Prevalence of Congenital Heart Disease in Sick Neonates: An Echocardiographic Evaluation.

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Received: April 2018
Accepted: April 2018

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ABSTRACT

Background: Congenital heart disease (CHD) is one of the major causes of mortality and morbidity in the paediatric population particularly in neonates and infants of both the developing and developed countries. Importance of congenital defects is more prominent in infants and delay in recognition may adversely effect survival. Objective: To find the prevalence and pattern of CHD in sick neonates in a tertiary care hospital VSSIMSAR Odisha India catering to economically backward area of our country. Methods: A prospective analysis of case of 8,858 patients (0-1 month) was conducted to ascertain the prevalence and spectrum of CHDs. Results: A total of 232 patients out of 8,856, were found having CHDs measuring a prevalence of 26.2/1000 among sick neonates. About 202 (91.3%) were the acyanotics and 20 (8.6%) were cyanotic heart patients. 4 (1.7%)were complex congenital heart disease Among the acyanotic heart diseases the most frequent lesion seen in 126 (62.7%) followed by ASD alone or in combination was detected in 76 cases (37.6 %) followed by PDA alone or in combination in around 74 cases(36.6%). Combined defects PDA and VSD in 40 cases (20.2 %). Valvular PS was observed in 3% of cases among the cyanotic heart diseases Tetralogy of Fallot was the most frequent cyanotic heart disease seen in 9 cases. Conclusion: Prevalence of congenital heart disease is very high among the sick neonates though figure of 26.2/1000 among the sick neonates could be an over estimation of the actual disease burden in our community because of high prevalence of sick children. The study heightened awareness among the treating physicians about the high prevalence of cardiac diseases in sick neonates and early recognition is essential to reduce the morbidity and mortality associated with these ailments.

Keywords: Sick neonates, Prevalence of congenital heart disease, echocardiography study.
MATERIALS AND METHODS

We prospectively studied all sick neonates hospitalized to SNCU PICU paediatric cardiology inpatient department of our hospital, sick neonates sent by paediatrician to our college for evaluation and treatment were included in the study during the period of March 2009 to December 2018. For the diagnosis of CHD, a definition proposed by Mitchell et al. was applied, that is, any gross structural abnormality of the heart or intrathoracic great vessels that is actually or potentially of functional significance excluding the systemic great arteries and veins.[6] Any patient having the signs and symptoms like shortness of breath, difficulty in feeding, excessive sweating, bluish discoloration of lips and tongue, failure to thrive, clubbing, palpitation, feeling of impending doom, fainting, light headedness, rapid breathing, discrepancy in pulse, cyanosis, heart murmur, abnormal chest X-ray, swelling of abdomen and feet, chest and abdomen pain, and arrhythmias and loss of consciousness, etc. were evaluated further and those suspected of cardiac disease were subjected for chest X-ray, electrocardiogram (ECG), Echocardiography was performed by two cardiologists and in doubtful cases were evaluated by both in one setting and in complex cases help of paediatric cardiologist taken. Echocardiography was done as per standards laid down by the American Society of Echocardiography,[5] using the M-mode, two-dimensional and colour Doppler, pulse and continuous wave echocardiogram. Written consent was obtained from parents and/or attendants from all enrolled patients following all ethical commitments. Prevalence all kinds of CHDs we observed were computed. The different types of CHDs considered for the present investigation as mentioned below:

1. Congenital heart disease PFO, ASD, VSD, PDA, Aorto Pulmonary Window, Valvular Aortic and Pulmonary Stenosis, Coracation of Aorta, Endocardial Cushion Defect alone or combination.

2. Cyanotic CHD: Tetralogy of Fallot, Tetralogy of Fallot-like conditions associated with pulmonary stenosis or atresia, total anomalous pulmonary venous connection, persistent truncus arteriosus, Ebstein’s anomaly, Hypoplastic left heart syndrome, aortic arch interruption, univentricular heart etc. transposition of great arteries, dextrocardia, double outlet right ventricle.

3. Complex CHDs (various types of CHDs existing together including a rare type of CHDs)

4. Other cardiac findings on echocardiography: Persistent pulmonary hypertension of newborn.

RESULTS

Total no 8.856 patients (0-1 month) were screened to ascertain the prevalence and spectrum of Congenital Heart disease. All the neonates were sick and had complain and features suggestive of presence of heart disease. About 232 neonates out of 8.856, were found having CHDs measuring a prevalence of 26.2/1000 among sick neonates. Out of total 232 about 202 (91.3%) were the acyanotic heart disease, and 20 (8.6%) were having cyanotic heart disease. Only 4 neonates (1.7%) were detected having complex congenital heart disease.

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<tr>
<th>Table 1: Acyanotic and Cyanotic Heart Disease (Single Defect)</th>
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<td><strong>Nature of defects</strong></td>
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<td>VSD</td>
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<td>ENDOCARDIAL CUSHION DEFECT</td>
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<td>COARCTATION OF AORTA</td>
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<th>Table 2: Combined Congenital Defect</th>
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<td><strong>Nature of defect</strong></td>
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<td>VSD PDA</td>
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<td>VSD ASD PDA</td>
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<td>VSD ASD PS</td>
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Among the acyanotic heart diseases Ventricular Septal Defect alone or in combination with other lesion was the most frequent lesion seen in 126 (62.7%) out of which muscular VSD constituted around 28 cases. ASD alone or in combination was detected in 76 cases (37.6%) followed by PDA alone or in combination in around 74 cases (36.6%) ASD II was the most frequent ASD with sinus venosus ASD Ostium Primum ASD was seen in one case each. Observed in followed by Combined defects were very common observation in the present study with combined PDA and VSD observed in 40 cases (19.8%) Combined VSD and ASD defects were observed in 18 cases (8.9%). Valvular PS was observed in 3% of cases (1.4%) and Endocardial cushion defect were observed in 3 cases (1.4%) Coarctation of Aorta in 2 cases (0.9%).

