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Incidence of Heart Diseases in Children with Cleft Lip and Cleft Palate

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Cleft lip and cleft palate are one of the most common craniofacial malformations that occur in children. Congenital heart diseases are more prevalent among children with cleft lip and cleft palate. Early intervention is necessary to improve the survival and for proper development of children.

Materials and Methods: A retrospective study is conducted at Paediatrics Department in Saveetha medical College for a period of one year. In the present study medical records of patients with cleft lip and palate are evaluated and analysed for the incidence of heart diseases.

Results: In the present study medical records of patients with cleft lip and palate are evaluated and analysed for the incidence of heart diseases. Out of 163 children with cleft lip and cleft palate, 56 children (71.42% male and 28.57% female) had cleft lip, 30 children (66.66% male and 33.33% female) had cleft palate, 77 children (66.23% male and 33.76% female) had both cleft lip and cleft palate.VSD is reported as the most common cardiac anomaly (42.86%) in children with cleft lip and cleft palate.

Conclusion: There is an increased incidence of congenital heart diseases in children with cleft lip and cleft palate. Echocardiography is an important investigation done for early identification and proper management.

Keywords: Cleft lip; cleft palate; congenital heart diseases; echocardiography.

1. INTRODUCTION

Orofacial clefts can be classified into cleft lip (CL), cleft palate (CP), and cleft lip and palate (CLP) anatomically irrespective of other classifications [1]. Both the heart and palate develop as part of the cardio craniofacial development module in gestational weeks 5 through 9, which depends mainly on complex signaling processes among interdependent embryonic tissues [2]. During embryogenesis anomalous development Of heart and cleft palate are dependent on genetic and environmental factors. However there is poor identification of molecular mechanisms behind cleft lip and cleft palate [3]. In a study done by Shafi T and Atiq M in cleft lip and palate cases in Pakistan, 29% of the patients had various congenital malformations and 51% of them were found to be linked with cardiac anomalies [4]. In a retrospective study done in cleft patients, Liang reported prevalence of 5.4% of the patients with CHD in China [5]. This study is done to assess the incidence of congenital heart diseases in children with cleft lip and cleft palate so that with early identification and proper management the survival of such children with cleft lip and cleft palate can be improved.

2. MATERIALS AND METHODS

A retrospective study is conducted at paediatrics department in Saveetha medical college for a period of 1 year. In the present study, medical records of children with cleft lip and palate are evaluated and analysed to find the incidence of heart diseases. Patients showing features of congenital cardiac diseases were included in the study. The data of the discharged patients including clinical signs and symptoms like difficulty in breathing, palpitations, growth retardation, cyanosis, clubbing, heart murmurs, history of recurrent infections, investigations including abnormal chest X-Ray, ECG & echocardiography were selected for the study.

3. RESULTS

In the present study medical records of patients with cleft lip and palate are evaluated and analysed for the incidence of heart diseases. Out of 163 children with cleft lip and cleft palate,111 were male and 52 were female , 56 children(71.42%male and 28.57%female)had cleft lip,30 children(66.66%male and 33.33% female)had cleft palate,77 children(66.23%male and 33.76%female) had both cleft lip and cleft palate.

Types of congenital heart diseases reported include VSD (42.86%), PDA(14.29%), TOF(10.71%), MVP(10.71%), ASD+VSD 7.14%), ASD(3.57%), Others(10.71%). VSD is reported as the most common cardiac anomaly (42.86%) in children with cleft lip and cleft palate.

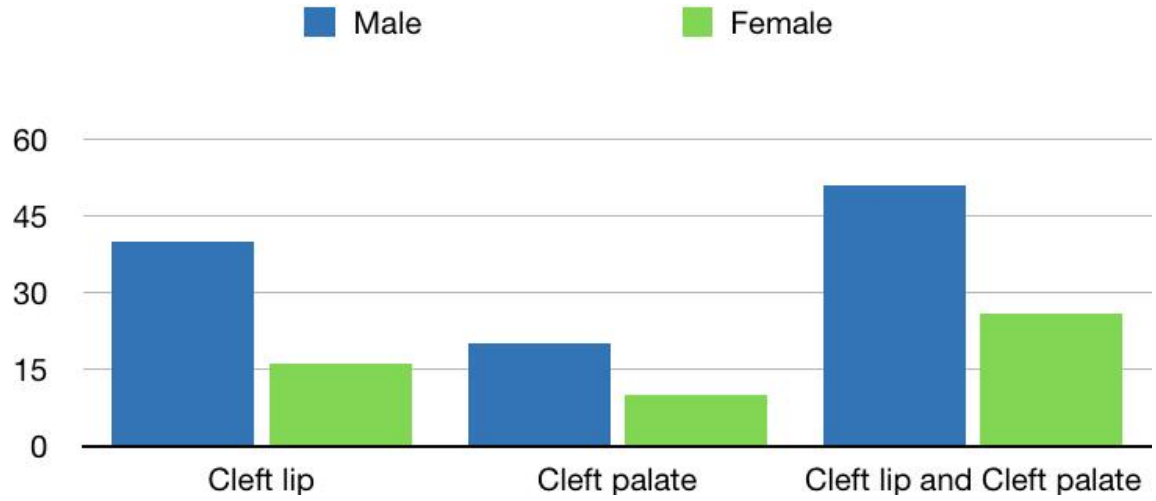

Fig. 1. Male and female ratio for cleft lip and cleft palate
Y Axis: Number of students
X Axis: Type of defects

