



Clinical and Echocardiographic Evaluation of Congenital Heart Diseases

KEYWORDS

acyanotic congenital heart disease, cyanotic congenital heart disease, VSD, TOF.

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ABSTRACT

Objective : To study the prevalence & pattern of Congenital heart diseases in relation to age ,sex and its clinical presentation, and its correlation with ECHO. in the dept. of pediatrics Kurnool over a period of one year.

Methods: Hospital based prospective clinical study

Study included 60 children of congenital heart diseases among 3853 admissions in pediatric medical ward during one year study period; clinically suspected cases of congenital heart diseases were subjected for further echocardiographic evaluation.

Participants: study sample of 60 patients diagnosed as congenital heart disease out of 3853 admissions during study period.

Out come: Prevalence & pattern of Congenital heart diseases in relation to age, sex and its clinical presentation and correlated echocardiographically and managed accordingly.

Results: Of the total 3853 in patients in pediatric ward, 43 cases (1.12%) were acyanotic and 17 cases (0.44%) were cyanotic heart diseases. We infer that, the peak incidence was seen in the age group of 1-12 months comprising of 46.67% of the total number of cases. 1.56% of hospital admissions were constituted by congenital heart diseases. Males formed 53.49% and females 46.51% of the acyanotic CHD. Ventricular septal defect formed the commonest acyanotic CHD (58.14%) in the present series of 60 cases. The remaining group comprises of ASD (14%), PDA (9.3%), AV Canal defect (9.3%), AS (7%), COA (2.32%). TOF comprised the most common cyanotic CHD (35.29%) followed by TGV (17.65%).

The commonest symptoms were breathlessness (86.67%) followed by recurrent respiratory tract infections (75%), CCF (28.33%) and Cyanosis (28.33%). We performed echocardiographic studies in 58 cases, when the results were analysed in 53 cases echocardiographic diagnosis correlated with clinical diagnosis.

Conclusion: The following conclusions could be drawn out of the present study of congenital heart diseases.

1. Acyanotic type (71.67%) of congenital heart disease is more common than cyanotic variety (28.33%).
2. Ventricular septal defect (58.14%) was the commonest type of acyanotic CHD in all age groups.
3. Tetralogy of Fallot (10%) formed the single most common type of cyanotic CHD beyond infancy.
4. Maximum numbers of cases were seen in between the age group of one month and twelve months of age.
5. The commonest symptoms were breathlessness (86.67%) followed by recurrent respiratory tract infections (75%), CCF (28.33%) and Cyanosis (28.33%).

INTRODUCTION:

Congenital Heart Disease is one of the most common birth defects accounting for 30% of total congenital malformations. (1) Congenital Heart Disease occurs in .5-.8% of live births. (2). Nearly 33% to 50% of these defects are critical, requiring intervention in the first year of life itself (3).

The reported incidence of CHD is 8-10/ 1000 live births according to various series from different parts of world. (4) It is believed that this incidence has remained constant worldwide (5).

Early identification is the key to success. It is because clinical presentation and deterioration may be sudden and some treatable defects may even cause death before diagnosis (6). In some cases early diagnosis can avoid irreversible pulmonary vascular disease (7). Nadas (8) in 1963 defined congenital heart disease as a "structural abnormality of the heart present since birth". Congenital cardiovascular

disease is also defined as an abnormality at birth in cardio circulatory structure or function.

ECHO CARDIOGRAPH: Single crystal (M- Mode) (9) is more important in evaluating cardiac function. Two-Dimensional Echo cardiograph (Real Time Scanning) (2-D Echo). (10) (11), gives important anatomical information not available on M-mode examination. Contrast Echocardiography has been used to detect systemic and pulmonary venous anomalies (12) and to detect intra cardiac and great artery level shunts. (13) (14) .

ROENTGENOGRAPHIC EXAMINATION (15) (16): The chest roentgenogram provides information about cardiac size and shape as well as other features that directly relate to the state of the cardiovascular system.

