

Original article

Pattern of congenital heart disease and clinical profile in children of rural Maharashtra

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ABSTRACT:

Background: Congenital Heart Disease (CHD) is one of the most common birth defects amongst all the congenital diseases. There are few studies mentioning about changing pattern and clinical profile in children with Congenital Heart disease in rural tertiary care hospital

Aims and objectives: Present study was conducted to study demographic profile and clinical profile of children with Congenital Heart Disease as well as different types of Congenital Heart Disease amongst childrens in rural tertiary care hospital of Maharashtra.

Materials and methods: It was a cross sectional descriptive study conducted in rural tertiary care hospital of Maharashtra over a period of one year with a sample size of 112. All patients from age 0 – 12 years diagnosed with congenital heart disease by 2D Echocardiography examination were included in the study. Premature(<37weeks) newborn babies with Patent Ductus Arteriosus (PDA),children with acquired heart diseases were excluded from study.

Results: Out of the 112 patients , Acyanotic Heart Disease was more common than cyanotic heart disease(87% vs.13%) with VSD and TOF were the commonest lesions in respective categories. Congenital Heart Disease was more common in males than females and it was diagnosed commonly in the age group 1 month - 12 months of age. General examination was normal in most of the patients with CHD, while CVS examination was abnormal in atleast 50% of patients with CHD. Visible cyanosis was seen in in approximately 20% of patients with cyanotic CHD.

Conclusion: Similar to previous reported studies, acyanotic heart disease was more common than cyanotic heart disease. General examination was usually normal,but cardiovascular examination gave abnormal findings in atleast half of the diagnosed patients.

Key words: Congenital Heart Disease,Ventricular Septal Defect,Cyanosis,rural tertiary care centre, Maharashtra.

INTRODUCTION:

Congenital Heart Disease (CHD) is one of the most common birth defects amongst all the congenital diseases.¹Although congenital heart disease (CHD) has an incidence of less than 1%, cardiac defects are the most common form of fatal congenital anomaly during infancy.Around one percent of all children show some symptoms of congenital heart diseases. So, it is important to screen such patients to rule out congenital heart disease on time. The birth prevalence of CHD reported is 8–12/1000 live births.²

Some recent studies have identified many associations with CHD, including the National Birth Defects Prevention Study, all these studies evaluated the potential risk of different medication

use during pregnancy to cause birth defects including cardiac defects.^{3,4-8} Children with CHD may present early or they may remain asymptomatic till late childhood depending on the type of underlying CHD.Timely diagnosis is the key in the management of children with CHD. Non-affordability, uneducated parents, social influence, unavailability of paediatric cardiologist and nearby cardiac tertiary centres are the few amongst many hurdles in diagnosing and managing children with CHD in rural population. We wanted to know the Status and pattern of congenital heart diseases in children and their clinical profile at rural Maharashtra, therefore decided to conduct a descriptive observational study about the same.

METHODOLOGY:

We conducted descriptive Cross sectional study in Rural Tertiary Care Center of Maharashtra. Ethics committee approval was taken before initiating the study. The aim of the study was to study pattern and clinical profile of children with Congenital Heart Disease. The objectives of the study were to know demographic profile of children with Congenital Heart Disease, to determine types of Congenital Heart Disease and their clinical profile. All patients in the age group between 0-12 years with Congenital Heart Disease confirmed by 2 D Echocardiography examination were included in the study. Parents / caretakers written informed consent for participation in the study was obtained before enrollment in the study. We excluded Premature (<37weeks) newborn babies with Patent Ductus Arteriosus (PDA) and those babies with Acquired heart diseases. We thus studied 112 children over period of 1 year. We maintained the confidentiality of the study subjects. The identity of subjects involved in the study was bound in strict

confidence. The clinical data was only available to the investigator carrying out the study and to the regulatory authorities.

Findings of congenital heart disease were noted down on 2D Echocardiography report (The type of CHD, the size of the lesion and relevant details). The required information of all patient's with confirmed congenital heart disease such as their demography (age, gender, height, weight at the time of examination, gestational age at the time of birth and birth weight), clinical examination findings (SPO₂, pulse rate, auscultatory findings had been recorded and written in Case Record Form.

Statistical Analysis:

Collected data was entered in Microsoft Office Excel-2007. Data collected was analysed using statistical analysis .SPSS version 17 was used for statistical analysis. Qualitative data was represented in form of frequency and percentage. Quantitative data was represented using mean, median and IQR (inter-quartile range).