Complex CHDs in this series. Neonates were very sick and there was really difficulty in detail analysis of these cases.

DISCUSSION

CHD is considered to be the most major congenital anomaly and a leading cause of mortality in the first...
year of life. However, little data is available from developing countries. The birth prevalence of CHD is estimated to be eight per 1000 live births. The burden of CHD in India is likely to be enormous, because of a very high birth rate. It is estimated that over 180,000 children in India are born with CHD every year. As only a very small proportion get required intervention, the number of young adults with CHD is steadily increasing. This heavy burden emphasizes the importance of detection of CHD very early in life in India. To know about the estimated index of CHDs in various population groups, several studies were carried out in past 40 years and during this period a notable improvement in diagnosis of CHD was made by the introduction of echocardiography.

One large study by Wanni KA, et al observed that Acyanotic heart disease formed the major chunk (88%), of the total CHD patients. Similar observation was made by many other studies in CHD, the most frequent type of CHD was VSD, and maximum number of cases of CHD was of the age group 1-12 months (46.7%), and including neonates. The frequency of the complex and rare types of CHDs was less when compared to the western data but similar to other Indian studies. This could be due to the severity of the defects which might have led to the death of the patients before accessing the medical facilities and racial and genetic factors between us and them. The diagnosis of CHD may pass unnoticed in 30% of infants during the 1st weeks of life. The birth prevalence of major congenital heart defects in three studies compared to estimated averages from literature overall 9 per 1000 birth and severe heart defects 2.5 per 1,000. Various types of VSD is the most common types of congenital heart defects Incidence ranges from 5 to 50 per 1000 live birth and 0.3 per 1000 adults. Various types of ASD constitute 6-10% of congenital heart defects in children, the incidence ASD has been estimated to be 56 per 100000 live births. Isolated PDA accounts for 5-10 %of congenital heart defects. No large study is available regarding the prevalence of different congenital heart defects in neonaes as all the study in children included children of various age groups.

The present study on Sick neonates we observed a prevalence rate of 26 % which seems higher than other studies but may be explained by inclusion of more sick neonates We observed VSD in 28.2 percent of cases followed closely by ASD in about 21 % of cases VSD PDA 19.8 and PDA alone in 9.9 % of cases in sharp contrast to earlier study by Saxena et al who observed, VSDs (restrictive and non restrictive) were the most common significant CHDs (43.9% and 20.7%, respectively) with a prevalence rate of 5.22 per 1000 live births. ASDs and PDAs consisted of 7.3% and 4.3% of the significant CHDs, with a prevalence rate of 0.59/1000 and 0.34/1000, respectively. Higher prevalence of Multiple congenital defects were observed with combined VSD PDA observed in 18.8% of cases followed by combined VSD and ASD 8.9% of cases. VSD ASD and PDA were observed in 3.8% of cases. No study has demonstrated the presence of multiple defects and our study was unique in identifying higher prevalence of such combined lesion. Higher prevalence of combined lesion is possible because of higher frequency of small ASD PDA which closes later on in life. There was less prevalence of Pulmonary Stenosis being observed in 3/123 case Coarctation of Aorta was detected in 2 cases similar to the observation by Saxena et al where the prevalence of these lesion was also low with two cases each of pulmonary stenosis, coarctation of aorta, and aortic stenosis. Cyanotic heart defects were much less compared to acyanotic heart disease 8.6 % of total cases Tetralogy of fallot physiology subset was most common followed by TAPVC in 3 cases Tricuspid atresisa and pulmanry atrsia in 2 cases each in contrast to saxena et al who observed that among the major cyanotic CHDs, transposition of great arteries and hypoplastic left heart syndrome were the most common (seven and five cases; There were three cases each of atrioventricular septal defects with pulmonary atresia and Tetralogy of Fallot (0.15/1000). Complex congenital heart disease was very low0.12 %. Frequency of the complex and rare types of CHDs was less and compared to the other Indian studies. This could be due to the severity of the defects which might have led to the death of the patients before accessing the medical facilities.

CONCLUSION

The magnitude of the CHD problem is considerable and is largely unrecognized, understated, and underestimated. Congenital malformations and in particular CHDs are important contributors to infant mortality. However, Recent advances in cardiovascular diagnostics particularly echocardiography and therapeutics have increased the survival of infants and children with CHDs Echocardiography with Doppler is the gold standard for the diagnosis of CHD in newborns with a very high sensitivity and specificity. There is encouraging results of treatment for most of the CHD from our country and should prompt more clinicians to take up the challenge of detecting these lesion early so that these sick neonates can be managed early. Hence, it is important to determine the exact prevalence and case burden of CHD very early as echocardiography and expert interpretation are easily available so that appropriate changes in health policies can be recommended.
REFERENCES