ELECTROCARDIOGRAM (17): Electrocardiography is a simple and useful bed-side investigation which helps in the di-

agnosis and management of patients with congenital heart disease (CHD). In general the Electrocardiogram (ECG) has to be interpreted along with clinical and radiological data. So a thorough physical examination and correct interpretation of X-ray and ECG is very important for the pediatrician who is caring for the poor and the sick children.

METERIALS AND METHODS:

Sixty cases of congenital heart diseases were studied over a period of one year. The present series constituted hospital admissions in children medical ward, Government General Hospital, Kurnool.

All these children were studied in detail regarding history and thorough clinical examination and all the cases were subjected to X-ray, E.C.G and Echocardiography.

Inclusion Criteria:

patients diagnosed clinically as having congenital heart disease are included in the study.

Statistical analysis: –When statistics are analysed relating distribution of Cyanotic & acyanotic among the total CHDs by applying Chi square & p value, p value found to be >0.05 not significant. Clinical findings correlated with Echo cardio graphic findings are analyzed statistically p value found to be Significant ,<0.018 stating that clinical findings are almost correlated with Echo cardio graphic findings in CHDs .

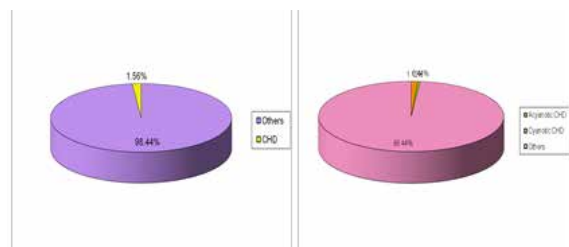
TABLE – 1 PREVALENCE OF CHD AMONG IN PATIENTS (3853)

S.No	Type	No. of cases	Percentage
1	Total CHD	60	1.56
2	Others	3793	98.44

TABLE –2 PREVALENCE OF ACYANOTIC AND CYANOTIC CHD AMONG IN PATIENTS (3853).

S.No	Type	No. of cases	Percentage
1	Acyanotic CHD	43	1.12
2	Cyanotic CHD	17	0.44
3	Others	3793	98.43

Of total 3853 in patients acyanotic patients (43/3853) 1.12%, cyanotic (17/3843) 0.44% were cyanotic heart diseases, that (60/38431) 1.56 % of total admissions constituted congenital heart disease



3: DISTRIBUTION OF BOTH ACYANOTIC AND CYANOTIC HEART DISEASES OF TOTAL 60 CASES OF CONGENITAL HEART DISEASES IN THE PRESENT SERIES.

S.No	Type	No. of cases	Percentage
1	Acyanotic CHD	43	71.67
2	Cyanotic CHD	17	28.33
Total		60	100.00

Of the 60 cases of congenital heart diseases, we had 43 cases (71.67%) of acyanotic heart diseases and 17 cases (28.33%) of cyanotic heart diseases.

TABLE – 4 SEX INCIDENCE OF CONGENITAL HEART DISEASES

S.No	Sex	Acyanotic CHD		Cyanotic CHD	
		No	Percentage	No	Percentage
1	Male	23	53.49	9	52.94
2	Female	20	46.51	8	47.06
Total		43	100.00	17	100.00

X² corrected = 0.0619, P = >0.05

The present study showed that there was slight male predominance as far as acyanotic CHD concerned. Males formed 53.49% and females 46.51% of the acyanotic CHD. This difference in male and female incidence was less noted in the cyanotic CHD group.

TABLE – 5 AGE INCIDENCE OF CONGENITAL HEART DISEASE.

