



Original Article

Frequency and Pattern of Congenital Heart Diseases in Newborn in a Tertiary Care Hospital

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Abstract

Congenital heart disease is most common heart disease in children and causes significant morbidity and mortality. This study was done to evaluate the frequency and pattern of congenital heart disease in neonates (age \leq 28 days) admitted in a tertiary care level hospital. It was a cross-sectional descriptive type of study conducted at the Department of Paediatrics of Rajshahi Medical College Hospital from January 2014 to December 2015. Among the 4120 neonates admitted in RMCH in that period, 52 cases had cardiac murmur on auscultation. Incidence of cardiac murmur in the newborn was 1.26%. Clinically, among the 52 cases, 40 cases were thought to have pathological murmur and 12 cases were thought to have innocent murmur. During echocardiography, structural cardiac defect (congenital heart disease) was detected in 38 cases. So, incidence of congenital heart disease was 9.22/ 1000 live births. Remaining 14 cases had normal cardiac anatomy in echocardiography. VSD (12 cases) was the most common type of acyanotic congenital heart disease (23.08%) followed by ASD (11 cases) and PDA (6 cases). Among the cyanotic congenital heart disease, tetralogy of Fallot was the most common abnormality and it was found in 4 cases (7.69%). In this study, parental consanguinity was detected in 4 cases (7.69%). Early diagnosis, timely referral and proper management of congenital heart can save valuable lives and allow normal growth and development.

Key words: Congenital heart disease, newborn

TAJ 2018; 31: No-2: 35-38

Introduction

Congenital heart disease (CHD) is one of the most common congenital malformations, affecting 6 per 1000 live births. They account for 10% of infant deaths and about 50% of deaths from malformations.¹ Congenital heart disease (CHD) is defined as a structural abnormality of the heart or intra thoracic great vessels that is actually or potentially of functional significance.² CHD is the

leading cause of infant deaths due to birth defects.³ The complete routine newborn examination is extremely important to evaluate congenital cardiac defect during neonatal period. If a murmur is heard during neonatal examination there is a 54% chance of there being an underlying cardiac malformation.⁴ Cardiac murmur may be the first sign of a serious structural cardiac disease, especially in the neonate. Although a normal

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clinical examination of healthy newborn babies does not exclude serious congenital cardiac malformations.⁵ Many studies have been carried out worldwide, showing incidence of CHD in different parts of the world is 5-10/1000 live birth. Asian race is found to be more affected than non-Asian race due to high rate of consanguineous marriages.⁶ But in Bangladesh, only a few study was to evaluate. A cross sectional study found that the prevalence rate of CHD in neonates is about 7.8/1000 live births.^{6,7} Maximum neonates remain asymptomatic during neonatal period. This study found that approximately 50–70% of neonates having clinical murmur remain asymptomatic.^{8,9}

In another study⁵ found that the major types of CHD are VSD (42.6%), TOF (18.3%), ASD (14.8%), and PDA (7.8%) which correlates with many studies and they advised that all newborn babies should be examined thoroughly for any evidence of CHD. Low birth weight (<2500 gm) and premature (<37 weeks of gestation) babies have 34% and 26% congenital heart disease (CHD) respectively.⁷ Approximately one third of these neonates containing CHD require intervention in the first month of life.⁶ So, detecting murmur during neonatal period especially in preterm low birth weighted baby is essential in first month of life.

Materials and Methods

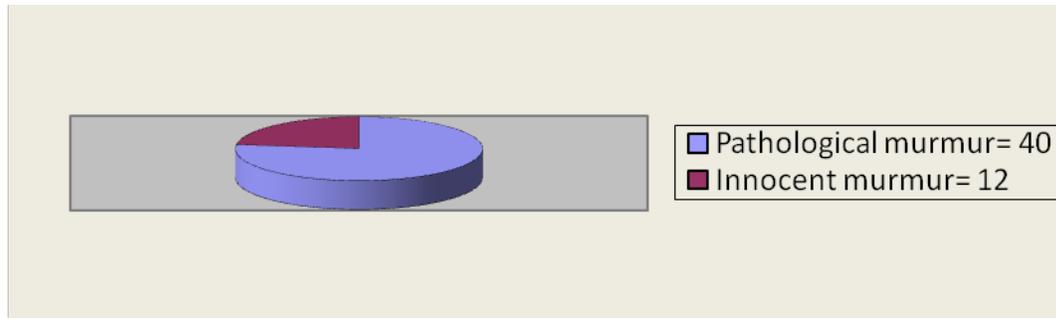
This was a cross sectional descriptive study, conducted in neonatal unit of pediatrics department of Rajshahi Medical college hospital. Study period was 2 years from January 2014 to December 2015. All the neonates (age 0-28 days) admitted in pediatric ward of Rajshahi Medical College Hospital who were fulfilled the selection criteria (total 4120 neonates) were enrolled. Among them 52 neonate had cardiac murmur and fulfill the selection criteria. Inclusion criteria: Age-0-28 days of life, presence of murmur. Exclusion criteria: Age– more than 28 days, patients having emergency surgical abnormalities, syndromic babies. All clinical information was received in predesigned data collection form. All the findings and investigation reports were recorded and analyzed.

