Profile of Congenital Heart Disease in the Paediatric Population attending Outpatient Clinic of a Government Medical College in the State of Goa

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ABSTRACT

Introduction: Congenital Heart Diseases are becoming fairly common. However, the exact estimate and its characterisation is not frequently done. Study objectives were to identify the pattern of various congenital heart diseases and the age-gender distribution of various congenital cardiac diseases in our Hospital.

Material and Methods: A Retrolective analysis of records of 412 children less than 18 years of age reporting to the Deparetment of Cardiology, Goa Medical College- Bambolim for Echocardiography from January to December 2019 was done. Results are expressed as percentages.

Results: Of the 412 children 55.9% were males and 44.1% were females. Almost 3/4th of the children had an acyanotic heart disease (75.24%). Most common acyanotic heart disease was Atrial Septal Defect followed by Ventricular Septal Defect, while the most common cyanotic disease was Tetralogy of Fallot. Kawasaki's Disease was seen in 2.4% of the children.

Conclusion: Accurate diagnosis and treatment advised at right time will no doubt go a long way in changing the natural history of these diseases and will have significant and positive impact on the future of these children as well as their families.

Keywords: Congenital Heart Disease; Echocardiography; Cyanotic Heart Disease; Acyanotic Heart Disease

INTRODUCTION

Cardiac defects that exist right from birth are congenital heart defects (CHD). These structural abnormalities develop during the intra uterine life. Before the introduction of high quality foetal echocardiography, echocardiography examination of the newborn, infant or growing child was the only way to make definitive diagnosis. There are studies from the West which have described the incidence of heart disease in children and prevalence of various types of defects.[1] A large registry that reviews all the births in Europe, found that amongst the various congenital anomalies CHD is the commonest.[2]

Cardiac defects are grossly divided into acyanotic and cyanotic heart diseases, former being more common.[3] Acyanotic congenital heart diseases are either shunt diseases like Atrial Septal Defect (ASD), Ventricular Septal Defect (VSD), Patent Ductus Arteriosus (PDA) or structural valvular lesions. Cyanotic heart diseases are further classified as those with increased pulmonary blood flow- Transposition of Great Arteries (TGA) type or reduced pulmonary blood flow- Tetralogy of Fallot (TOF type). Among acyanotic heart disease, VSD is the most common and in cyanotic the occurrence of TOF is more common than others.[3]

Though there is no universal data that one can refer to in India, various researchers have published their experiences. A hospital based study published by Khalil A. et al showed that the incidence of congenital heart disease was 3.9/1000 live births.[4]

Community based studies from India are few. A study by Naik S et al from Kashmir showed the prevalence of CHDs to be 5.3/1000 in the population. VSD, ASD, PDA and TOF, in this order were the common occurrence of the CHDs in this area.[5] Some researchers have also published data pertaining to prevalence of heart diseases in school children.[6,7]

Symptoms related to congenital heart disease depend on the nature and the severity of the defect. Some infants remain asymptomatic and continue to grow well despite their defects. However, a proportion of these infants may develop symptoms in the first year of life. If untreated, this could be a leading cause of mortality during early childhood. The outcome of congenital heart disease depends on various factors like weight of the infants and presence of other anomalies.[8] The prevalence described depends on the nature of the study. The hospital based study give higher prevalence compared to community based study.[9]

Within India various researchers have published their data. A study from Sopore, Kashmir, was based on the screening of the children between 0 months to 18 years and this

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How to cite this article: Borker S, Mutyala SCVS, Desai M, Prabhu S, Kamat US, Anto CBPProfile of congenital heart disease in the paediatric population attending outpatient clinic of a government medical college in the state of Goa. International Journal of Contemporary Medical Research 2021;8(1):A1-A4.

DOI: http://dx.doi.org/10.21276/ijcmr.2021.8.1.11

study was carried out under RBSK programme.[5] Another Hospital based study by Jadhav et al was based on clinical examination and echocardiography performed on children referred to medicine department.[10] A study from central India was based on evaluation of patients from 1 to 12 years of age attending OPD and IPD of paediatric department and these children were evaluated using ECG, Chest Xray and echocardiography.[11] Another similar study, published by Amber B Mir et al from a hospital in northern India concluded that burden of heart diseases is probably underestimated.[12]

India is a diverse and heterogenous country. There are few large studies in India that address the pattern of Congenital Heart Diseases and there are none from the state of Goa. This study was undertaken to identify the pattern of various congenital heart diseases and the age- gender distribution of various congenital cardiac diseases in our Hospital.

