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Original Research Article

Frequency and pattern of congenital heart defects among admitted patient in a tertiary care hospital in Bangladesh

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ABSTRACT

Background: Congenital heart disease (CHD) is the commonest of all congenital lesions accounting for nearly 28% of all congenital malformations that have significant impact on morbidity, mortality and heath care cost in children. The aim of study was to determine the pattern of distribution of CHD and the age at which initial diagnosis of CHD was made among children admitted under paediatric cardiology department, Bangladesh Shishu hospital and institute.
Methods: This is a descriptive and prospective hospital-based study conducted in the pediatric cardiology department, Bangladesh Shishu hospital and institute. This study included all the patients admitted during January-June 2022 in pediatric cardiology department having confirmed diagnosis of CHD on basis of echocardiographic report. The collected data was entered and analyzed by using statistical package for social sciences v 24.0.
Results: Out of 337 patient, 175 patient were male (51.9%) and 162 female (48.1%) with male female ratio of 1.08:1. Total 219 cases (64.9%) were acyanotic CHD and 118 (35.1%) were cyanotic congenital heart lesions. In acyanotic CHD ventricular septal defects (VSDs) constitute 38.8% followed by AV canal defect 6.7%, patent ductus arteriosus (PDA) 3.6%. In cyanotic CHD tetralogy of Fallot (TOF) was the commonest lesion accounted for 28 (8.3%) followed by d-transposition of great arteries 16 (4.7%), pulmonary atresia 15 (4.5%), total anomalous pulmonary venous circulation TAPVC 11 (3.3%), tricuspid atresia 9 (2.7%) and DORV, VSD, PS 10 (2.9%). The commonest combination was VSD with ASD in 15 cases (4.5%). Most of the patient was diagnosed in 1st year of age 280 (83.1%)
Conclusions: CHD are very common in our setup and early detection of CHD is increasing. Overall burden of CHD is also increasing therefore a proper population-based study on a large scale is needed to estimate the prevalence accurately.

Keywords: CHD, VSDs, TOF, Cyanotic heart defect, Dextrocardia

INTRODUCTION

Congenital heart defect is defined as structural malformation of heart or great vessels that is present by birth. It includes the defects in the interior walls of the heart, septation of the chambers and their sequence, the valves inside the heart and/or the arteries and veins. There are different types of CHD which can be broadly classified as acyanotic CHD and cyanotic CHD. It is the most common single group of congenital abnormalities accounting for about 28% of the total and has high mortality rate during infancy, depending on the type and severity of lesion.[1-3] CHD can be found as either an isolated lesion or in combination with other heart defects. These are also found as a part of/in association with certain syndromes.[3]

The incidence of CHD is approximately 8 per 1000 live birth and this incidence has remained constant worldwide.[4] The proportion of this disease prevalence is the same as incidence across the globe.[5] A recent systemic review reported that the highest prevalence

9.3/1000 live births in Asia due to high birth rate and consanguineous marriages and the lowest prevalence 8.2/1000 live births in Africa.[6] ln Bangladesh, a birth prevalence of CHD is 8.3 per 1000 live recently.[7] Now with modern cardiac surgery more than 85% of the estimated 25,000 infant born annually with CHD are likely to reach adulthood.[8] If the problems are recognized at earlier age by screening apparently healthy children for CHD, the chance of long term complications are less and the outcome is better. As a result of improved medical and surgical management, more children with CHD are surviving into adolescence and adulthood.[9] According to recent update report of the American heart association, ASD, VSD, TOF, PDA, pulmonary stenosis, aortic stenosis, coarctation of aorta, and atrio VSD accounts for 85% of all CHDs.[10] Thus this study was conducted in a paediatric cardiology department of Bangladesh Shishu hospital and Institute which is a tertiary care hospital in Bangladesh with the aim to determine the current pattern of distribution of CHD in the population and the age at which initial diagnosis of CHD was made.