S.No	Age	Acyanotic		Cyanotic		Total	
		No	%	No	%	No	%
1	Less than 1 month	5	8.33	5	8.33	10	16.67
2	1-12 months	20	33.33	8	13.33	28	46.67
3	1-6 years	10	16.67	1	1.67	11	18.33
4	6-12 years	8	13.33	3	5	11	18.33

Corrected 1.0619 , p=>0.05 NS

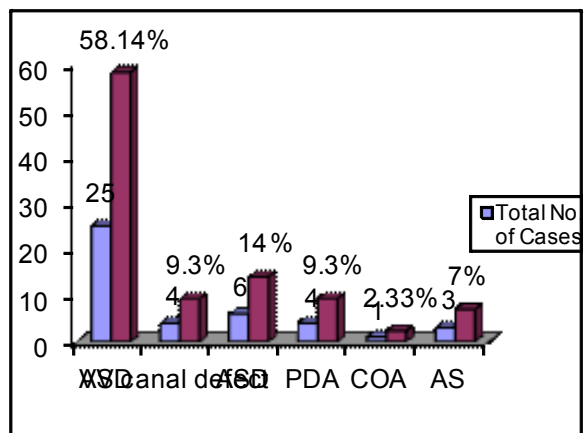
The peak incidence was seen in the age group of 1-12 months comprising of 46.67% of the total number of cases. The lowest incidence was seen in the age group of less than one month comprising 16.67%of the total number of case

DISTRIBUTION OF ACYANOTIC HEART DISEASES

Ventricular septal defect formed the commonest acyanotic CHD (58.14%) in the present series of 60 cases. The remaining group comprises of ASD (14%), PDA (9.3%), AV Canal defect (9.3%), AS (7%), COA (2.32%).

DIST'RIBUTION OF CYANOTIC HEART DISEASES

From the analysis of the above data TOF comprised the most common cyanotic CHD (35.29%) followed by TGV (17.65%). In the age group of less than 1 month, the two cases of cyanotic CHD were that of TGV. In the present series there were 2 cases are non conclusive CHD. Male to female ratio was all most equal. \s \s



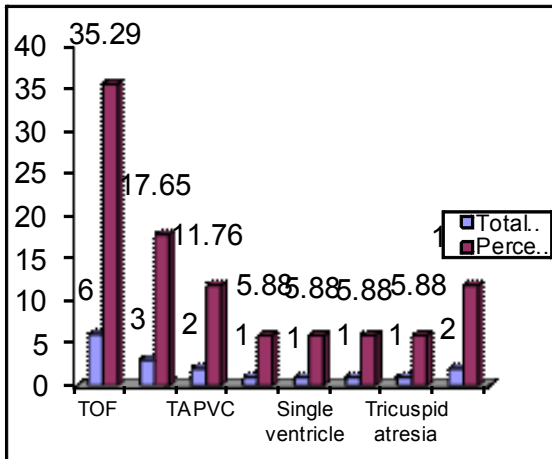


TABLE – 6 COMMON CLINICAL PRESENTATIONS IN ACYANOTIC CONGENITAL HEART DISEASE.

S.No	Features	No. of cases	Percentage
1	Breathlessness	37	86.05
2	Recurrent respiratory tract infections	30	70
3	CCF	15	34.38
4	Feeding problems	13	30.23
5	Extra cardiac complaints	5	11.63
6	Growth retardation	3	7
7	Delayed mile stones	1	2.32

In the present series, commonest symptom was breathlessness (86.05) followed by recurrent respiratory tract infections (70%), CCF (34.38%). 30.23% of patients presented with feeding problems. In 9.3% of cases, acyanotic CHD was detected on examination while admitted for other complaints like GIT problems, fever etc. Growth retardation was present in 7% of cases. Single child presented with delayed mile stones.

TABLE – 7 COMMON CLINICAL PRESENTATIONS IN CYANOTIC CONGENITAL HEART DISEASE.

