribution of individual susceptibility genes may vary across different populations (Dixon et al., 2011).

The incidence of these defects varies according to geographical location, ethnicity, and socio-economic status, but in Caucasian population populations it is uniform with 1:800 to 1:1000 (CLP) and 1:1000 (CP) live births affected. The clinical manifestations of these defects include isolated clefts of the lip to complete bilateral clefts of the lip, alveolus, and palate. Approximately 70 percent of cleft lip and palate cases are non-syndromic, occurring as an isolated condition unassociated with any other recognizable anomalies while remaining 30 percent of syndromic cases are present in association with deficits or structural abnormalities occurring outside the region of the cleft (Schutte and Murray, 1999). The child at age six years usually appears to have adequate midface development, but by the time the pubertal growth spurt is completed, the defect is usually apparent and often severe. This accounts for the frequency of orthodontic relapse in adolescence when the facial form can alter due to differential growth.

The majority of reconstructive surgery patients presenting to the rehabilitation hospitals are suffering from cleft lip and cleft palate. Obtaining blood samples from children can be distressing to not only the child but also for their parents and the medical team. The study aims to analyze the hemoglobin level of cleft patients undergoing surgery. It is therefore important to collect data on the scope of the problem to advocate and plan for better health services. Blood transfusion in all patients may result in incompatibility reactions. There are significant costs associated with blood storage and distribution. Previously our team has a rich experience in working on various research projects across multiple disciplines (Neelakantanet al., 2015; Ramamoorthy, Niveditha and Divyanand, 2015; Abdul Wahabet et al., 2017; Eapen, Baig and Avinash, 2017; Manivannanet al., 2017; Patiletet al., 2017; Ezhilasaran, Sokal and Najimi, 2018; Jeevanandand and Govindaraju, 2018; Ravindiran and Praveenkumar, 2018; Wahabet et al., 2018; MalliSureshbabuet al., 2019; Mehta et al., 2019; Rajeshkumaret al., 2019; Samuel, Acharya and Rao, 2020; Sathish and Karthick, 2020). The aim of the study is to assess the difference in hemoglobin level in male and female children undergoing primary cleft lip and palate surgeries.

II. MATERIALS AND METHODOLOGY

This retrospective cross sectional study was done in 110 patients who reported to the department of cleft and craniofacial department over a period of 10 months in a university-based setting. The study was approved by the ethical committee and institutional research board (SDC/SIHEC/2020/DIASDATA/0619-0320). The medical records and clinical lab reports of patients below 36 months of age with cleft lip, cleft lip and alveolus, cleft lip and palate and cleft palate who were registered to the institution and underwent surgery were included in the study. Cleft patients of age above 36 months and those who have other congenital anomalies were excluded from the study. 33 subjects were selected based on the inclusion and exclusion criteria from the total sample of 110 subjects. The analysis was carried out using the statistical package for social sciences version 20.0 (SPSS Inc, Chicago, IL, USA). The mean and standard deviation of blood hemoglobin levels of patients undergoing cleft lip and palate corrective surgery was evaluated. Anova was evaluated between the age and hemoglobin level and an independent sample T test was performed to compare the mean hemoglobin level of males and female cleft patients.
III. RESULTS AND DISCUSSION

<table>
<thead>
<tr>
<th>Age</th>
<th>Mean Hb(g/dL)</th>
<th>Standard deviation(g/dL)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 12 months</td>
<td>9.94</td>
<td>0.93</td>
<td></td>
</tr>
<tr>
<td>13 months-24 months</td>
<td>10.25</td>
<td>2.06</td>
<td>0.293</td>
</tr>
<tr>
<td>25 months-36 months</td>
<td>11.08</td>
<td>0.69</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10.22</td>
<td>1.40</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: The table depicts the mean, standard deviation and p-value of the Anova test. A mean value of 9.94 +/- 0.93g/dL, 10.25 +/- 2.06 g/dL, 11.08 +/- 0.69 g/dL was obtained for cleft patients under the age of <12 months, 13-24 months, 25-36 months respectively. Anova test reported a p-value of 0.293 which was greater than 0.05 indicating that there was no statistically significant difference among the hemoglobin levels of cleft lip and palate patients of age <12 months, 13-24 months and 25-36 months.

