



ORIGINAL RESEARCH PAPER

Pediatrics

PATTERN OF CONGENITAL HEART DISEASE IN NEONATAL CARE UNIT IN TERTIARY CARE HOSPITAL

KEY WORDS: Neonates, congenital-heart disease, echocardiography, prevalence, Neonates, congenital-heart disease, echocardiography, prevalence, Patent ductus arteriosus

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ABSTRACT

OBJECTIVE(S): Pattern of congenital heart disease in neonatal care unit in tertiary care hospital
Method(s): This is a retrospective hospital based study carried out over a period of 12 months (August 2017- July 2018) where all suspected case of CHD due to the appearance of murmur, cyanosis, tachycardia were subjected to echocardiographic study. The age, sex, clinical presentation and echo findings were well documented.
OBSERVATION(S) : A total of 214(5.3%) patients were suspected as having congenital heart disease out of 4020 . On Echocardiography 93 (prevalence of 20.6/1000neonates) were found to be having significant findings. About 77 (82.7%) were the acyanotics, and 16 (17.20%) were cyanotic heart patients. Among the acyanotic heart diseases atrial septal defect was the most frequent lesion seen in 29% , followed by VSD (27%), patent ductus arteriosus in 20% neonates. Among the cyanotic heart diseases tetralogy of Fallot (12.5%) was the most frequent cyanotic heart disease seen in patients.
CONCLUSION(S): In this era of most accurate diagnostic modalities, any clinical suspicion of congenital heart disease should be confirmed by echocardiography to hasten the diagnosis, timely management and prevention of complications.

INTRODUCTION

Congenital cardiac defects have wide spectrum of of severity in infants. About 2-3 in 1000 newborns infants will be symptomatic with heart disease in first year of life . The diagnosis is established by 1 week of age in 40-50% of patients ,and by 1 month in 40-50% of newborns.

CHD is, a gross structural abnormality of the heart or intrathorasic great vessels that is actually or potentially of functional significance⁽¹⁾. Most cases of CHD were thought to be multifactorial and result from a combination of genetic predisposition and environmental stimulus⁽²⁾.

Most CHD are well tolerated in the fetus because of parallel nature of the fetal circulation . The marked changes in physiology and chamber dominance during the perinatal transition are reflected in evolution of the ECG during the neonatal period. Thus Echocardiography improves the rate of detection of CHD in symptomatic and high risk neonates⁽³⁾.

MATERIALS AND METHODS

This is a retrospective observational study, conducted at Department of pediatrics Government Medical College kota from August 2017 to July 2018. The objective of the study was to evaluate pattern of congenital heart disease in neonates admitted to neonatal care during our study period . Neonates with clinical suspicion of heart disease or referred for screening of congenital heart disease were subjected to clinical examination. Patients were subjected to echocardiography due to the appearance of murmur, cyanosis, tachypnoea. The presence or absence of CHD and its character was confirmed by echocardiography. The data of all patients regarding age of presentation, gender, signs and symptoms, clinical features and echo findings were noted.

Neonates with congenital heart disesase were included in the study. Excluded patients were those with normal echocardiography ,with cardiac failure and respiratory distress due to noncardiac causes like anemia. After final inclusion in the study, patients were classified according to the cardiac defects. The observation and discussion are as follows.

OBSERVATION AND DISCUSSION

During this study period out of 4020 neonates examined, 93 neonates (55males and 38females) were diagnosed with CHD, giving a prevalence of 20.6 / 1000 neonates as shown in Table 1. our findings are similar to study done to find prevalence of Congenital Heart Defects from 1980 to 2014 in different Regions

of India by Bhardwaj et al(2015)⁽⁴⁾ giving a prevalence of 19.14 per 1000 , In Mumbai 13.28 by Sawant et al.2013⁽⁵⁾ ,in Kanpur 26.4 by Kapoor and Gupta.2008⁽⁶⁾ but prevalence was only 3.9 by study done in Delhi by Khalil et al. (1994)

According to gender distribution. In our study male to female ratio is 1.44(Table 1). This finding is similar to observation of other studies^(7,8). Slightly higher prevalence of males in our study may be related to gender bias towards males. Which may be due to high health seeking behaviour in parents for male child.