MATERIAL AND METHODS

Goa Medical College is the only medical college in the state of Goa and it is the only tertiary centre in Goa. Department of cardiology was established in 2013. The Department of Cardiology in association with the Department of Paediatrics together conducts weekly Paediatric cardiology clinic. This clinic is conducted by a cardiologist trained in paediatric echocardiography and a register of patients attending this clinic is maintained. Each child attending this clinic has an echocardiographic examination done during the first visit and subsequent visit ECHOs re performed only if necessary. Other relevant test like Chest Xray and ECG are performed depending on clinical indication.

Register contains the following patient details- name, age, gender, diagnosis and advice. This is a retrolective study based on our register. The study was conducted from January 2019 to December 2019. The cases included all the children that attended the Paediatric Cardiology Clinic during this time period. Approval was taken from the Institutional Ethics Committee.

The patients were classified into different Congenital Heart Diseases based on their Echocardiographic Diagnosis. The age and sex specific frequency of all kinds of CHDs we observed, were computed. This data was used to determine the common and rare CHDs presenting in our Hospital. Patients with complex congenital cardiac anomalies and the commonest pattern of presentation were also identified.

RESULTS

A total of 412 patients (aged 0-18 years) attended the Paediatric Cardiology Clinic in our hospital during the months January 2019 to December 2019. Out of these were 229(55.59%)males and 183(44.41%) were females. Table 1 presents the age sex distribution of the study population.

A total of 21 types of isolated Congenital cardiac anomalies and 33 types of more than 1 anomaly were detected in our study population. Children with acyanotic heart disease (75.24%) were found to be more than the children with cyanotic heart disease(24.76%). The most common lesion among the cyanotic heart diseases was TOF(34.31%) while the most common lesion among the acyanotic heart diseases was ASD(35.48%), followed by VSD(18.71%). Table 2 shows the various types of congenital heart diseases, their gender distribution and proportion of each type of defect. Within ASD, Ostium Secundum ASD was the only subtype to be seen in this study population. Perimembranous VSD was the most common presentation of VSD (93.8%).

Ninety seven (23.54%) patients had combination of multiple congenital cardiac anomalies, out of which 32(32.9%) patients had ASD + VSD, which was the commonest

Age Group	Male	Female	Total (%)
Neonate	20	22	42(10.2%)
1 to 6 months	45	38	83(20.14%)
6months- 1 year	38	26	64(15.5%)
1 to 3 years	51	53	104(24.5%)
3 to 6 years	40	26	66(16%)
6 to 9 years	21	7	28(6.8%)
>9 years	14	11	25(6.1%)
Total	229(55.59%)	183(44.41%)	412

Table-1: Age sex distribution of the study population

Common Congenital anomalies		Male	Female	Total
Ventricular septal Defect	Peri membranous	36	16	58(16.7%)
	Muscular	2	1	
	Swiss cheese	2	1	
Atrial septal defect	Ostium Secundum	47	63	110(31.6%)
Patent Ductus Arteriosus		10	11	21(6%)
Coarctation of aorta		3	0	3(0.9%)
Atrio-Ventricular canal defect		1	4	5(1.5%)
Tetralogy Of Fallot		22	13	35(10.1%)
Double Outlet Right Ventricle		3	3	6(1.7%)
Patent Foramen Ovale		8	5	13(3.7%)
Kawasaki's Disease		6	5	11(3.2%)
Valvular defects		20	7	27(7.8%)
Hypertrophic Obstructive Cardiomyopathy		1	0	1(0.3%)
Others		34	24	58(16.7%)
Total		195	153	348

Table-2: Congenital Heart Defects in the Study Population

Multiple CHD	Male	Female	Total
VSD with ASD	15	17	32(58.2%)
VSD with ASD with PDA	3	2	5(9.1%)
VSD with DCRV	2	1	3(5.5%)
ASD with PS	2	3	5(9.1%)
ASD with PDA	4	1	5(9.1%)
VSD with PDA	2	1	3(5.6%)
ASD with MR	1	1	2(3.6%)
	29	26	55(13.3%)

*VSD-Ventricular Septal Defect, ASD-Atrial Septal Defect, PDA-Patent Ductus Arteriosus, DCRV-Double Chambered Right Ventricle, PS-Pulmonary Stenosis, MR-Mitral Regurgitation

Table-3: Distribution of Multiple Congenital Cardiac Anomalies*

Complex cyanotic Heart Diseases	Male	Female
HLHS	0	1
TOF with pulmonary atresia with Glenn Shunt	1	0
HRHS	1	0
Tricuspid Atresia	1	0
TGA	1	1
TAPVR	1	2
Total	5	4

*HLHS-hypoplastic left heart syndrome,TOF-tetralogy of fallot, HRHS-hypoplastic right heart syndrome, TGA-transposition of great arteries, TAPVR-total anomalous pulmonary venous return

Table-4: Distribution of Complex Congenital Heart Diseases*

presentation. 10 (2.42%) of the study population had Kawasaki's disease. Twelve (2.91%) of the study population had a Patent Foramen Ovale (PFO). Table 3 presents the distribution of multiple congenital cardiac anomalies, and Table 4 the complex heart diseases.