RESULTS:

In the present study, records of 112 patients with CHD were collected and analysed, which showed following observations:

Table 1: Demographic profile of children with CHD

Age	0-29days : 46	1month-1year:47	>1year:19
Gender	Male: 61	Female:51	
Birth weight(grams)	Mean:2414.241	Min: 1000	Max: 3800
Weight(Kg)	Mean: 4.9110	Min: 1	Max: 18
Height(cm)	Mean: 54.456	Min:22	Max:133

(Table 1) There were 46 patients in the age group of 0-29 days , 47 patients between 1 month-12 month and 19 patients above the age of 1year.Overall ratio of Males : Females was 1.2:1

(61males & 51 females).Mean weight and height of patients was 4.9Kg and 54.45cm respectively. Mean Birth weight and gestational age was 2414 gram and 36weeks respectively.

Table 2 : Distribution of types of CHD in children.

Type of CHD	Numbers	Percentage
Acyanotic	98	87.5%
Cyanotic	14	12.5%
Total	112	100%

As we can see in Table 2, out of the 112 patients 12.5% (14) children had cyanotic heart disease and 87.5% (98) children were with acyanotic heart disease. Common congenital heart diseases

diagnosed in our study(out of 112).1st VSD = 51.7% ; 2nd ASD = 22.3% ; 3rd TOF = 6.25%; 4th Coarctation = 4.46% and Pulmonary valve stenosis = 4.46%; 5th AS and AVSD = 0.89%

Table 3 : Specific type of Acyanotic and cyanotic heart disease.

Type of CHD	Subtype	Number	Percentage
Acyanotic	VSD	58	59
	ASD	24	25
	COA	5	5
	Pulmonary stenosis	5	5
	Bilateral SVC	2	2
	Aortic Stenosis	1	1
	AVSD	1	1
	AP window	1	1
	Shones complex	1	1
Total		98	100
Cyanotic	TOF	7	50
	Complex CHD	4	29
	TAPVC	1	7
	PTA	1	7
	Ebstein Anomaly of TV	1	7
Total		14	100

(VSD: Ventricular Septal Defect; ASD: Atrial Septal Defect; COA: Coarctation Of Aorta; PS: Pulmonary stenosis; SVC:Superior Vena Cava; AVSD: Atrioventricular Septal Defect; AP window: Aortopulmonary window; TOF: Tetralogy of Fallot; TAPVC:Total Anamolous Pulmonary Venous Connection; PTA:Persistent Truncus Arteriosus; TV: tricuspid valve).

Amongst acyanotic CHD, most common defects were VSD, ASD, Pulmonary stenosis and coarctation of aorta with percentage of 59, 25, 5,5 respectively. Amongst acyanotic CHD majority of defects were of small in size (mild in severity) with percentage of 48% for small sized VSD and 15% for small sized ASD. We have seen different types of cyanotic CHD in our study such as Tetralogy of Fallots(TOF), Persistent Truncus Arteriosus(PTA), Total Anamolous Pulmonary Venous Connection(TAPVC),Complex CHD,Situs inversus. Tetralogy of Fallots(TOF) was the commonest cyanotic CHD.

Females were 1.2:1(61males & 51 females).In acyanotic category 54 was males and 44 were females. In cyanotic category, both male and female were equal in number (7). We noticed that VSD, ASD and PS were more common in males than females with a male: female ratio of 1.23:1, 1.2:1 and 1:5 respectively and TOF and coarctation of aorta was more common in females than males with male: female ratio of 1:2.5 and 1:1.5 respectively.

Mean pulse oximetry reading (spo2) was 97 % in acyanotic category and 85% in cyanotic category without any significant difference in upper

and lower limb readings. Out of 98 babies with acyanotic CHD,87% showed normal general examination and 13% showed abnormal findings. Severe acute malnutrition with apparent wasting was the commonest finding. Other abnormalities found on general examination were signs of respiratory distress, facial dysmorphism.downs phenotype, cleft lip/palate and, precordial bulge and abnormal hairs. Further on examination,88% of acyanotic heart disease does not show visible cyanosis/pallor and in 9% cases showed pallor.

Out of 14 babies with cyanotic CHD,60% showed normal general examination and 40% showed abnormal findings. Downs phenotype and precordial bulge were the abnormal findings in 12% babies. Visible cyanosis was seen in 28% babies of which 7% as peripheral and 14% as central cyanosis. In 7% babies, there was central cyanosis with clubbing. Out of 98 babies with acyanotic CHD,50% had normal auscultatory finding, remaining 50% babies had abnormal auscultatory findings, Ejection systolic murmur(ESM) was the commonest finding(27%) followed by Pan-Systolic murmur(PSM) in 17% of babies.

