Research Article

Pattern of congenital heart diseases in a tertiary care teachinghospital, Chinna Kakani, Guntur

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Abstract

Objective: To evaluate the spectrum and pattern of congenital heart diseases in NRI general hospital, a tertiary care teaching hospital, Chinna Kakani, Andhra Pradesh. **Methods:** A retrospective hospital based analysis of children attending pediatric department over a period of two years during January, 2014 to December, 2015 was performed. Patients suspected to have cardiac symptoms or cardiac murmurs were referred for 2D echo and colour Doppler to confirm the diagnosis. Prevalence rate per 1000 patients was calculated. Relative frequencies of individual CHD types as a proportion of total CHDs were also calculated. **Results:** A total of 174 Echo confirmed cases of CHDs were identified from a total of 60,000 patients attending the hospital over a two year period with a calculated prevalence of 2.9/1000 patients. Of total cases 96 were female and 78 were male children. A total of 149 Acyanotic CHD cases (86.5%) were identified of which, Isolated ASD were 52 (35%), Isolated VSD were 42 (28%), AVCD were 2 (1.34%), PS were 12 (8%), AS were 4 (2.7%), COA were 2 (1.34%), PDA were22 (14.7%), combination of ASD + VSD were 10 (6.7%) and Dextrocardia with situs inversus were 3 (2%). A total of 25 cases of Cyanotic CHD were identified, of which TOF and its variants were 16 (64%), DORV+VSD+PS were 2 (8%), rare complex CHDs like DORV+HLHS, TAPVC, Ebstien Anomaly, Cortriatrium, were one case (4%) each and TGA were 3 (12%) cases. **Conclusion:** The calculated prevalence of CHD at 2.9 /1000 among hospital attending patients could be an underestimation of actual disease burden in our community. The maximum numbers of children with CHD were identified by 5 years of age. The most commonly found Acyanotic CHDs were ASD, VSD and PDA. The most common cyanotic CHD was TOF.

Keywords: Congenital heart disease, Guntur, Tetralogy of Fallot, Ventricular septal defect

Introduction

Congenital heart disease (CHD) is defined as a gross structural abnormality of heart or intra thoracic great vessels that has functional or potential significance at birth or at a later date [1]. This definition excludes PDA in pre-terms, Marfan syndrome, Bicuspid aortic valve, Mitral valve prolapse, Cardio myopathies, and congenital arrhythmias. CHDs account for 1/3rd of all major congenital anomalies and it has variable prevalence and pattern geographically and is a rising global health problem. The incidence of CHD depends primarily on the small VSDs included in the series and this number in turn depends upon how early the diagnosis was done [2]. The profile of CHD varies with age group studied; simple and potentially correctable conditions like VSD, ASD and PDA are common at all age groups.

The incidence of CHD is approximately 0.5 to 0.8 % of live born children with a reported prevalence of 3.7 to 17.5 per 1000 live births globally. According to a status report of India [3], 10% of present mortality may be accounted for CHDs alone.

The burden of CHD in India is likely to be enormous due to high birth rate. Nearly, 180,000 children are born with CHD, each year in India. We also have large number of adults with CHD, either due to lack of

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awareness or inadequate health care facilities. Information on expected prevalence and spectrum of CHDs is helpful for primary care health professionals like general physicians and paediatricians to better assess and attend the needs of children with congenital heart diseases. Paediatric cardiac services in India are scarce and still in infancy and are in dire need to develop specialized cardiac services for the early management of children with CHD.

Methods

The present study is conducted in NRI General Hospital, which is multi-speciality, tertiary care teaching hospital, located at Chinna Kakani, Guntur. We receive patients from lower to upper middle class strata.

We retrospectively analysed the hospital records of all patients from paediatric department (including out-patient department and in-patient department) from January, 2014 to December, 2015, over a period of two years.

Clinical examination and 2D Echo with Doppler were used to confirm the diagnosis of CHD.

Inclusion criteria:

1. Age from 1month to 18 years.
2. Congenital heart diseases as defined by Mitchell [1]

Exclusion criteria:

1. Inborn babies of less than 1month of age, even after echo proven CHDs.
2. Rheumatic heart diseases and other acquired heart diseases
3. Clinically recognizable genetic syndromes, cardio myopathies, arrhythmias, bicuspid aortic valve, and MVP.

The objective was to assess the profile and magnitude of different CHDs among patients attending our tertiary care centre. The relative frequency of individual CHD types as a proportion of total CHD were calculated.

Results

During the study period of over two years, out of 60,000 patients attending the paediatric department, 174 patients were diagnosed having CHD, with a calculated prevalence of 2.9 per 1000 patients. Of total cases, 96 were female and 78 were male children.The relative frequency and distributions of different CHDs are shown in **Error! Reference source not found.** and **Error! Reference source not found.**. The total numbers of male and female children affected are shown in**Error! Reference source not found.**.