METHODS

This is a descriptive and prospective hospital-based study was conducted at the paediatric cardiology department of Bangladesh Shishu hospital and institute (BSH and I) from January 2022 to June 2022. Patient can be of any age and must be a diagnosed case of congenital heart defect on the basis of ECHO done in (BSH and I) were enrolled in this study. Patient having unconfirmed diagnosis of CHD or diagnosed case of acquired heart disease were excluded from the study. The required information was entered in the sheet by interviewing the study participants and from their hospital record. Duplication of the data was avoided by entering the hospital registration number. Total 337 subjects were enrolled and data sheets were filled. Collected data was entered and analyzed by using statistical package for social sciences v 24.0 (SPSS, Inc., Chicago, IL, USA). Descriptive statistics including frequencies, mean and percentages are calculated.

RESULTS

Out of 337 cases of CHD. There were 175 males (51.9%) and 162 females (43.6%) with male female ratio of 1.08:1 (Table 1).

Table 1: Sex distribution of patients with CHD, (n=337).

Sex	N (%)
Male	175 (51.9)
Female	162 (48.1)

All the cases were divided into different age groups to identify the age group at which initial diagnosis of CHD. Out of 337 cases of CHD, in majority of cases, 280 (83.1%) were diagnosed in 1st year of life, 29 (8.6%) cases were diagnosed in 1-3 years of age. Only 3 (0.9%) cases were diagnosed after 9 years of age (Table 2).

Table 2: Age at the time of initial diagnosis of CHD, (n=337).

Age group (In years)	N (%)
0-1	280 (83.1)
>1-3	29 (8.6)
>3-6	18 (5.3)
>6-9	7 (2.1)
>9-18	3 (0.9)

Among 337 cases of CHD, 219 cases (64.9%) acyanotic CHD and 118 (35.1%) were cyanotic CHD (Table 3).

Table 3: Types of CHD, (n=337).

Types of CHD	N (%)
Acyanotic CHD	219 (64.9)
Cyanotic CHD	118 (35.1)

Out of 219 cases of acyanotic congenital heart defect, VSD was 131 (38.8%) followed by AV canal defect 23 (6.7%), PDA 12 (3.6%), ASD 3 (0.9%). Among obstructive lesion Pulmonary stenosis was 0.9% followed by Aortic stenosis 0.6% and Coarctation of aorta 0.9%. In 33 (9.8%) cases of combination of VSD, ASD, PDA, PS were encountered and commonest combination was ASD with VSD in 15 cases followed by VSD with PDA in the 8 cases and VSD with ASD with PDA in the 7 cases (Table 4).

Table 4: Pattern of acyanotic CHD.

Types of defects	N	Acyanotic CHD (%)	All CHD (%)
VSD	131	59.7	38.8
AV canal defect	23	10.4	6.7
PDA	12	5.5	3.6
ASD	3	1.4	0.9
Aorto-pulmonary window	2	1	0.6
Pulmonary stenosis	3	1.4	0.9
Aortic stenosis (AS)	2	1	0.6
Congenital mitral regurgitation (MR)	2	1	0.6
Coarctation of aorta	3	1.4	0.9
ALCAPA	3	1.4	0.9
Cor-triatriatum	2	1	0.6
Combination of VSD+ASD	15	6.7	4.5
Combination of VSD+PDA	8	3.5	2.3
Combination of VSD+ASD+PDA	7	3.2	2.1
Combination of ASD+PS	3	1.4	0.9
Total	219	100	64.9

Out of 118 cases of cyanotic congenital heart defect TOF was most common 28 (8.3%) followed by d-Transposition of great arteries 16 (4.7%), pulmonary atresia 15 (4.5%), TAPVC 11 (3.3%), Tricuspid atresia 9 (2.7%) and DORV, VSD, PS 10 (2.9%) (Table 5).

Table 5: Pattern of cyanotic CHD.