Results

We examined total 4120 neonates during this study period among them only 52 (1.26%) neonates were presented with cardiac murmur. So, incidence rate of cardiac murmur in neonates is 1.26%. The neonates having murmur presented within 1st week of life (46.15%), then after second week (32.70%), rest of the neonates presented within 1-2 weeks of life. Mean age of all the neonates was (11.81± 8.49) days, ranging from 1 day to 28 days. (22= 42%) Male: female ratio is 1.36: 1 16=30.77% This study showing that preterm babies (<37 weeks of gestation) are more prone to develop cardiac murmur (61. 54%). Then term baby. Post term babies are less affected 92.31% and maximum neonates who are presented with murmur are the offspring of non-consanguineous parent (48= 92.31%). This study showed that, maximum neonates with murmur came from low socioeconomic family (30=57.70%), then from middle class family (14=26.93%). Physical examination revealed tachycardia and tachypnea in the most of the patients. A major portion of the patients presented with features of heart failure. Investigation findings showed that, 21.15% neonates X-Ray reveals normal findings. 78.85% neonates presented abnormal X-Ray findings. Among them cardiomegaly was present in 30.77% cases and feature of pneumonia was present in 32.69% cases. In 40.38% cases lung fields were plethoric that means blood flow was increased and in 11.54% cases blood flow is reduced (oligaemic lung field).

Table 1: Echocardiogram findings

Findings	No of patient	Percentage
Normal findings	14	26.92%
VSD	12	23.08%
ASD	11	21.15%
PDA	06	11.54%
Endocardial cushion defect	01	1.92%
TOF	4	7.69%
Severe PS with VSD	1	1.92%
Tricuspid atresia with Single ventricle	2	3.85%
TGA+ASD	1	1.92%
Total	52	100%

Figure 1: Clinical suspicion about significance of murmur (N= 52)

This figure showing that among the 52 cases 40 cases (77%) having significant (pathological) murmur and 12 cases (23%) having innocent murmur. This figure showing echocardiogram detected 14 cases (26.92%) as normal cardiac anatomy and 38 cases (73.08%) with cardiac defect. In this study sensitivity was 89%, specificity was 57%, positive predictive value rate was 85%, negative predictive value rate was 66.66 % and accuracy or validity rate was 80.76%. Here specificity and negative predictive value rate is 57% and 66.66% respectively. These rates are lower than the expected value. It may be due to the lack of skill, experience and doing echocardiogram from various investigation centers.

Discussion

There is a popular believe that murmur in neonatal period has no importance, it is a physiological phenomenon.¹⁰ But, it is not true at all times. Murmur in neonatal period may be the first sign of underlying serious structural cardiac defect. After discharge from hospital that had a murmur before discharge.¹¹ In this study have found the incidence rate of cardiac murmur is 1.26%. The reported incidence of cardiac murmur in neonates varies from 0.6% to 77.4%.^{13,14} It was shown in their study that the incidence of murmur in neonates is 0.6%.¹⁴ In another study has found that the incidence of cardiac murmur in neonates is 1.37%.¹⁵ This study have found the incidence rate of murmur is 3.1%. These variations may be due to the examiners skills and experience, the timing and frequency of examination. Cardiac murmur includes both pathological and innocent. In this study pathological murmur was 76.92% (40 out of 52) and innocent murmur was 23.08% (12 out of 52). Study observed pathological murmur in 51.60% cases and innocent murmur in 48.40% cases of neonates. Another study found that murmur in 76% cases was due to underlying structural cardiac defect and murmur of 24% cases was innocent.

This study had shown that acyanotic congenital heart diseases were more common than cyanotic congenital heart diseases. In study, the rate of acyanotic heart diseases was 78.95% (30 out of 52) and cyanotic heart diseases was 21.05% (8 out of 52). It had shown that the rate was 78.5% and 21.5% respectively.¹⁶ Another study had found 84.4% acyanotic CHD in their study.¹⁷ Similar result was found by other.¹² In this study, the most frequently diagnosed acyanotic heart disease was VSD (23.08% -- 12 out of 52) then ASD (21.15% -- 11 out of 52) and PDA (11.54% -- 6 out of 52) which were similar to other study results. A local study found that incidence of VSD was 32.70% then ASD (incidence was 21.20%).¹⁰ In a study had found the similar outcome.⁵ They concluded that the most common lesion was VSD (42.6%) followed by TOF (18.3%), ASD (14.8%), PDA (7.8%) and others. (15.5%).

This study had shown that among the cyanotic heart diseases Tetralogy Of Fallot (TOF) was the most common lesion. Incidence rate was 7.69% (4 out 52 cases). This result was very close to the result of other study.¹⁶ Their study had shown that the rate was 7.10%. In their study TGA (Transposition of Great Arteries) was the second most common cyanotic lesion (4.8%)¹⁶ and all of them had found similar result^{10,12,5} but in our study

Tricuspid Atresia with single ventricle was the second most common cyanotic lesion (3.86% -- 2 cases out of 52 cases).

Conclusion

Murmur indicates underlying cardiac diseases in early life. All neonates should be examined to evaluate cardiac murmur. Neonate with suspected murmur must be investigated especially by echocardiogram. Early diagnosis and timely referral to higher centre can significantly improve the outcome. Examination of the precordium of every neonate by trained physician can help in early diagnosis of congenital heart disease.

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