Original Article

Clinical Profile and Outcome of Children with Congenital Heart Disease in First Year of Life

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Abstract

Diagnosis of congenital heart disease (CHD) which is a structural abnormality of the heart or intra thoracic great vessels in the earliest possible time is very important. Identifying the various modes of presentation, early referral and appropriate intervention can save lives and reduce risk of complications. The objectives of this study were to determine the clinical profile, complication and immediate outcome of children with congenital heart disease in first year of life. This cross-sectional observational study was conducted from October 2011 to March 2012 among 50 children from zero to one year of age who was diagnosed as CHD by echocardiography admitted in Department of Paediatrics of Shaheed Suhrawardy Medical College, Dhaka and Department of Paediatric Cardiology of National Institute of Cardiovascular Diseases, Dhaka, Bangladesh. Among 50 infants acyanotic CHD was detected in 70% and cyanotic in 30% infants. Major structural defects were venticular septal defect 34%, patent ductus arteriosus 30%, tetralogy of fallot's 14%, transposition of great arteries 12%, atrial septal defect 6%. Presenting features were cough 82%, dyspnea 80%, poor weight gain 70%, feeding difficulty 68% and fever 58%. Frequently observed complications were failure to thrive, pulmonary hypertension and heart failure. Among the outcome of CHD 8% cases closed spontaneously, case fatality rate was 8% and the rest were advised accordingly for surgery, intervention and medical management among which 14% had device closure within the study period. High index of suspicion, early diagnosis, close monitoring and timely intervention can reduce complication of CHD.

Keywords: *Acyanotic, CHD, cyanotic, echocardiography.*

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INTRODUCTION

Congenital heart disease (CHD) is a gross structural abnormality of the heart or intra thoracic great vessels that is actually or potentially of functional significance.[1] The incidence of CHD is 8-10/1000 live births in different parts of the world.[2] Nearly one third to half of these CHD are critical requiring intervention in the first year of life.[3] CHD is one of the most common types of anomaly that is responsible for significant morbidity and mortality in children.[1] Presence of congenital heart disease is suspected on the basis of following findings; a) presence of cardiac murmur, b) presence of cyanosis or feeding difficulty, c) cyanosis associated with feeding difficulty, d) features of congestive heart failure or failure to thrive.[1] Early recognition of CHD is important because clinical presentation and deterioration may be sudden and some treatable defects may even cause death before diagnosis.[4, 5]

CHD is divided into acyanotic and cyanotic, but there are several conditions like tetralogy of Fallot, Ebstein's anomaly, Eisenmenger Syndrome which may start as acyanotic and become cyanotic with time.[6]

Clinical profile of congenital heart disease varies according to type and severity of the defect. In neonate, the presenting features of CHD are cyanosis (with or without respiratory distress), heart failure (with or without cyanosis) an abnormal clinical sign detected on routine

examination (e.g. absent femoral pulse or a heart murmur).[7] In infancy and childhood the usual presenting features are cyanosis, digital clubbing, murmur, syncope, squatting, heart failure, arrhythmia, failure to thrive.[8] CHD is responsible for more deaths in the first year of life than any other birth defects. Some CHD heal over time, others will require treatment.[9] In some cases early diagnosis can avoid irreversible pulmonary vascular disease.[5] With currently available treatment modalities over 75% of infants born with critical CHD can survive beyond the first year of life and many can lead near normal lives thereafter. Majority of the children born in developing countries and afflicted with CHD do not get the necessary care, leading to high mortality and morbidity.[10]

Diagnosis of CHD at the earliest possible time is very important because early referral and appropriate intervention can save lives and reduce complications.

The objectives of the study was to determine the clinical profile, complications and immediate outcome of children with congenital heart disease in their first year of life who were admitted at hospital during the study period.

MATERIALS AND METHOD

This cross-sectional observational study was carried out from October 2011 to March 2012 in the Department of Paediatrics of Shaheed Suhrawardy Medical College (ShSMC), Dhaka, Bangladesh. The study enrolled 50 children of day zero to one year of age admitted in the Department of Paediatrics of ShSMC and the Department of Paediatric Cardiology of National Institute of Cardiovascular Diseases (NICVD), Sher-E-Bangla Nagar, Dhaka.

The inclusion criterion was CHD among admitted children from day zero to 1 year of age diagnosed by echocardiography and clinical evaluation.

Fifty infants with congenital heart disease were purposively selected for the study following inclusion exclusion criteria. After enrolment detailed history, presenting clinical features, age at first diagnosis, complication and immediate outcome of the cases were recorded to evaluate their clinical presentation. All the relevant data related were noted in a preformed datasheet by pre-tested semi structured questionnaire. Data were analyzed using Microsoft excel program and were presented as tables and figures.

RESULTS

Table I Shows this study was done over 50 children of CHD. Among them 62% cases were diagnosed within 6 months of age and 38% cases were between 7 to 12 months. Male patients were predominant (54%) and male female ratio was 1.17:1.

