Original Research Article

A study of prevalence of neonatal cardiac murmur and it's echocardiographic correlation

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Abstract

Background: The neonatal examination takes place at a time of rapid change within the cardiovascular system as part of adaptation to extra uterine life. These changes may produce murmurs which can be mistaken for heart disease. **Aims and Objectives:** to Study of Prevalence of Neonatal cardiac murmur and it's echocardiographic correlation. **Methodology:** This was a cross-sectional study in the patients who were screened for cardiac murmur on auscultation at tertiary health care in the neonates were included into the study, so during the two years period i.e. January 2016 to January 2018 - out of the 2000 neonates screened, 73 neonates with murmur were included into the study. All details of the information like weight, sex, term or pre-term etc. information retrieved. The statistical analysis done by Sensitivity and Specificity by Med Cal software. **Result:** In our study we have seen that that the average age of the neonate in our study was (days, mean±sd)-15.2±8.12, majority of the patients were Female i.e. 57.53% and male were 42.46%,and majority of the patients were Term i.e. 71.22% and preterm were 28.78%.Out of the 2000 neonates screened 73 were with murmur and true patients with heart disease were 34 so prevalence heart disease was 0.02 % and murmur was 0.04%. Sensitivity was 94.12%, Specificity was 76.92%, Positive Likelihood Ratio was 4.08, Negative Likelihood Ratio was -0.08**,** Positive Predictive Value was 78.05%, Negative Predictive Value was 93.75 %, Accuracy was 74.64%. The most common structural abnormality was VSD in 29.41%, Complex CHD was in 20.59%**.**Left heart obstruction in 14.71%, Pulmonary stenosis in 11.76%, ASD in 8.82%, Tetralogy of Fallotwas5.88 %, ASD/VSD -2.94%, PDA in 2.94%, TAPVC in 2.94%. **Conclusion**: **I**t can be concluded from our study that the prevalence of cardiac murmur and heart disease was very less i.e. 0.04% and). 02% respectively, and the efficacy of clinical methods for detecting the type of murmur was good i.e. Significant versus Innocent and on 2 D echo the most types of cardiac defects were VSD, Complex CHD, Left heart obstruction etc.

Key Words: Neonatal cardiac murmur, Ventricular Septal Defect (VSD), Patent Ductus Arteriosus (PDA). Cynotic Heart disease (CHD).

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INTRODUCTION

Up to six in every 1000 live born babies have a cardiovascular malformation1 which presents in infancy, but most are asymptomatic at birth.[1–4] Auscultation of the heart during routine examination before discharge from hospital provides an opportunity for early diagnosis and is recommended in the report of the Third Joint Working Party on Child Health Surveillance.[5] Despite this recommendation, routine auscultation has not been subjected to prospective evaluation. The diYculties in detecting heart disease at neonatal examination are well known.[6,7] The neonatal examination takes place at a time

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of rapid change within the cardiovascular system as part of adaptation to extra uterine life.[8] These changes may produce murmurs which can be mistaken for heart disease.[9] Similarly, if transitional changes are slow to occur, presentation of congenital heart disease may be delayed. The reported prevalence of murmurs in neonates varies from 0.9% to 7.74% and seems to be inversely related to the size of the study.[10–13] Detection of a murmur depends on the examiner's skill and experience, the timing and frequency of examination, and the conditions under which examination takes place. Most reports of the prevalence of neonatal murmurs come from early studies,[10–11] predating echocardiography which has improved the accuracy of diagnosis of congenital heart disease.[14] There is little in published findings that correlates murmurs during the newborn period with confirmed anatomical diagnosis.

MATERIAL AND METHODS

This was a cross-sectional study in the patients who were screened for cardiac murmur on auscultation at tertiary health care in the neonates were included into the study, so during the two years period i.e. January 2016 to January 2018 - out of the 2000 neonates screened, 73 neonates with murmur were included into the study. All details of the information like weight, sex, term or pre-term etc. information retrieved. The statistical analysis done by Sensitivity and Specificity by Med Cal software.

RESULT

Table 1: Distribution of the neonates as per the general character

Age (days, mean±sd)	15.2±8.12	(range 1-25)
Admission weight (gm, mean±SD)	2325.7±324.2	(range 1000-3400)
Sex distribution		
Male	31	(42.46%)
Female	42	(57.53%)
Preterm	21	(28.78%)
Term	52	(71.22%)

The average age of the neonate in our study was (days, mean±sd)-15.2±8.12, majority of the patients were Female i.e. 57.53% and male were 42.46%, and majority of the patients were Term i.e. 71.22% and preterm were 28.78%.