S.No	Features	No. of cases	Percentage
1	Cyanosis	17	100
2	Breathlessness	15	88.24
3	Cyanotic spells	6	35.29
4	Squatting	5	29.41
5	Growth retardation	5	29.41
6	CCF	4	23.53
7	Recurrent respiratory tract infections	2	11.76
8	Feeding problems	2	11.76
9	Brain abscess	1	5.88

The commonest clinical presentation in cyanotic congenital heart disease was cyanosis (100) % followed by breathlessness (88.24%), cyanotic spells were noted in 8 cases (47.05%), 5 children had squatting episodes in the present series. Growth retardation was present in 5 cases (29.41%), CCF in 4 cases (23.53%).

One child with TOF had presented with cerebral abscess and hemiplegia on left side, child was transferred to Neurosurgical ward for surgical management, but child succumbed to neurological complication.

ANALYSIS OF CONSANGUINITY IN THE ACYANOTIC CHD.

Consanguinity was noted in 41.86% of all acyanotic CHD and more associated with AV canal defects in 3 out of 4 cases, VSD in 10 cases out of 25 cases and ASD 3 cases out of 6 cases.

ANALYSIS OF CONSANGUINITY IN THE CYANOTIC CHD.

Consanguinity was noted in 52.94 % of all cyanotic CHD. Consanguinity is seen in 3 out of 6 cases of TOF.

CHD associated with extracardiac manifestations:

One case of CHD was associated with anorectal anomalies. One case was associated with polydactyly. Four cases were Downs syndrome. One case was Williams syndrome

Echocardiographic analysis of congenital heart diseases in the Present series:

We performed echocardiographic studies in 58 cases of our series and the results were analyzed. Due to non compliance, technical problems it was not possible to do Echo in two cases.

TABLE –8 CORRELATION BETWEEN CLINICAL AND ECHO-CARDIOGRAPHIC FINDINGS.

S.No	Type	Clinical findings correlated with Echo findings			
		Yes	Percentage	No	Percentage
1	Acyanotic CHD (43)	42	97.67	1	2.33
2	Cyanotic CHD (15)	11	73.33	4	26.67
Total(58)		53	91.38	5	8.62

χ^2 corrected = 5.5596 , P = 0.01838

Out of 43 cases of acyanotic heart diseases, in 42 cases echocardiographic diagnosis correlated with clinical diagnosis .Out of 17 cases of cyanotic heart diseases echocardiography was done only in 15 cases. Among them In 11 cases only echocardiographic diagnosis correlated with clinical diagnosis.

Among the cyanotic CHD rare case recorded was, single ventricle, TGA with mitral atresia.

DISCUSSION:

As a group congenital Heart Diseases constitutes a significant proportion of congenital malformations. . Hence it is important to determine the exact prevalence and case burden of congenital heart diseases.

Table – 1 Prevalence of congenital heart diseases:

S.No	Studies	Number	No of congenital heart diseases/1000
1	Chandha et al	11,83	4.2
2	Thakur et al	40,950	2.25
3	Present series	3853	15.6

Most of the studies from India which are available regarding prevalence of congenital heart diseases. According to Vashistha et al prevalence of congenital heart diseases is 5.2 per 1000. (18). Khalil in 1999 placed the overall incidence as 3.9 per 1000 live births. (19) According to Thakur it is 2.25 per 1000 children. (20) Chadha et al 2001 gave the value as 4.2 per 1000 children. (21) Taken in toto, children with congenital heart disease are predominantly male as in accordance with studies by Chadha et al, Bidwai et al. (22) Jain et al. (23). In our present study it is 15.6 per 1000 children.

Table – 2 Distribution of CHD:

S.No	Type	Govind et		Present series	
		No	%	No	%
1	Acyanotic	40	80	43	71.67
2	Cyanotic	10	20	17	28.33
Total		50	100	60	100

Acyanotic congenital heart disease is by far the most common CHD than cyanotic CHD in most of the studies from India. In the present study also acyanotic CHD formed 71.67% of the total number of cases, concurring with other studies

Almost similar to other studies like in Govind et al series showing 80% ACHD, 20% CCHD.