Table I: Distribution of CHD cases by age and sex (n=50).

Age group	Male n(%)	Female n(%)	Total n(%)
0-6 months	16 (51.6%)	15 (48.4%)	31 (62.00%)
7-12 months	11 (57.9%)	8 (42.1%)	19 (38.00%)
Total	27 (54%)	23 (46%)	50 (100%)

Table II Shows among 50 cases 35 (70%) were acyanotic heart lesions and 15 (30%) were cyanotic heart lesions. Among all structural defects VSD was predominant and present in 17 (34%), PDA in 15 (30%) cases, TOF in 7 (14%) and TGA in 6 (12%) cases.

Table II Distribution of cases by structural defects of CHD (n=50).

Structural Defect	Number (%)
Acyanotic	35 (70)
VSD	17 (34)
PDA	15 (30)
ASD	3 (6)
Cyanotic	15 (30)
TOF	7 (14)
TGA	6 (12)
TA with ASD	1 (2)
PS with VSD	1(2)

Table III Shows complaints of children with CHD showed cough in most cases (82%), dyspnoea in 80%, poor weight gain in 70%, feeding difficulty in 68% and fever in 58% cases.

Table III: Distribution of cases with CHD by presenting complaints on admission.

Complaints	No (%)
Cough	41 (82)
Dyspnoea	40 (80)
Poor weight gain	35 (70)
Feeding difficulty	34 (68
Fever	29 (58)
Bluish coloration of lips,fingers	15 (30)

Table IV Shows murmur was the most common (90%) presenting sign among children with CHD, followed by tachycardia (82%); cyanosis was reported in 30%, tender hepatomegaly in 28%, oedema in 12% and clubbing was found in 4% cases.

Table IV: Distribution of cases with CHD by presenting signs.

Signs	Number of child n (%)
Murmur	45 (90)
Tachycardia	41 (82)
Cyanosis	15 (30)
Hepatomegaly	14 (28)
Oedema	6 (12)
Clubbing	2 (4)

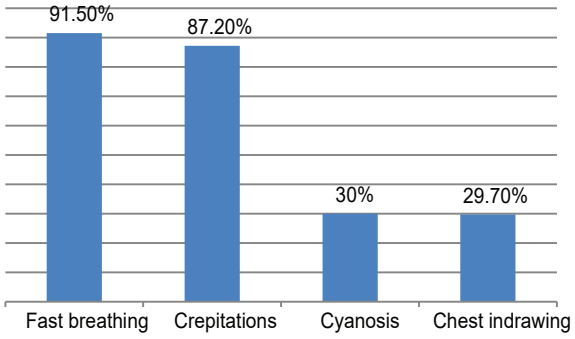

Figure 1: *Distribution of respiratory features among cases with CHD.*

Fig 1: Respiratory features were common, 47(94%) cases presented with various features of respiratory difficulties like fast breathing in 91.5%, crepitations in 87.2%, cyanosis in 30% cases, chest indrawing in 29.7% cases

Table V Shows among both age group 60% cases had history of more than two episodes of respiratory symptoms.

Table V: Distribution of cases with CHD of different age group by number of attack of respiratory problems (n=50)

Age group	Total Cases	No episode	≤2 episode	>2 episode
0- 6 months	31	3	11	17
7 - 12 months	19	0	6	13
Total n (%)	**50 (100)**	**3 (6)**	**17 (34)**	**30 (60)**

Table VI Shows among various complications with CHD, failure to thrive was detected in 76%, heart failure in 28% and pulmonary hypertension was detected by echocardiography in 34% cases.

Table VI : Distribution of cases with CHD by complication.

Complication	No (%)
Failure to thrive	38 (76)
Pulmonary hypertension	17 (34)
Heart failure	14 (28)

Table-IV shows spontaneous closure of CHD was detected in 8% cases, 14% underwent device closure and 8% cases died of which two cases were TGA, one was TOF and the other one was VSD with severe PS with renal mass.

Table-VII: Outcome of CHD in children (n=50).

	Advice for surgery &or conservative treatment	Closed Spontaneous n(%)	Device n(%)	Death n(%)
VSD (17)	14 (28)	3 (6)	0 (0)	0 (0)
PDA (15)	7 (14)	1 (2)	7 (14)	0 (0)
TOF (7)	6 (12)	0 (0)	0 (0)	1 (2)
TGA (6)	4 (8)	0 (0)	0 (0)	2 (4)
ASD (3)	3 (6)	0 (0)	0 (0)	0 (0)
TA with ASD (1)	1 (2)	0 (0)	0 (0)	0 (0)
PS with VSD (1)	0 (0)	0 (0)	0 (0)	1 (2)
Total n (%)	**35 (70)**	**4 (8)**	**7 (14)**	**4 (8)**

DISCUSSION

Diagnosis of Congenital heart disease at the earliest possible time and identifying the mode of presentation, complications and outcome is very important as early recognition referral and appropriate intervention could save the lives and reduce the risk of further complications.

