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ORIGINAL RESEARCH

Study of echocardiographic Profile of Children with Congenital Heart Disease

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ABSTRACT

Aim: Study of echocardiographic Profile of Children with Congenital Heart Disease
Methods: This is a descriptive study was done in the 110 patients with age group 1 m - 5 years, known case of congenital heart disease including cyanotic and acyanotic who are diagnosed with bronchopneumonia and surgically corrected CHD diagnosed as bronchopneumonia were included in the study.
Results: Of the 110 children enrolled, 100 (90.91 %) children had acyanotic congenital heart disease while 10 (9.09 %) had cyanotic heart disease. The mean age of presentation of all the cases was 0.9 years.Of the 100 acyanotic congenital heart diseases, 42% of the diseases were seen in females. 58% were seen in males. Combined males and females put together, more than 55 % of the children were less than 6 months old. Of the 10 cyanotic congenital heart diseases, 40 % of the diseases were seen in females. 60 % were seen in males. Combined males and females put together, more than 70 % of the children were less than 1 year old. The average duration of stay of the children from the present study was 7.82 days. There was an overall mortality of 9.09 % in the entire study population. The p value was 0.113, which is statistically not significant. Among ACHD, 28 (28 %) children presented in CCF, while 72 (72 %) had no features of CCF. The incidence of CCF in CCHD from higher to lower was TAPVC, TOF, DORV. P-value 0.0112 (< 0.05). Pulmonary Hypertension was seen in 20 % of the children in both ACHD and CHD groups.
Conclusions: Early diagnosis of CHD in the neonatal period can help reduce the morbidity associated with bronchopneumonia in infancy and help reduce the incidence of failure to thrive and recurrence of respiratory tract infections.
Keywords: Congenital Heart Diseases, Congestive Cardiac Failure

Introduction

Congenital heart disease (CHD) comprises one of the major diseases in the pediatric age group and is one of the leading causes of death in children with congenital malformations. CHD by definition is the structural or functional heart disease present at the time of birth, even if it is detected later on.[1] The incidence of CHD in the normal population is

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approximately 0.5-0.8% of live-born children, with a higher percentage in those aborted spontaneously or stillborn.

In our country, the majority of childbirths still takes place at home and routine neonatal screening is not common, so it is difficult to calculate the true birth prevalence of CHD.[2] Echocardiography done for the suspected babies has increased the detection of various CHD.[3] Pediatric cardiac care in India is still in its infancy. There are very few specialized pediatric cardiology training programs, those that are, are concentrated in certain regions of India and are often imparted through combined adult and pediatric programs.

Training programs exclusively dedicated to pediatric cardiology and pediatric cardiac surgery need to be established in centres with good standards of pediatric cardiac care.[4] With newer diagnostic modalities including echocardiography, it is now considered as near confirmatory in diagnosing most congenital heart lesions. X ray chest and ECG are complementary to echocardiography. Chest X-ray is usually the first radiography performed for a newborn. This test is easily accessible and yet a basic screening method. Digital radiography has improved this method. Most studies using color- Doppler echocardiography have reported higher incidence, which means that this method had facilitated the detection of asymptomatic lesions to a great extent.[5]

Echocardiography represents the non-invasive tool most commonly used in pediatric cardiology. Indeed, it enables the definition of both the morphological and functional findings in congenital heart disease (CHD), as completely as possible in almost all cases.[6] With limited resources in developing countries like India clinical acumen still forms the backbone of diagnosis and treatment, later to be confirmed by echocardiography and to deliver the appropriate management at the right time. It would also allow the physician to identify relatively unnoticed syndromes and act swiftly.[7]

Material and methods

This is a descriptive study was done in the department of Pediatrics Institutional Ethical Committee approval was obtained before the study.

Inclusion Criteria

110 patients with age group 1 m - 5 years, known case of congenital heart disease including cyanotic and acyanotic who are diagnosed with bronchopneumonia and surgically corrected CHD diagnosed as bronchopneumonia were included in the study.

Exclusion Criteria

Children aged more than 5 yrs., associated co-morbid conditions like rheumatic heart disease, bronchial asthma, viral myocarditis, congenital lung deformities and tuberculosis were excluded from this study.

Congenital heart disease has been diagnosed with some significant anatomical abnormality of the heart or intrathoracic blood vessels of functional importance except the large arteries and veins of the system. To diagnose the CHD, M-mode, two dimensional and colour Doppler, pulse, and continuous wave echocardiogram was performed. Complete blood count, ECG and X Ray chest are performed in all patients. Thyroid profile and serum electrolytes are done in selected patients as and when required. A chest X ray was done for each patient. Bronchopneumonia was diagnosed based on clinical and radiological findings. All cases underwent transthoracic 2 Dimensional (2D) and Doppler echocardiography done by the cardiologist. Type of congenital heart disease so found was noted. The type and size of the defects were noted. Heart failure was diagnosed when the patient fulfilled the clinical diagnostic criteria of heart failure outlined as significant tachycardia, significant tachypnoea, cardiomegaly and tender hepatomegaly of at least 3 cm size below the right costal margin.

