Mediscope The Journal of GMC

ORIGINAL ARTICLE DOI: https://doi.org/10.3329/mediscope.v8i1.52201

Incidence, pattern and presentation of Congenital Heart Disease in neonates in southern part of Bangladesh

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Abstract

Background: Congenital heart disease (CHD) has already been recognized as one of the important cause of neonatal mortality and morbidity. The reported prevalence of CHD in live newborns tends to vary a lot due to various unrecognizable lesions at birth and lack of technical expertise. Aims & objectives: The ultimate aim of this study was to assess the birth incidence and pattern of congenital heart disease (CHD) using echocardiography in babies born in different government and private hospitals and also in different households. Results: Overall incidence of congenital heart disease in neonate in this study was 4.9 per 1000 live birth. Mean age of diagnosis was 22.5±4.6 days. Average weight of these neonates was 26.70 gm. 61.5 % neonates were female. 30.8% was preterm. Respiratory distress was the most common clinical presentation (76.9%). The commonest type of congenital heart disease was Ventricular septal defect (VSD) (61.5%). Maternal co-morbidity may have influence. 30.8% mothers had gestational diabetes mellitus. Hypothyroidism, hypertension and maternal infection may have co-relation. Conclusion: In this study, we have found that the overall incidence of neonatal congenital heart disease is 4.9 per 1000 live birth. A high index of suspicion and routine neonatal cheek-up may have key role in diagnosis.

Key words: Incidence, congenital heart disease, VSD, ASD, pattern.

Introduction

Congenital heart disease (CHD) has been defined as a gross structural abnormality of the heart or intrathoracic great vessels that is actually or potentially of functional significance.1 In the developed world, CHD is considered to be the most major congenital anomaly and a leading cause of mortality in the first year of life. 2,3 However, little data is

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available from developing countries. The birth prevalence of CHD is estimated to be eight per 1000 live births.4,5 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.6 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 CHD in India. Recent advances in cardiovascular diagnostics and therapeutics have increased the survival of infants and children with CHDs. Unfortunately, access to quality care for children with CHD is largely restricted to developed parts of the world. It is important to have reliable information about CHD birth prevalence in the developing world, including India, to plan and provide better care to these patients. An earlier study from India7, published in 1994, has reported on the prevalence of CHD at birth, but the diagnosis is primarily based on clinical examination. It is well known that routine clinical examination of newborns has a poor sensitivity for detection of CHD.8,9 Echocardiography with Doppler is the gold standard for the diagnosis of CHD in newborns with a very high sensitivity and specificity.10-12 In Bangladesh, regarding this, reliable & authentic data are still less.

In our study, we describe the birth incidence of CHDs in babies born in a tertiary level private hospital, Bangladesh using screening chest radiograph & echocardiography.

Materials and methods:

This research was conducted as a cross sectional study in corporate private hospital of south-east zone of Bangladesh, Gazi Medical College Hospital, Khulna, initially with a total number of 2638 neonate from a period of January 2019 to January 2020 (In-patients, out-patients & from free medical campaign) . Later on, among these 2638 patients, a total number of 425 suspected patients (based on inclusion & exclusion criteria) were taken for further evaluation by investigation (chest radiograph & echocardiogram). Inclusion criteria: Dyspnoea, Feeding difficulties, Presence of cyanosis. Exclusion criteria: Recurrent wheeze, childhood bronchial asthma, Respiratory tract infection. Congenital heart disease was found in a total number of 13 patients. All data was collected and analyzed prospectively- such as patient details history, clinical & investigative findings etc. Convenient purposive sampling was used as a method of selecting study sample. In this clinical study, both manual and computer based statistical analysis of the data were done. Data were analyzed manually and then rechecked with SPSS (Statistical Package for the Social Sciences) computer package programmer. The survey data were usually be analyzed using both analytic as well as descriptive statistic. Such as; mean, SD, percentage etc. Ethical clearance was taken individually from patient and from the ethical review committee of Gazi Medical College Hospital, Khulna, Bangladesh.