Figure 1: The graph represents the mean of hemoglobin level for the three age groups i.e. <12 months, 13-24 months and 25-36 months. X-axis represents the age groups and Y-axis represents the hemoglobin level values ranging from 9.8 to 11.2 g/dL. Even though there is an increase in hemoglobin level with age, statistically insignificant difference was observed between the 3 age groups (Anova test; p value- 0.293)
Table 2: The table depicts the mean, standard deviation and p-value of the independent sample T test. A mean value of 10 +/- 1.61 g/dL and 10.42 +/- 1.18 g/dL was obtained for female and male cleft lip and palate patients respectively. Independent sample T test reported a p-value of 0.389 which was greater than 0.05 indicating that there was no statistically significant difference among the hemoglobin levels of cleft lip and palate patients of both the genders.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td>10.00</td>
<td>1.61</td>
<td>0.389</td>
</tr>
<tr>
<td>Males</td>
<td>10.42</td>
<td>1.18</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2: The bar graph depicts the difference in means between the gender of cleft lip and palate patients and their mean hemoglobin level with standard deviation. Age groups <12 months (blue color), 13-24 months (green colour) and 25-36 months (brown colour) respectively. X-axis represents the age groups and Y-axis represents the mean of hemoglobin level values. There is no statistically significant difference among the mean hemoglobin levels of cleft lip and palate patients of both the genders (Independent sample T test, p value- 0.389).

Previously our team had conducted clinical trials (Kamisetty et al., 2015; Krishnan, Pandian and Kumar S, 2015; Viswanath et al., 2015; Sivamurthy and Sundari, 2016; Felicita, 2017b; Samantha et al., 2017; Vikram et al., 2017), lab animal studies (Ramesh Kumar et al., 2011; Jain, Kumar and Manjula, 2014; Rubika, SumathiFelicita and Sivambiga, 2015; Felicita, 2017a; Pandian, Krishnan and Kumar, 2018) and in vitro studies (Felicita,
Out of the 33 subjects selected, 17 were male and 16 were female. All these patients underwent primary cleft lip and palate surgery. The hemoglobin levels were estimated and a mean value of 10+/- 1.61g/dL and 10.42 +/- 1.18 g/dL was obtained for female and male cleft lip and palate patients respectively. A mean value of 9.94+/- 0.93g/dL, 10.25 +/- 2.06 g/dL, 11.08 +/- 0.69 g/dL was obtained for cleft patients under the age of <12 months, 13 -24 months, 25-36 months respectively. The mean Hb levels in the normal and healthy infants was 11.75+/-1.09 g/100ml at 12 months of age and 11.96+/-1.16 g/100ml in children of 24 months of age(Burman, 1972). Our study results show that the mean hemoglobin level of cleft lip and palate children under the age of 24 months are less when compared with the non-cleft lip and palate children of the same age. This can indicate a possibility of prevalence of malnutrition and anemia amongst them.

An orofacial cleft contributes substantially to the long term development of the affected child as well as to emotional and financial stress for the affected family. Treatment of facial clefts is a long term process which should start soon after birth and may continue well into the end of the second decade of life with several surgical procedures and long term speech therapy and orthodontic treatment, oto-rhino, laryngological follow-up and medical as well as dental care. The department of orthodontics and the cleft-craniofacial center receives all the patients born and diagnosed as having a cleft lip and cleft palate or craniofacial anomaly in many hospitals as well as many older individuals with cleft lip and palate who could not afford the treatment. They learned about the department of orthodontics and dentofacial orthopedics and cleft lip and palate center through the media and activities made by the institution for raising awareness amongst the masses.

The blood loss associated with the cleft repair is small and the average preoperative hemoglobin above 10g/dl. It is not routine practice to obtain postoperative blood of patients and we are therefore unable to comment on the impact on hemoglobin level of cleft repairs. There is little evidence that mild anemia affects complications of anesthesia and surgery. Our study results show that the mean hemoglobin level for a male is 10.42+/-1.18 g/dl and female is 10+/- 1.61 g/dl and is in close agreement with the results of Karen et al study(Eley and Goodacre, 2010). Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc, Marimuthu and Devadoss, 2018; Ramesh et al., 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai et al., 2019; Sridharanet al., 2019; VijayashreePriyaharsini, 2019; Mathew et al., 2020).

IV. CONCLUSION

Within the limits of this, the hemoglobin level of children undergoing cleft repair surgery was determined. The results of this study will help in assessing the fitness of patients undergoing invasive primary cleft and palate correction procedures. It will also help develop a better postoperative management protocol. The limitation of the study was that it used only data from one center. Center-based studies have to be substituted in the absence of exact population studies. Being a cleft and craniofacial center, the center receives cases from almost all over Chennai. The potential for selection bias is one of the major limitations of studies like this. Other limitations are its small sample size and lack of representation of all demography and thereby cannot be generalized to a larger population. Further studies have to be done for a larger population and can serve in better diagnosis and treatment planning.

REFERENCES