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Results

Of the 110 children enrolled in the study, 46 (41.82 %) were females and 64(58.18 %) were males. mean ge of the boys was 11.9 months while that of the girls was 8.47 months.

Table 1. Gender distribution of patients

Gender	No of patients =110	%
Female	46	41.82
Male	64	58.18

Of the 110 children enrolled, 100 (90.91 %) children had acyanotic congenital heart disease while 10 (9.09 %) had cyanotic heart disease. The mean age of presentation of all the cases was 0.9 years.Of the 100 acyanotic congenital heart diseases, 42% of the diseases were seen in females. 58% were seen in males. Combined males and females put together, more than 55 % of the children were less than 6 months old. Of the 10 cyanotic congenital heart diseases, 40 % of the diseases were seen in females. 60 % were seen in males. Combined males and females put together, more than 70 % of the children were less than 1 year old.

Among ACHD, VSD constituted 35 cases which was 35 % of the total ACHD cases. Among cyanotic CHD, 3 cases each of TOF (Tetralogy of Fallot) and TAPVC (Total Anomalous Pulmonary Venous Connection) were observed (40 %), 1 cases each of DORV (Double Outlet Right Ventricle) and single ventricle and one case of AP (Aorto- Pulmonary) window were noted.

The average duration of stay of the children from the present study was 7.82 days. Among ACHD, 92 children were discharged and there were 8 deaths, amounting to

8 % mortality. Among CCHD, 8 children were discharged while there were 2 deaths with a mortality of 20 %. There was an overall mortality of 9.09 % in the entire study population. The p value was 0.113, which is statistically not significant.

Among ACHD, 28 (28 %) children presented in CCF, while 72 (72 %) had no features of CCF. The incidence of CCF in CCHD from higher to lower was TAPVC, TOF, DORV. P-value 0.0112 (< 0.05). Pulmonary Hypertension was seen in 20 % of the children in both ACHD and CHD groups. P value = 1, which is not significant.

Table 2. Cyanotic and Acyanotic Congenital Heart Diseases

	Female		Male	
Age Group	**No.**	**%**	**No.**	**%**
Cyanotic Congenital Heart Diseases				
< 6 Months	26	26 %	29	29 %
6 m – 1 y	12	12 %	21	21 %
1 - 2	2	2%	4	4 %
2 - 3	1	1 %	2	2 %
3 - 4	0	0 %	1	1 %
4 - 5	1	1%	1	1 %
Grand Total	42	42%	58	58 %
Acyanotic Congenital Heart Diseases				
< 6 months	2	20 %	1	10 %
6 m – 1 y	1	10 %	3	30 %
1 - 2	0	0 %	1	10 %
2 - 3	1	10 %	0	0 %
4 - 5	0	0 %	1	10 %
Grand Total	**4**	**40 %**	**6**	**60 %**

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Table 3. Types of Congenital Heart Diseases

Row Labels	No.	%
Cyanotic Congenital Heart Diseases		
VSD	35	35
ASD	29	29
TR	10	10
PFO	10	10
PDA	8	8
MR	3	3
PR	2	2
AR	1	1
MVP	1	1
COA	1	1
Grand Total 100	100	100
Acyanotic Congenital Heart Diseases		
TAPVC	4	40
TOF	3	30
DORV	1	10
Single Ventricle	1	10
AP Window	1	10
Grand Total	10	100 %

Table 4. Average Duration of Stay

Row Labels DiagnosisDuration	Average of Stay (days)
Acyanotic AR	5.51
ASD	7.66
COA	8.01
MR	6.79
MVP	2.01
PDA	6.15
PFO	7.28
PR	7.34
TR	12.17
VSD	7.39
Acyanotic Total	7.79
Cyanotic	
AP Window	2.01
DORV	4.01
Single Ventricle	4.51
TAPVC	8.76
TOF	10.01
Cyanotic Total	8.06
Grand Total	7.82

Discussion

Of the 110 children enrolled in the study, 46 (41.82 %) were females and 64(58.18 %) were males. mean ge of the boys was 11.9 months while that of the girls was 8.47 months.

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Of the 110 children enrolled, 100 (90.91 %) children had acyanotic congenital heart disease while 10 (9.09 %) had cyanotic heart disease. The mean age of presentation of all the cases was 0.9 years.