Table 8: Relative frequency of Acyanotic Heart diseases.

Acyanotic heart diseases								
Type	**1m-1yr**	**>1-5yrs**	**>5-10yrs**	**>10-18yrs**	**Female**	**Male**	**Total**	**%**
PDA	10	8	3	1	11	11	22	14.77
ASD	11	9	15	17	29	23	52	34.90
VSD+ASD	7	2	0	1	7	3	10	6.71
VSD	17	8	10	7	18	24	42	28.19
PS	3	3	3	3	7	5	12	8.05
AS	0	0	1	3	0	4	4	2.68
COA	1	1	0	0	2	0	2	1.34
AVCD	1	0	1	0	2	0	2	1.34
Dextrocardia with situs inversus	1	1	0	1	2	1	3	2.01
Total	51	32	33	33	78	71	149	100.00
%	34.00	21.33	22	22	52.00	47.33		

Table 9: Relative frequency of Cyanotic Heart diseases.

Cyanotic congenital heart diseases								
Type	**1m-1yr**	**>1-5yrs**	**>5-10yrs**	**>10-18yrs**	**Female**	**Male**	**Total**	**%**
TOF	5	3	3	5	10	5	16	64.00
TGA	1	0	1	1	2	1	3	12.00
DORV	1	0	0	2	2	1	3	12.00
TAPVC	1	0	0	0	1	0	1	4.00
Ebstien Anomaly	0	1	0	0	1	0	1	4.00
Cortriatriaum	0	1	0	0	1	0	1	4.00
Total	8	5	4	8	17	7	25	100.00
%	29.16	20.83	16.67	33.33	70.83	29.17		

Table 10: Age and sex distribution.

Age	**Female**	**%**	**Male**	**%**	**Total**	**%**
1m-1yr	25	26.04	34	43.59	59	33.91
1-5yrs	22	22.92	15	19.23	37	21.26
5yrs-10yrs	21	21.88	16	20.51	37	21.26
>10yrs	28	29.17	13	16.67	41	23.56
Total	**96**	**100**	**78**	**100**	**174**	**100**

1. Profile of individual CHDs: Distribution of observed Acyanotic and Cyanotic CHDs are available in **Error! Reference source not found.** and **Error! Reference source not found.**. Acyanotic CHDs n=149 (85.6%), seen in**Error! Reference source not found.**, were the most common followed by cyanotic CHDs n=25 (14.4%) **Error! Reference source not found.**.The most common acyanotic CHD was ASD, comprising 34.9 % (n=52) as isolated and combination of ASD+VSD in 5.74% (n=10) of cases, thus making it a total of 41.6.6%. Though majority of VSD were isolated type, 28% (n=42), 17 other patients of VSD were in combination with a variety of other cardiac defects (PS, ASD, PDA, DORV, etc.). Thus making it a total of 39.6 % (n=59). Majority of VSDs were of sub Aortic type constituting 45% (n=19) followed by perimembranous 38% (n=16), muscular type 9.5% (n=4) and sub pulmonic type 7 % (n=3).

Isolated PDA was identified in 14.7% (n=22) of cases, isolated P.S was found in 8% (n=12) of total cases, left sided obstructive lesion A.S was found in 2.7% (n=4) cases and Coarctation of Aorta either in combination with PDA or VSD was seen in 1.34% (n=2) cases. AVCD defect was seen in 1.34% (n=2) cases, Dextrocardia with situs inversus was identified in 2% (n=3) cases.

TOF and its variants, seen in**Error! Reference source not found.**, were the most common amongst the cyanotic CHDs constituting 64% (n=16) of cyanotic CHD cases. Other rare cyanotic conditions DORV +VSD+PS 8% (n=2), DORV+HLHS 4% (N=1) and TGA 12% (n=3), were observed, while one each of Cortriatrium, TAPVC and Ebstien anomaly were also identified at 4%.

2. Sex Distribution of CHDs: Of total 174 cases females (n=96) outnumbered males (n=78) with a ratio of 1:1.23. PDA was observed equally in both sexes male (n=11), female (n=11).VSD was more frequently observed in males (n=24) than in females (n=18), whereas ASD identified more frequently in females (n=29) than males (n=23). Right sided obstructions TOF and PS were more frequently identified in females (n=11 and 7 cases) than in males (5 and 5 cases). While left sided obstructions AS (n=4) was observed in males only, and Coarctation (n=2) in females only.

3. Age Distribution of CHDs: In the present study of CHDs, 34.5% (n=60) of total cases were detected between 1month and 1 year of age, 21.2% (n=37) were identified between 1 - 5 years of age, 21.2% (n=37) between 5 - 10 years of age, 23% (n=41) between 10 – 18 years of age. Age and sex distribution of cases are shown in**Error! Reference source not found.**.