Results

The demographic distribution of 13 patients of congenital heart disease in this research has been depicted in table 1. Overall incidence rate was 4.9 per 1000 live birth. Mean age of diagnosis was 22.5 days. 61.5 % (08 out of total 13) neonates were female, 30.8% (04) were preterm, and mean weight of these neonates was 26.70 gm.

Table 01: Demographic profile of the neonates

Demographic profile	Value
Incidence rate	4.9 per 1000 live birth
Mean age±SD	22.5±4.6 days
Sex:	
Male	05 (38.5%)
Female	08 (61.5%)
Gestational age:	
Preterm	04 (30.8%)
Term	09 (69.2%)
Mean weight±SD	2670.6±280.4 gm

Regarding the clinical feature of the disease, the most common was respiratory and feeding problem. Approximately 76.9% (10) & 61.5% (8) had respiratory distress & feeding problem respectively. 15.4% (2) neonates presented with cyanosis. Heart failure was found in 7.7% (1) neonate (Table 2).

Table 02: Presentation of the neonates with congenital heart disease

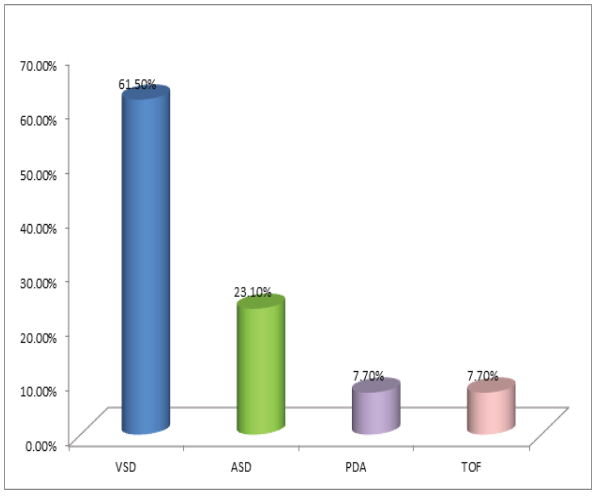
Presentation	No of patients (n)	%
Respiratory distress	10	76.9
Cyanosis	2	15.4
No cyanosis	11	84.6
Reluctant to feed	8	61.5
Heart failure	1	7.7

Ventricular septal defect (VSD) was found as the most common pattern (61.5%, 08 neonates), followed by Atrial septal defect (ASD) in 23.1% (03) neonates. 01 (7.7%) neonate of Patent ductus arteriosis and tetralogy of Fallot was found in this research (Figure 01).

analysis was done by applying paired 't' test for the difference in pre and post treatment values. For inter group analysis unpaired 't'-test and 'chi-square' test were applied. Pvalue <0.05 was taken as significant. Data analysis was done by computer aided statistical software SPSS and Data were presented in the form of tables and graphs.

Results

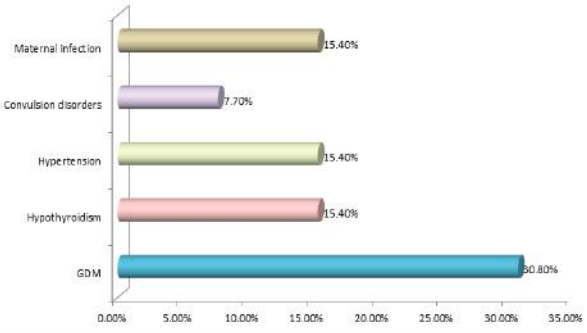
Among the participants the mean age in the labetalol treated group (A) was 26.16 ± 4.94 years and in the methyldopa treated group (B) was 24.54 ± 4.99 years and 't' value is 1.629; p > 0.05. In the labetalol treated group, the mean gestational age was34.9 ± 3.65 weeks and in the methyldopa treated group was35.78 ± 3.72 weeks and 't' value is 1.19; p > 0.05. Mean of MBP before treatment in labetalol and methyldopa treated group 123.9 ± 17.11 and 121.23 ± 13.59 respectively; p >0.05.The difference between the two groups was statistically not significant with regards to mean age of patient, gestational age, and mean blood pressure distribution.