In early neonatal age group (<7 days of birth) CHD was identified in 72(77.4%) newborns and 21 (22.6%)neonates with CHD identified in late neonatal period(Table 1). This is attributed to increasing number of hospital deliveries and increasing awareness and prompt referral on suspicion of congenital heart defects or may be due to the fact that each newborn has 24 hours access to pediatric care . As both pediatric and maternity hospitals run under same roof at our centre.

According to weight of neonates at the time of examination, those who were underweight (weighing less than 2.5 kg) formed majority of CHD cases(70.96%). Only 27neonates(29.04%) were above 2.5 kg (Table 1) . Serious congenital heart disease is more common among low birth weight babies than in overall neonatal population and is associated with high mortality according to study done on 1000 infants by M.Archer,MD of the university of Florida(2011)⁽⁹⁾.

There was racial difference of CHD cases coming from Hindu or muslim familes. 83.87% of neonates were Hindu and 16.03% were muslims. This difference is in accordance to population ratio of both religions and hospital admissions in our area.

Most of the CHD cases belong to rural areas . About 72(77.4%) neonates were from rural areas . Only 21(22.6%) neonates belong to urban area(Table 1). Only 2-4 % cases of CHD are associated with environmental or adverse maternal conditions and teratogenic influences . Thus huge difference in rate of rural and urban population is attributed to large number of referral from nearby villages and remote areas .

TABLE 1 Case Distribution (CHD) According To Age,Gender,Religion,Weight,Residence

Age	Gender	Religion	Weight	Residence
>7 days 72 (77.4%)	Male 55 (59.1%)	Hindu 78 (83.87%)	<2.5kg 66 (70.96%)	Urban 21 (22.6%)
<7 days 21 (22.6%)	Female 38 (39.9%)	Muslim 15 (17.13%)	>2.5kg 27 (29.04%)	Rural 72 (77.4%)

Among 93 neonates Acyanotic group formed the major chunk (80.7%), of the total CHD. As most common lesions are those that produced a volume load and most common of these are left to right shunt lesions like ASD,VSD,PDA⁽¹⁰⁾. Neonates with cyanotic heart disease were 16 (19.3%) patients which is congruent with the other studies⁽¹¹⁾. Among the Acyanotic heart diseases Septal defects (ASD ,VSD) , PDA either isolated or in combination were more readily recognized(Table 2). Atrial septal defect seen in 29% was the most frequent lesion . which was closely followed by Ventricular septal defect in (27.9%),followed by PDA 20%. If we analyse the neonatal population of various studies we find that ASD and PDA outnumbered VSD in these age groups^(12,13). Neonatal echocardiography might lead to bias for minor lesions (e.g. small VSDs, ASDs, PFO, and PDA), which are likely to be spontaneously corrected by a certain age.

TABLE : 2 Pattern and distribution pattern of major congenital lesions-ACHD (Echocardiography findings)

Ventricular septal defect

Type of lesion	frequency	Percentage of all lesions
Isolated VSD	5	5.37%
VSD & ASD	9	9.67%
VSD & PDA	1	1.07%
VSD& PDA& PFO	1	1.07%
VSD & ASD & PS	1	1.07%
VSD&ASD&TR	1	1.07%
ASD &VSD&PDA	7	7.52%
ASD & VSD& PDA moderate TR	1	1.07%

Atrial septal defect

Type of lesion	frequency	Percentage of all lesions
Isolated ASD OS	22	23.65%
ASD & mild PAH & TR	1	1.07%
ASD & Moderate PDA & S.TR	3	3.2%
ASD & Mild TR,RA RV dilated	1	1.07%