Discussion

According to a recent systematic review [4], highest prevalence of CHD is reported from Asia (9.3 per 1000 live births), while least is reported from Africa (1.9 per 1000 live births). In contrast to epidemiological studies from developed countries, there is no comprehensive prevalence data on CHD in Indian population. There are few scattered studies in different regions of India, mostly in the north and they are again either school based or hospital based with very few population based studies.

Studies from India [5-12], have reported a wide variation in prevalence of CHD from 2.25 to 26.3 per 1000 live births, depending on the type of study being performed [6,10,11,13]. For instance, hospital based studies may have a higher prevalence as new-borns are included, in whom, the number of trivial lesions are high, while [5,7] school based studies may show lower prevalence. This study is a hospital-based study with a calculated prevalence of 2.9 per 1000 patients. This hospital has adult cardiac services providing device closure or surgical closure of simple CHDs in uncomplicated patients. Though the observed prevalence is consistent with low prevalence studies as seen in [7,9,14] hospital based and in some school based studies [5,7,14], this observation may not reflect the true prevalence in the community because it is a retrospective hospital based study. Also, new-borns and stillborn babies were excluded from this study.

In our study, acyanotic CHDs form a major chunk (n=149) 85.6% of total CHDs, which is in congruent with other studies [3,11]. ASD was most common accounting for 35% of total cases, either isolated (n=52) 30% or in combination with VSD (n=10) 5.7%; which is similar to some studies [14,15] and in contrast to several studies where VSD is comparatively common.

The next common lesion identified is VSD, comprising 34% (n=59) of total cases (still within reported range 21-42%), out of which isolated were 24% (n=42) and remaining 17 cases were in combination with various defects like PS, PDA, ASD, DORV, Coarctation of Aorta, etc. Of sub types of VSD, sub aortic type 45% (n=19) was more frequently observed, followed by perimembranous and muscular type [7,10]. Right sided pulmonic obstructive lesions like TOF and PS were more commonly observed than Left Ventricular Obstructive Lesions like Coarctation and AS, which are in accordance with other studies in India.The rare and complex CHDs like Cortriatrium, HLHS, TAPVC and Ebstien Anomaly were found one case each, which are known to have very low frequency. This observance is similar to that found in studies conducted in Mysore and Uttarakhand [6,11].

In our study 34% of CHDs were detected by one year of age and majority (56%) were identified by five years of age, which is in concordance with many other studies [3,15]. We also observed that simple defects like PDA and VSD were identified earlier, i.e. pre-school age, and most of ASD were identified after the age of 5years. Looking at children between 10 -18 years of age, ASD outnumbered all defects, followed by VSD and PDA, indicating either early diagnosis or spontaneous closure of VSD and PDA.

Of all Cyanotic CHDs, 50% of cases were identified during 1 month to 5 years of age. TOF and its variants were identified in all age groups in our study. Children of 15 years of age and above, constituted 9 % of total cases of which ASD was most commonly observed, followed by VSD and cyanotic lesions, but no PDA was observed. This is an important observation indicating a delay in diagnosis of unrecognised or uncorrected CHD. Female children outnumbered the male children with a ratio of 1:1.23. Both Acyanotic and Cyanotic lesions, right sided obstructive lesions (TOF, PS), and ASD were observed more frequently in females. VSD were seen more frequently in males whereas PDA was seen equally in both sexes.

Conclusion

This study gives an overview of the pattern of CHD with a prevalence of 2.9/1000 patients attending the hospital.The limitation in our study is lack of paediatric cardiac services, which might influence the underreporting of actual number of children with CHD, in the community.

Noninvasive diagnostic tool, 2D echo plays a major role with a high detection rate in the diagnosis of CHDs. Early detection through new born screening, can potentially improve the outcome of CHDs. ECHO and Pulse oximetry, along with appropriate clinical examination at birth and 6 weeks of age, would reduce morbidity and mortality rates associated with many of the CHDs. An implementation of protocols for timely management of infants with CHD is essential.

Abbreviations

ACHD – Acyanotic Congenital Heart diseases, AS – Aortic Stenosis, ASD – Atrial Septal Defect, AVCD – Atrio Ventricular Canal Defect, CCHD – Cyanotic Congenital Heart Disease, CHD – Congenital Heart Disease, COA – Coarctation of Aorta, DORV – Double Outlet Right Ventricle, HLHS – Hypo Plastic Left Heart Syndrome, MVP – Mitral Valve Prolapse, PDA – Patent Ductus Arteriosus, PS – Pulmonary Stenosis, TAPVC – Total Anomalous Pulmonary Venus Connection , TGA- Transposition of Great Arteries, TOF – Tetralogy of Fallot, VSD – Ventricular Septal Defect.

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