Table 2: Distribution of the patients as per the efficacy of clinical diagnosis

Clinically	Diagnosis on 2 D Echo		Total
	Cardiac defect	Innocent	
Significant murmur	32 (a)	9 (c)	41 (a+c)
Innocent	2 (b)	30 (d)	32 (b+d)
Total	**34 (a+b)**	**39 (c+d)**	**73 (a+b+c+d)**

Out of the 2000 neonates screened 73 were with murmur and true patients with heart disease were 34 so prevalence heart disease was 0.02 % and murmur was 0.04%.

Table 3: Statistical analysis

Statistic	Formula	Value	95% CI
Sensitivity	$\frac{a}{a+b}$	94.12%	80.32% to 99.28%
Specificity	$\frac{d}{c+d}$	76.92 %	60.67% to 88.87%
Positive Likelihood Ratio	$\frac{Sensitivity}{1-Specificity}$	4.08	2.29 to 7.28
Negative Likelihood Ratio	$\frac{1-Sensitivity}{Specificity}$	0.08	0.02 to 0.30
Positive Predictive Value	$\frac{a}{a+c}$	78.05%	66.58% to 86.39%
Negative Predictive Value	$\frac{d}{b+d}$	93.75 %	79.45% to 98.31%
Accuracy	$\frac{a+d}{a+b+c+d}$	84.93%	74.64% to 92.23%

Sensitivity was 94.12%, Specificity was 76.92 %, Positive Likelihood Ratio was 4.08, Negative Likelihood Ratio was 0.08. Positive Predictive Value was 78.05%, Negative Predictive Value was 93.75 %, Accuracy was 74.64%

Table 4: Distribution of the patients as per the 2 D-Echocardiographic findings

2 D-Echocardiographic findings	No.	Percentage (%)
VSD	10	29.41
Complex CHD	7	20.59
Left heart obstruction	5	14.71
Pulmonary stenosis	4	11.76
ASD	3	8.82
Tetralogy of Fallot	2	5.88
ASD/VSD	1	2.94
PDA	1	2.94
TAPVC	1	2.94
Total	**34**	**100.00**

The most common structural abnormality was VSD in 29.41%, Complex CHD was in 20.59% Left heart obstruction in 14.71%, Pulmonary stenosis in 11.76%, ASD in 8.82%, Tetralogy of Fallot 5.88 %, ASD/VSD - 2.94%, PDA in 2.94%, TAPVC in 2.94%.

DISCUSSION

Although congenital heart disease is present at birth, there are often no signs and most babies are asymptomatic. Detection of a murmur on routine neonatal examination may be a clue to the presence of heart disease and offers the possibility of early, pre-symptomatic diagnosis[3]. In vast majority of children with CHD the diagnosis can be

made on the basis of thorough history and physical examination[4]. But experience regarding CHD in neonate is mixed. Routine neonatal examination fails to detect heart defects in more than half of babies with heart defects[3,4,6,9] In our study we have seen that that the average age of the neonate in our study was (days, mean±sd)-15.2±8.12, majority of the patients were Female i.e. 57.53% and male were 42.46%,and majority of the patients were Term i.e. 71.22% and preterm were 28.78%.Out of the 2000 neonates screened 73 were with murmur and true patients with heart disease were 34 so prevalence heart disease was 0.02 % and murmur was 0.04%. Sensitivity was 94.12%, Specificity was 76.92 %, Positive Likelihood Ratio was 4.08, Negative Likelihood Ratio was -0.08**,** Positive Predictive Value was 78.05%, Negative Predictive Value was 93.75 %, Accuracy was 74.64%. The most common structural abnormality was VSD in 29.41%, Complex CHD was in 20.59%. Left heart obstruction in 14.71%, Pulmonary stenosis in 11.76%, ASD in 8.82%, Tetralogy of Fallotwas5.88 %, ASD/VSD -2.94%, PDA in 2.94%, TAPVC in 2.94%. The study by Mohammad MonirHossain *et al* [15] found Sixty eight percent cases with murmur were found to have structural heart defect and 32% had innocent murmur. Among the cases with structural heart defect 70.6% were found to have significant heart defect and 29.4% were physiological variant. Clinical suspicion able to differentiate innocent murmur or structural heart defect ($p < 0.05$). and Sensitivity was 82.4%, specificity 68.8%, positive predictive value 84.9%, negative predictive value 64.7% and accuracy 78%. The differences in some of the results may be due to change in the setting of the study.

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