Types of defects	N	Cyanotic CHD (%)	All CHD (%)
TOF	28	23.8	8.3
D-transposition of great arteries	16	13.6	4.7
Pulmonary atresia	15	12.7	4.5
TAPVC	11	9.3	3.3
Tricuspid atresia	9	7.6	2.7
DORV+VSD+PS	10	8.5	2.9
Ebstein anomaly	5	4.3	1.5
DILV	5	4.2	1.5
Dextrocardia, Single ventricle	4	3.4	1.2
Truncus arteriosus	4	3.4	1.2
TOF with absent pulmonary valve	4	3.4	1.2
C-TGA	3	2.5	0.9
Hypoplastic left heart syndrome (HLHS)	2	1.7	0.6
Tet canal	2	1.7	0.6
Total	118	100	35.1

DISCUSSION

CHD was the most common congenital defect and had relatively higher mortality rate than other birth defects during first year of life. The incidence, prevalence and pattern of distribution of CHD types vary from region to region.[11,12] In western industrial countries the incidence of CHD vary from 3-12/1000 live births.[13] The meta-analysis report, which analyzed 114 studies from all over the world, showed that the highest birth prevalence of CHD 9.3/1000 live births is in Asia.[6] WHO reports the incidence of CHD in Bangladesh is 6%, 15% in India, 6% in Burma and 10% in Sri-lanka.[14] The studies from India report birth prevalence ranging from 3.9/1000 to 26.4/1000 live births.[15,16] However the birth prevalence of 8-10/1000 live births is generally accepted worldwide and it is believed that it remained constant.[17,18] This study was a hospital based study which included only cases of CHD which were admitted in paediatric cardiology department of Bangladesh Shishu hospital and institute so it was not possible to find the prevalence or incidence. It shows the pattern of disease and frequency of defects. Among 337 cases of CHD, 64.9% were acyanotic CHD and 35.1% were cyanotic CHD. Hussain et al found similar result.[19]

The commonest type of acyanotic CHD found in this study was VSD 38.8% followed by AV canal defect 6.7%, PDA 3.6% and ASD and the most common cyanotic defect was TOF 8.3% followed by d-transposition of great arteries 4.7%, pulmonary atresia 4.5%, TAPVC 3.3%, Tricuspid atresia 2.7% and DORV, VSD, PS 2.9%. Burki at el showed that out of 144 cases of CHD, 61.4% had VSD and relative frequency of TOF, ASD and PDA was 8.77%.[20] The retrospective study conducted at Peshawar reported that out of 3072 cases of CHD 40.6% had VSD.[21] In comparison with other countries of Asia, the same variation is encountered. The research from our neighboring country India reported that the most common lesion is VSD. In one study 21.3% cases of VSD were followed by ASD 18.9%, PDA 14.6% and TOF 4.6%.[16] In another study 33% cases of VSD were recorded followed by ASD 19%, and TOF 16%.[15] A study from Hajdu-Bihar reported a different pattern, the most frequent defect was ASD secundum followed by VSD and PDA.[22]

In this study, the diagnosis in 83.1% of cases was made under one year of age, 8.6% cases were diagnosed in 1 to 3 years of age. Only 3 (0.9%) cases were diagnosed after 9 years of age. Mollah et al found that most often children are presented by 1 years of age.[10] Hussain et al. found 44.99% CHD were diagnosed during neonatal period.[19] The diagnosis in 75.43% of cases was made under one year of age, in the research conducted in Hazara.[20] In Indian studies diagnosis was made in between zero and three years of age in 82.9% cases in one study and in other 58% cases were diagnosed in age group 0-5 years.[15,16]

Moreover, in this study significant number of cases, 9.8% of combination of simple defects are recorded, among these the commonest combination is VSD with ASD 4.5% followed by VSD with the PDA 2.3%. Such variation in frequencies of defects and the age of diagnosis, among this study and the other studies may be because this study is conducted among admitted children in a tertiary care hospital that is Bangladesh Shishu hospital and institute that receive referrals from all over the country.

CONCLUSION

CHD are very common in our setup and early detection rate of CHD is increasing as the general doctors and pediatrician referred the patient to cardiologist when they suspect the CHD or find murmur. Complex CHD increasing day by day most probably due to doing screening colour Doppler echo in early age of the child. This is a single center study but proper population-based study on a large scale is needed to estimate the prevalence accurately.

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