Table 1. Congenital heart disease cases

Types of cleft	Number of patients	Cases of congenital heart diseases	%
Cleft lip	56	4	7.14
Cleft palate	30	4	13.33
Cleft lip and Cleft palate	77	20	25.97
Total	163	28	17.17

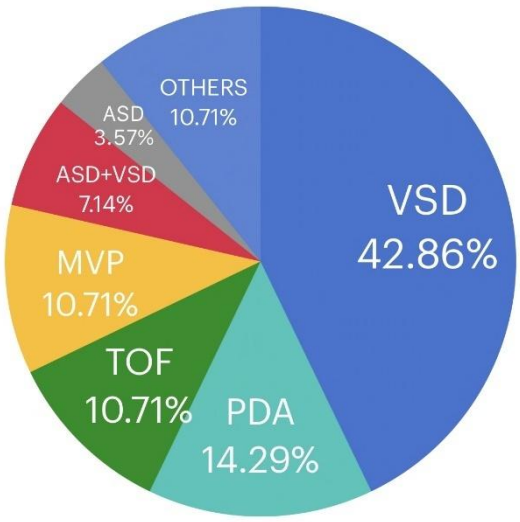

Fig. 2. Pie chart showing case ratio

4. DISCUSSION

The development of both cardiac tissues and craniofacial tissues is influenced by neural crest cells. They contribute to the separation of outflow tract of the heart into pulmonary and aortic channels through conotruncal endocardium cushions. This could be the reason for the coexisting cardiac anomalies along with craniofacial anomalies in many infants [6].

In a study reported by Aqrabawi, the most common associated anomaly (47%) in patients with orofacial cleft was CHD [7]. Also, Two studies from the southern part of Nigeria have shown that CHD had prevalence in the range of 9.5 per cent to 15 per cent [8]. Alcohol consumption, active as well as passive smoking during pregnancy, ,folatedeficiency, gestational diabetes mellitus are the non genetic causative factors contributing to cardiac anomalies [9]. In this study, out of 163 children with cleft lip and cleft palate,17.17 % were reported to have congenital heart disease. Incidence of heart diseases was higher among children with cleft lip and cleft palate (25.97%) when compared to children who had only cleft lip(7.14%) and children with only cleft palate(13.33%).This is contrast to a study reported by Ting Sun et al. In which an incidence of congenital heart disease in cleft palate(20%) was higher than that in Cleft lip (3.1%) and cleft lip and palate. (16.3%) [10]. However in a study conducted by Barbara E Otaigbe et al the number of heart disease patients were distributed equally in all the types of cleft patients [11].

The prevalence in our study is much lower as compared to study conducted by Sun et al from Eastern China and Rawashd eh from Jordan in which prevalence was 45.1% and 45.5%respectively [10]. However ,the prevalence in our study is much higher than the study reported by Geiset al from England and Barbosa et al from Brazil which was 6.7% and 9.5% respectively [12]. In a study with sample size almost higher than our study which was conducted in north western geopolitical zone reported a prevalence of 20% of congenital heart disease in children with orofacial cleft [13].

Ventricular septal defect(42.86%) is the most common cardiac anomaly reported in our study followed by Patent ductus arteriosus (14.29%). This is in contrast with a study in which ASD was seen as the the most common congenital heart defect in patients with orofacial cleft [14]. Congenital heart diseases accounts for

significant infant mortality in India [15]. The impact of cardiac anomalies on morbidity and medical care cost in children and adults is significant. Thus, its prevalence in cleft lip and cleft palate children is of great concern [16]. Children with cleft lip and cleft palate are commonly found to have poor physical and mental growth. Proper preoperative evaluation by multidisciplinary team including paediatricians, cardiologists, maxilla facial surgeons and anesthetists is necessary before any surgical intervention to prevent postoperative complications such as Pulmonary hypertension, arrhythmias, stroke due to blood clots and congestive cardiac Failure [17]. Careful medical history, clinical examination, diagnostic evaluation, Investigations including complete blood count, WBC count, C-reactive protein, coagulation profile such as prothrombin time, Activated partial thromboplastin time, International Normalised Ratio(INR) are necessary.

Continuous ECG monitoring, pulse oximetry is necessary before conduction of anaesthesia. Echocardiography is the most preferred investigation for assessment of children with cleft lip and cleft palate [18]. Small forms of VSDs can be managed conservatively however large cardiac anomalies require surgical management. Congenital cardiac disease istreated first followed by cleft lip and cleft palate surgeries in high risk group especially if cardiac anomaly is of greater concern. This would reduce the medical and surgical complications. Early diagnosis and timely management will also influence the proper development of the child [19].

5. CONCLUSION

Identification of associated cardiac anomaly in children with cleft lip and cleft palate at an earliest age is necessary. This has become possible by Echocardiography which has increased diagnostic rate and also serves as an important imaging tool to improve the outcome of patients by early identification and intervention.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

CONSENT

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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