Out of 14 babies with cyanotic CHD, 42% had normal auscultatory findings, remaining 58% babies had abnormal auscultatory findings, Ejection systolic murmur (ESM) & Pan-Systolic murmur (PSM) were the abnormal auscultator findings.

DISCUSSION:

There are many studies in literature regarding congenital heart disease in children, but most of these studies are conducted at urban population. There are very few studies which are conducted at tertiary rural care center because of obvious reasons (non-availability of pediatric cardiologist and pediatric cardiac care services). We were fortunate enough to have one full time pediatric cardiologist and facility for management of children with congenital heart disease. We were able to screen many children between 0-12 years of age, who were suspected of CHD. Over a period of 1 year we screened more than 1000 children and found to have CHD in 112 patients.

In our study we saw that commonest CHD was VSD followed by ASD, TOF, Coarctation of aorta, PS, AS and AVSD in decreasing percentage order, while in Amir A. Sepehria² study VSD was followed by PS, TOF, AS, ASD, coarctation of aorta, AVSD. In our study ASD was the second most common CHD, when compared to the stated study. If we observe carefully the distribution/subtypes of CHD, we found almost all types of acyanotic CHD in our study with variable frequency. However in cyanotic CHD, we got TOF as the commonest cyanotic CHD, Complex CHD, PTA, Ebstein anomaly and TAPVC were the other types. We did not find TGA (Transposition of Great Arteries), DORV (Double outlet Right Ventricle), tricuspid atresia, pulmonary atresia in our study.

Our study showed that acyanotic heart disease was 87% and cyanotic heart disease was 13% whereas in the prospective study of Rajkumar Motiram Meshram⁹ Acyanotic heart disease constituted 66.74% and cyanotic 33.26%. Thus, our study showed significantly higher percentage of acyanotic CHD.

In our study VSD, ASD and PS were more common in males than females while in the prospective study by L Shamima¹⁰ VSD, TOF, A-V canal defect and single ventricle were more common in males. TOF and coarctation of aorta were common in females in our study, while ASD, PDA, COA, PS and TGA were more common

amongst females according to study by L Shamima¹⁰.

High index of suspicion, careful clinical examination and timely use of pulse oximetry are effective methods for early diagnosis and subsequently planning further management in children with Congenital Heart Disease. As per our study male: female ratio was 1.2:1 while that in a descriptive study of Dr Bhushan Deo¹¹ male to female ratio obtained was 1.45:1. In prospective study of Rajkumar Motiram Meshram⁹ CHD was more common in male (56.98%) giving rise to a male: female ratio was 1.3:1.

Below the age of 1 month we had 41.07% babies with CHD, between 1 month to 1 year 41.96% and above 1 year 16.96% babies with CHD. While in prospective study of Rajkumar Motiram Meshram⁹ about 56.28% of patients were below 1 year. Mean birth weight was 2414.241 gram in our study while in the study of Rachel R. Huxley¹² mean birth weight was 3293 (SD 401) gram, with boys being significantly heavier than girls.

Mostly in our study we could not find much findings on general examination in babies with acyanotic heart disease, only few showed pallor (9%). But in cyanotic heart disease category visible cyanosis with/without clubbing was observed in significant number of babies (21%). Whereas in the prospective study of L Shamima¹⁰ pallor was not observed and cyanosis was observed in 20% of patients. Prevalence of murmurs is variable in different studies as it depends on the clinical skills/expertise of the attending doctor, frequency and timing of examinations as nearly half of newborn babies as well as infants with CHD will have no murmurs/soft murmurs and possibly no other signs of CHD when examined at first time. In Auscultatory findings in our study we found that there were 50.89% cases where murmur was heard while in the retrospective epidemiological cross-sectional study of Marwa¹³, they detected audible murmurs in 74.4% of patients.

CONCLUSION:

Acyanotic Heart Disease was more common than cyanotic heart disease (87% vs. 13%). In acyanotic heart disease VSD was most common. In cyanotic heart disease TOF was most common. Congenital Heart Disease was more common in males than females. The most common age group in which CHD was diagnosed was 1 month - 12 months. General examination was normal in most of the

patients with CHD, while CVS examination was abnormal in atleast 50% of patients with CHD. Visible cyanosis was seen in approximately 20% of patients with cyanotic CHD, rest did not show visible cyanosis. Pulse oximetry is useful screening tool which showed SPO2 <94% in all patients with cyanotic CHD.

Limitations of study: Larger sample size is required in consolidating the findings of our study. The follow up of the patients was not done in our

study to know the spontaneous resolution of certain CHD's as well as operative percentage of those who were advised for surgical treatment.

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