Out of the children that attended the Paediatric Cardiology Clinic, 78(18.93%) were advised Surgical Intervention or catheterisation based intervention, 25(6.07%) were Advised Medical management (drug treatment), and the rest 309(75%) were advised only Follow Up.

DISCUSSION

Goa is a small and unique state on the western coast of Indian union. It is unique because it has a resident population of 16 lakhs, but a significant migrant and floating population of visitors and individuals working in tourist industry, construction industry and those performing unskilled jobs across the state. Goa medical college is one of the oldest medical colleges of Asia. It is the only tertiary care institution in the public sector providing cardiology services and paediatric and cardiac interventional and surgical services in the state of Goa. This study was a hospital based retrolective study based on the OPD register of the paediatric cardiology clinic. This study is thus not community based study, and cannot give the exact prevalence. However, it is a reflection of prevalence as well as variety and indirect epidemiology of CHD in the state of Goa, as there is no other institution where children with heart defects within Goa undergo diagnostic or therapeutic workup, management and planning. Among various defects seen in live births, CHD, is consistently found to be the commonest defect seen in various populations and countries across the globe.[13] Studies in the literature have thrown light on the congenital heart defect scenario of India, and estimate the prevalence of CHD to be high.[14]

A wide variety of CHDs exist in the state of Goa. Majority of the subtypes described in the literature, except for rare conditions like anomalous left coronary artery from the pulmonary artery (ALCAPA) have been seen in the state of Goa. Community based studies in India have observed VSD to be relatively a common defect. Other defects like PDA, ASD and TOF are also common in the Indian community.[5] Other hospital based studies within India have also found VSDs to be the commonest heart defect within the subset of acyanotic CHDs and TOF within the subset of cyanotic CHDs. Our study found that ASD(26.70%) was the commonest followed by VSD(14.08%), valvular lesions(6.55%), TOF(8.49%) in that order. The difference from other studies could be related to the fact that our study was hospital based and limited to the children visiting the outpatient clinic. The very sick children from the NICU thus got excluded from this study. The total number of children with ASD was 110 and was more common in females (58%). A study from Vietnam(15) showed similar gender difference in patients detected with ASDs.

VSD is a fairly common CHD. 58 out of 412 patients had VSD, most of which were perimembranous. 2 of the patients with VSD referred to the clinic had undergone spontaneous closure. Advances in Echocardiography has enabled us to not just make a diagnosis of VSD but also to provide anatomical and physiological aspects.[16] Many children get diagnosed with VSD because of a murmur and get referred to Paediatric Cardiology Clinic.

Almost one-fourth of all patients had Cyanotic Congenital Heart Disease, TOF was the commonest within Cyanotic cohort. Most of the studies done in India and elsewhere show similar trends.[9,11,12] With Goa Medical College being a public institution and diagnostic services being provided free to children, the access to healthcare has improved. Echocardiographic diagnosis of CHDs has become efficient and even tiny left to right shunts get detected and documented. As a result, many lesions which may not have any implications for children, also become part of their diagnosis. We thus found 97 children with more than one shunt lesion. The commonest combination was ASD + VSD. For simplicity in our study we made a category of complex cyanotic congenital heart diseases. This is not an established category however was made based on various factors like severe clinical implications for the children, difficulties involved in diagnosis, making treatment decisions and guarded prognosis with or without treatment. This category included HLHS, TOF with Pulmonry atresia with Glenn shunt, TGA, TAPVR, Tricuspid atresia. It is possible that many children with such conditions could die immediately at, or after birth, or could remain in intensive care for a long time and may not find their way to the out patient clinic, and therefore there could be an underestimation of this

population. Some studies consider all cyanotic heart disease to be severe including TOF.[17]

CONCLUSION

Although this is a hospital based study and has relied entirely upon the OPD register, it is reflection of the variety and magnitude of CHD in the state of Goa. The wide spectrum of heart defects seen in this register indicates that the prevalence of CHD in Goa is significant. Accurate diagnosis and treatment advised at right time will no doubt go a long way in changing the natural history of these diseases and will have significant and positive impact on the future of these children as well as their families. A community based, wider, and more conclusive study should however be performed in the state of Goa as well as nationally. A database should be maintained. The database should not just include the treatment advised, but also have a mechanism of tracking the progress made by these children and make necessary recommendations to the Government and other agencies that could help implement treatment programs especially for lower socioeconomic groups.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 15-11-2020; **Accepted:** 25-12-2020; **Published:** 30-01-2021