Patent Ductus Arteriosus and Patent foramen ovale

Type of lesion	frequency	Percentage of all lesions
PDA	8	8.60%
PDA & ASD	9	9.67%
PDA & PFO	2	2.15%
PDA & PFO&TR	1	1.07%
PFO	4	4.30%

Other major congenital lesions

Type of lesion	Frequency	percentage
Pulmonary atresia,moderate PDA, pulmonary stenosis,Rt Ventricular hypertrophy	2	2.15%
Dextrocardia	1	1.07%
Dextrocardia With Double Outlet Right Ventricle,VSD,ASD,ventricular inversion,PS	1	1.07%
Tetralogy of Fallot	2	2.15%
Transposition of great arteries & ASD,VSD	2	2.15%
Total Anomalous pulmonary venous connection,ASD,PAH	1	1.07%
Tricuspid Atresia & VSD,PDA	1	1.07%
Dysplastic, dilated RA RV with moderate PAH	1	1.07%
Hypoplastic Left heart syndrome	1	1.07%
Pulmonary Atresia	1	1.07%
Double outlet right ventricle ASD,VSD,PDA	1	1.07%

Among the cyanotic heart diseases Tetralogy of Fallot (12.5%) was the most frequent cyanotic heart disease (Table 3),TOF is reported

as most common cyanotic disease in several studies(11,12) Apart from these major heart defects various isolated and combined defects and minor lesions were also encountered. These involved 4 cases of patent Foramen ovale, 2cases of pulmonary atresia,. Transposition of great arteries with ASD and VSD 2 cases, single case of hypoplastic left ventricle ,1case of total anomalous pulmonary venous connection, one case of Tricuspid atresia ,one case of Double outlet right ventricle, two cases of Dextrocardia were present(Table 3).

CHDs were either the main cause of death or contributed to death in some way. Mortality occurred in 16 cases of CHD. Most common cardiac defects which resulted in mortality was combination defects such as ASD+VSD, ASD +PDA. Cyanotic heart defects such as Tetralogy of fallot, Dextrocardia, hypoplastic left heart syndrome were among the other contributory heart defects leading to mortality of neonates.

TABLE: 3 CYANOTIC HEART LESIONS (ECHOCARDIOGRAPHY FINDINGS)

ASD,VSD &PDA	1 (6.2%)
TAPVC,ASD & PAH	1(6.2%)
Tricuspid atresia with VSD & PDA	1(6.2%)
ASD with RA RV dilated	1(6.2%)
Dextrocardia with small ASD with TOF	1(6.2%)
Pulmonary Atresia with Dysplastic dilated RV with AS	1(6.2%)
Symmetric Septal Hypertrophy with Moderate PDA Dilated LA with Pumonary Atresia	1(6.2%)
TGA with large VSD with ASD	2(12.4%)
Total Anomalous Pulmonary Venous Connection	1(6.2%)
Pulmonary aresia with moderate left to right shunt with pulmonary stenosis	2 (12.4%)
Pulmonary atresia with moderate PDA ,severe critical PS ,RVH	1(6.2%)
Dextrocardia with DORV with VSD with ASD with Ventricular inversion with PS	1(6.2%)
Tetralogy of Fallot	2 (12.5%)
Total	16 (100%)

CONCLUSION

There is high prevalence of CHD among neonates admitted in NICU. CHD is more common in males,low birth weight neonates and those coming from rural areas. Septal defects are more commonly seen in neonates with acyanotic heart disease,TOF is common cyanotic disease. Mortality rate in CHD cases is higher, which was 16 cases(17.20%) among 93 cases.

The magnitude of the CHD problem is considerable and is largely unrecognized, understated, and underestimated. In this era where we have the most accurate diagnostic modalities, any clinical suspicion of congenital heart disease should be confirmed by echocardiography. Fetal echocardiography should be advised liberally to the expectant mothers when one of the siblings is known to have complex congenital heart disease.

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