Sex Incidence:

The slight male predominance may be due to the fact that male children are given

studies importance in this society and brought for medical aid promptly.

Male preponderance of cases in the present study (55.5%) is in par with other

Studies showing male preponderance, **Takai et al** 55%, **Bidwai et al** 65.8%. Moreover, specific defects may show definite sex preponderance, patent ducts arteriosus and ventricular septal defect and pulmonary stenosis are more common in females, whereas valvular aortic stenosis, congenital aneurysm of the sinus of valsalva, coarctation of the aorta, transposition of the great arteries are more common in males. (24)

Age incidence:

In our series the maximum incidence of CHD was seen in the age group of 1-12 months which formed 40% of the total cases. In comparison with **Sonail tank et al** series 39.46% of cases between 1-12 months.

The reason for the higher incidence in the age group of 1-12 months may be that organic CHD become symptomatic at that age group.

Relative incidence of various lesions in C.H.D

The present series showing similarities, with other studies done in India, with reference to relative incidence--VSD as the commonest CHD. Mathur et al had 20.9% (of 143 cases), **Thatakia** 26.0% (out of 31 cases), and **Bhargava** 18.18% (out of 77 cases). **Pai** and **Varkey** had 29% (out of 200 cases) and **Merlyn C. Joseph** had 31.71% (out of 1050 cases) of VSDs in their series. The present series also reflected VSD as the commonest CHD which formed **41.67%** of the total cases.

Friedman (1988) and **Nadas** (1972) had a maximum incidence of VSDs in their series of cases while **Anand** (1988) reported VSD as second in their order of incidence. Anand had TOF as the most common C.H.D, whereas all the other authors including present study had TOF as the most common cyanotic CHD in their series with the T.G.V coming second.

Common clinical presentations in congenital heart diseases:

When symptoms were taken in to consideration we found that breathlessness (86.67%), recurrent respiratory tract infections (75%) are the common presentations of CHD and it was correlated with the **Sonail Tank et al** study.

In our study 44 cases were referred to higher centers for further management, 10 cases were discharged and 6 were succumbed to death. The mortality rate in our study was 10%.

A high index of suspicion, a detailed history, physical examination, chest X-ray and Electrocardiogram along with the use of 2D-Echocardiography, helps us to diagnose most of the cases of congenital heart diseases. Early diagnosis, close monitoring and timely intervention in cases of congenital heart diseases will go a long way in reducing the morbidity and mortality to a great extent.

CONCLUSIONS

- Acyanotic type (71.67%) of congenital heart disease is more common than cyanotic variety (28.33%).
- Ventricular septal defect (58.14%) was the commonest type of acyanotic CHD in all age groups.
- ASD, AV canal defect, PDA are next most common to VSD.
- Tetralogy of Fallot (10%) formed the single most common type of cyanotic CHD beyond infancy.
- Below the age of one month Transposition of great vessels, was the most common form of cyanotic CHD.
- Maximum number of cases are seen in between the age group of one month and twelve months of age
- The predominant clinical presentations of acyanotic congenital heart disease were breathlessness (86.67%), recurrent respiratory tract infections (70%), CCF (34.38%), feeding problems. In cyanotic congenital heart disease cyanosis (100%), followed by breathlessness (88.24%).
- A cyanotic (71.67 %) of congenital heart disease is more common than cyanotic variety (28.33%).
- Echocardiography has certain limitations in diagnosing CHD Eg:-small VSDs especially muscular type s are not diagnosed echocardiographically.
- Echocardiography is available only in selected centers. Echocardiography however very useful for confirmation of diagnosis and for pre operative evaluation of the child with CHD.
- In a developing country like India it is not possible for all patients to utilize this facility. So a thorough physical examination and correct interpretation of X-ray and ECG is very important for the pediatrician who is caring for the poor and the sick children.

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