VSD- ventricular septal defect, ASD- Atrial septal defect, PDA- Patent ductus arteriosus, TOF-Tetralogy of Fallot.

Figure 01: Pattern of congenital heart disease

About 30.8% (04) mothers of affected neonates had a history of gestational diabetes mellitus, followed by 15.4% (02) had history of hypothyroidism, hypertension and maternal infection respectively. History of convulsion disorders was found in 7.7% (01) mother (Figure 02).



GDM- Gestational diabetes mellitus

Figure 02: Association with maternal co-morbidities

Discussion

The results of this research suggest that the incidence of congenital heart disease in neonate was approximately 4.9 per 1000 live birth. Overall mean age± of diagnosis was 22.5±4.6 days. Average weight of these neonates was 26.70 gm. In this study, 61.5 % (08 out of total 13) neonates were female. 30.8% (04) and 69.2% (09) were preterm & term neonate respectively. Respiratory distress was the most common clinical presentation (76.9%, 10 neonates), whereas, feeding problem (reluctant to feed) was another common symptoms (61.5%, 8 neonates). Cyanosis was present in approximately (15.4%, 02 neonates). Only 01 neonate (7.7%) presented with heart failure. The most common form of congenital heart disease was Ventricular septal defect (VSD) (61.5%, 08 neonates). On the other hand, Atrial septal defect (ASD) was found in 23.1% (03) neonates. In this study, 01 (7.7%) neonate of Patent ductus arteriosis and tetralogy of Fallot was found. Maternal co-morbidity may have co-relation with congenital heart disease in neonate. 30.8% (04) mothers had an associated history of gestational diabetes mellitus, hypothyroidism and hypertension. Maternal infection (persistent chorioamnionitis and chronic pelvic inflammatory disease) was associated with 15.4% (02) mothers. Congenital heart disease has already been recognized as one of the important cause of neonatal mortality and morbidity. Ferencz et. al., reviewed seven major studies from Europe and North America and concluded that confirmed CHD prevalence had been remarkably constant at 4/1000 live births over 40 years time span from 1940-1980.13 In a particular study male and female ratio was 1.2:1.14 This gender distribution correlates partially with observation of Mollah et. al.15 Clinically respiratory distress (71%) was the commonest presenting symptom followed by cyanosis (26%) and reluctant to feed (24%)14. Similar observation was found by others.16-18 In a study the important CHD in order of frequency were found VSD (29%), ASD (24%), PDA (10%), complex congenital heart disease (8%), TGA (8%), TOF (6%) respectively.14 This correlates with the study of Mitchelle et. al12. Mollah et. al14. and Hussain et. al.19 A study conducted on Delhi school children to find out prevalence of congenital heart disease showed lesions in order of frequency were VSD 30%, ASD 23%, PDA 11%, TOF 4%.19 Report of New England regional infant cardiac program showed VSD as the commonest lesion, which is similar to our study20. But our study differs from Rahman et. al21., Siddique et. al22. and Fatema et. al.23

They found ASD was the commonest lesion. This difference in observation might due to that Rahman et. al. and Siddique et. al. included many adult patients in their study.12 Maternal disease like diabetes mellitus, maternal infection, hypertension and some drugs might increase occurrence of heart disease in neonates. In a research, 10% mothers were diabetic, 8% hypertensive and 4% mothers gave a positive history of suggestive of infection during their pregnancy period.12

Conclusion

In this study, we have found that the overall incidence of neonatal congenital heart disease is 4.9 per 1000 live birth. Respiratory problem, cyanosis and reluctant to feed are the most common presentation. Ventricular septal disease is the commonest type (61.5%). Maternal diseases like- gestational diabetes mellitus, hypothyroidism, hypertension, maternal infection etc. may have association. High index of suspicion and routine neonatal cheek-up may have key role in diagnosis.

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