The data obtained is similar to the results found in the study of Saleh HK[8] where the mean age of presentation was around four years with 48 % males and 52 % females. 85 % of the cases were acyanotic and 15 % cyanotic. Cyanotic defects presented in the first year of life, most of them being neonates. Acyanotic defects presented after 3 years of age. Most common acyanotic lesion was VSD, followed by PS (Pulmonary Stenosis) and PDA. Most common acyanotic lesion being TOF. In the study conducted by Y O Sahan[9] 24 percent was cyanotic and 76 percent of 50 children with CHD admitted with lower respiratory tract infection were acyanotic. Which is also in line with Shah GS et al.[10] studies 69 % and 31 %, Pate et al.[11] 60.6 % and 38.6

%, and Sani et al.[12]68.9 % and 31.1 %. Although few studies vary from our results, those studies include Wanni et al.[13] 88.6 % and 11.4 %, Saxena et al.[14] 79.88 % and 20.12 %, and Bakhtyar Zahid et al.[15] 52.8 % and 47.2 %. Among ACHD, VSD constituted 35 cases which was 35 % of the total ACHD cases. Among cyanotic CHD, 3 cases each of TOF (Tetralogy of Fallot) and TAPVC (Total Anomalous Pulmonary Venous Connection) were observed (40 %), 1 cases each of DORV (Double Outlet Right Ventricle) and single ventricle and one case of AP (Aorto- Pulmonary) window were noted.

VSD was the most prevalent acyanotic CHD while TOF was the most frequent cyanotic CHD. Most literature studies reported similar observations from India and other countries;[11-14] however, few studies recorded a higher incidence of PDA compared to ASD.[11,13] Among other cyanotic CHD studies, our results are comparable to Saxena et al. and Abquari et al,[16] whereas Wani et al.[13] documented a higher incidence of large tube, single ventricle, complete anomalous pulmonary transposition.

Of the 100 acyanotic congenital heart diseases, 42% of the diseases were seen in females. 58% were seen in males. Combined males and females put together, more than 55 % of the children were less than 6 months old. Of the 10 cyanotic congenital heart diseases, 40 % of the diseases were seen in females. 60 % were seen in males. Combined males and females put together, more than 70 % of the children were less than 1 year old.

Shah et al[9] in 2006 have observed that VSD constituted the most cases in ACHD group followed by ASD. Among CCHD, TOF was the most common lesion. Similar results were seen in study conducted by Chadha et al[17] , who studied the prevalence of CHD in random sample of 11833 children in Delhi.

Among ACHD, VSD constituted 35 cases which was 35 % of the total ACHD cases. Among cyanotic CHD, 3 cases each of TOF (Tetralogy of Fallot) and TAPVC (Total Anomalous Pulmonary Venous Connection) were observed (40 %), 1 cases each of DORV (Double Outlet Right Ventricle) and single ventricle and one case of AP (Aorto- Pulmonary) window were noted.

The results are in line with Harish GV et al[18] who have conducted a study to evaluate the underlying CHD in recurrent bronchopneumonia in a tertiary centre over a period of 6 months. The incidence of CHD in recurrent bronchopneumonia was 10 % among the 40 children selected out of 370 PICU (Paediatric Intensive Care Unit) admissions. 2 cases were large size ASD, one PDA and the other peri membranous VSD. There was also a significant increase in the mean duration of stay among the children with CHD. Heart failure and murmurs should be evaluated for CHD with a strong index of suspicion.

The mean age of presentation of all the cases was 0.9 years. Among ACHDs, COA presented the earliest at 0.18 years of age. ASD presented at 0.88 years of age. AR presented late at 2.14 years of age. Among cyanotic CHDs, AP window, DORV and TAPVC presented

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around 6 months of age. TOF had a delayed presentation compared to other diseases at 1.6 years of age.

The average duration of stay of the children from the present study was 7.82 days. The duration of stay of ACHD children was, on an average, 7.79 days, out of whom the average duration of stay was shortest for the children with MVP and longest for the children with TR. The duration of stay of cyanotic CHD was 8.06 days out of whom those with AP window stayed the shortest and the duration of stay was the longest with those diagnosed with TOF.

Among the children with ACHD, children from 4 - 5 years of age stayed the longest in the hospital with an average stay of 11 days, children from 2 - 3 years age group stayed the shortest. In the CCHD group, children from 1 - 2 years of age stayed for one day while the longest duration of hospital stay was from the less than 6 months age group.

Among ACHD, 92 children were discharged and there were 8 deaths, amounting to 8 % mortality. Among CCHD, 8 children were discharged while there were 2 deaths with a mortality of 20 %. There was an overall mortality of 9.09 % in the entire study population. The p value was 0.113, which is statistically not significant.

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Conclusion

Early diagnosis of CHD in the neonatal period can help reduce the morbidity associated with bronchopneumonia in infancy and help reduce the incidence of failure to thrive and recurrence of respiratory tract infections.

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