In this study male patients were predominant (54%) and male female ratio was 1.17:1. Male sex preponderance in children with CHD was also found by Rahman et al.[6] Male female ratio of this study was very much consistent with another study in Bangladesh where it was reported as 1.3:1.[11]

This study found that 70% of CHD cases were acyanotic and 30% cases were cyanotic heart disease. VSD was the most common structural defects (34%) with PDA as the second common (30%), TOF was found in 14% cases, TGA in 12% cases and ASD in 6% cases. It correlates with the findings of Hussain et, al where acyanotic heart disease were found in three-forth cases among which VSD was the commonest acyanotic and TOF was the commonest cyanotic heart disease.[12] Hoque et al found VSD as the commonest CHD but Begum et al found ASD as the commonest CHD.[13,14] Structural defect of CHD varies depending upon age group; simple and potentially correctable heart defects like VSD, PDA and ASD are common at all ages.[10]

In the present study 62% of the cases presented within first 6 months of age and 38% were first diagnosed between 7 to 12 months. Many CHD may not be diagnosed during neonatal period or at the time of birth. About 30% CHD may die without a diagnosis, again in case of postnatal CHD who were discharged without a diagnosis, 35% became unwell or died by 6 weeks of age.[4,5]

The present study is almost consistent with the other study on presenting complaints of children with CHD.[11] As a presenting complaints cough was found in 82% cases, dyspnoea in 80%, poor weight gain in 70%, feeding difficulty in 68%, fever in 58% cases. Sharmin et al found dyspnoea in 60%, cough in 43.5%, poor weight gain in 41.7%, feeding problem in 26% cases.[11]

Cardiovascular examination revealed murmur in 90% and 10% of the children had no murmur but was diagnosed as CHD by clinical evaluation and echocardiogram. In contrast to the findings of this study much higher rate of absence of murmur (31.82%) in child with CHD was reported by Hoque et al and Anisworth et al (55.36%)[13,15] where the age group was limited to neonates only. Other common presenting signs among CHD cases were tachycardia in 82% children, cyanosis in 30%, tender hepatomegaly in 28% and oedema in 12%, which is also similar to sharmin et al showing cyanosis in 20%, and tachycardia in 37.4% and oedema in 10.4% cases.[11]

Out of 50 cases 47 cases presented with different respiratory features like fast breathing 91.5%, crepitation on auscultation in 87.2% and chest indrawing in 29.7% children. History of repeated respiratory tract infection was detected by Sharmin et al[11] in 34% cases and in this study in 60% cases which is higher than the previous study. Age group of children was different in two studies and rate is higher among infants below one year of age. Children with history of repeated respiratory tract infection should be sought out and screened for the possibility of CHD.

In this study complication due to CHD detected were failure to thrive in 76% cases, heart failure in 28% and various degree of pulmonary hypertension detected by echocardiography in 34% cases. Shah et al, stated that considering the age at presentation maximum number of children presented during infancy and failure to thrive was seen in 86.9% cases and heart failure in 46% cases.[16]

Six children had associated anomaly like Down syndrome, clubfoot, cleft lip/palate and hypothyroidism. All children with Down syndrome should be screened for CHD after birth. Babies with Down's syndrome were referred for early assessment and echocardiography, yet 34% remained undiagnosed by 6 weeks of age and 24% by 12 weeks.[5]

In the current study VSD were detected in 34% cases with various size. Among them large VSDs (17.65%) were referred for surgical closure, moderate and small sized VSD were reported in 47.06% cases and 17.65% cases were spontaneously closed during study period. VSDs can be closed spontaneously even up to 4 year of age.[17] Among the 15 cases of PDA 1(6.67%) case with small PDA was closed spontaneously, 7 (46.6%) cases had device closure and the rest 7 (46.6%) was on conservative management and advised for closure by one year of age. Fatema et al, found spontaneous closure in 29.16% VSD and in 33.3% PDA cases by first year of life.[18]

Among the outcome of CHD in children, spontaneous closure was detected by echocardiography in 8% cases and another 8% children died during the study period. Rest of the children was advised accordingly for surgery, intervention and medical management; among which 14% had device closure within the study period. Outcome of 70% cases could not be followed due to constrain of study period. Intervention was not possible in some of the children due to associated complications like failure to thrive, pulmonary hypertension and heart failure. Some patient left the hospital due to financial problem.

CONCLUSIONS

The modes of presentation of CHD are variable according to age, therefore high index of suspicion, early diagnosis, close monitoring and timely intervention is required for better outcome of children below one year of age. Detection and management of CHD below one year of age can prevent many complications and provide better prognosis of the disease.

ETHICAL ISSUE

This study was done with prior permission of the Directors of Shaheed Suhrawardy Medical College Hospital and National Institute of Cardiovascular Diseases. Informed written consent was taken from parents of the children. Anonymity of the participants and confidentially of information was maintained strictly.

CONFLICT OF INTEREST

We do not have any potential conflicts of interest.

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