Original Article

Frequency of Significant Structural Heart Disease in Neonates Presenting with Cardiac Murmer

Aroma Tariq and Maryam Rafiq

ABSTRACT

Objective: To know the frequency of Significant Structural Heart Disease in Neonates Presenting with Cardiac Murmer.

Study Design: Cross sectional study

Place and Duration of Study: This study was conducted at the Paediatric Department, Sheikh Zayed Hospital Lahore from July 2013 to December 2013.

Materials and Methods: Seventy five (75) neonates with murmur collected from Nursery, Postnatal Gynae Ward and Out-Patient Department of Shaikh Zayed Hospital .The information was recorded in a pre-formed Performa, Data was analyzed using statistical package SPSS 12.

Results: Echocardiography confirmed murmurs in 65 neonates due to significant structural heart disease and remaining 10 murmurs were functional. Regarding frequencies of different heart defects VSDs were 43 (57.3%), ASDs 13 (17.3%), PDAs 6 (8%) and PS, ASD + PDA and VSD + ASD 1 (1.3%) each.

Conclusion: The clinician should have high index of suspicion regarding congenital heart disease especially in neonates presenting with murmur. Having missed, a large number of neonates with significant congenital heart disease present late when they actually become in-operatable resulting in disability or even death of the neonate.

Key Words: Significant structural heart disease, Innocent murmur, asymptomatic neonates

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INTRODUCTION

Up to ten in every 1000 live born babies have a cardiovascular malformation which presents in infancy, but most are asymptomatic at birth[1]. There is a relatively high incidence of structural heart disease in neonates presenting with asymptomatic cardiac murmur[2]. One in 100 is borne with some form of CHD, many of whom are first diagnosed by the findings of a cardiac murmur. The remainder of the children with murmur will have no cardiac disease and the murmur will be labeled as innocent or functional[3]. There is however, a wide misconception that murmurs are common in neonates and the most are innocent or physiological. This may explain why there seems to be a reluctance to make early referral for definitive diagnosis of heart disease[4].The purpose of this study is to emphasize the importance of detecting cardiac murmurs in asymptomatic neonates as an evidence of possible clinically significant structural heart disease.

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Two - Dimensional Echocardiography remains the gold standard non-invasive technique for the diagnosis of significant structural heart disease[5]

Congenital heart disease is one of the most common causes of death in newborn infants. The incidence of CHD has been reported as 6-8 in every 1000 live born babies but most are asymptomatic at birth[6]. Congenital heart disease (CHD) is defined as a "gross structural abnormality of heart or intrathoracic great vessels that is actually or potentially of functional significance"[7]. A cardiac murmur is a very common finding in the first few days of life and the most common reason for referral to the pediatric cardiologist. The reported prevalence of heart murmurs in neonates varies from 0.6% to 77.4%. About half of these murmurs in the neonates are due to an underlying cardiovascular malformation. The prevalence of heart murmur in a study was 13.7 per 1000 neonate[8]. If a murmur is heard there is a 54% chance of there being an underlying cardiac malformation Detection of a murmur on routine examination may be a clue for heart disease and offers the possibilities of early, pre symptomatic diagnosis and requires further evaluation[9].

Heart murmurs are a common finding in infants and children and mostly originate from normal flow patterns with no structural or anatomic abnormalities of the heart or vessels and are referred to as innocent, physiological or normal murmurs; conversely, murmur may be created by abnormal flow patterns in the heart

and vessels resulting from congenital heart abnormalities.[10]

In Pakistan, no community-based data is available on CHD prevalence. However, the reported incidence of CHD in NWFP is 8 / 1000 live births[11].

The frequencies of different cardiac defects remain constant in different studies with VSD being the commonest among acyanotics and TOF among cyanotic heart defects both nationally and internationally[12, 13].

MATERIALS AND METHODS

This study was conducted at the Paediatric Department, Sheikh Zayed Hospital Lahore from July 2013 to December 2013.

Sample size: Sample size of 75 cases is calculated with 95% confidence level, 8.5% margin of error and taking expected percentage of PDA i. e., 16.3% in neonates presenting with cardiac murmur.

Data Collection Procedure

Sample Technique: Non probability purposive sampling

Sample selection:

- **Inclusion criteria** Term neonates (>37 weeks) with cardiac murmurs as per operational definitions.
- Patients of both genders.

Exclusion criteria for both groups

- All those who were admitted in NICU due to some illness, e.g. D.I.C. (PT, APTT and D-dimers), hyaline membrane disease (on X-ray), C.C.F. (clinically).
- Any neonate with a risk factor that was known to be associated with an increased incidence of congenital heart disease (e.g., tachypnoea, respiratory rate> 60/ min, cyanosis, Down's syndrome).

Date collection: Sample size of 75 cases is calculated with 95% confidence level, 8.5% margin of error and taking expected percentage of PDA i. e., 16.3% in neonates presenting with cardiac murmur.

Seventy five cases fulfilling inclusion and exclusion criteria taken from Shaikh Zayed Hospital's Nursery, Postnatal Gynae Ward and O.P.D. Informed consent was taken before the enrollment and demographic information name, age (in months), sex, contact details were obtained from parents. After necessary clinical examination the neonates with murmurs were sent for 2-Dimensional echocardiography. After echocardiography, the patients were categorized depending upon the presence or absence of any clinically significant heart disease as per operational definitions. Then in neonates with significant structural heart disease the anomalies like ASD, VSD and PDA were noted. All the data was collected through a Proforma .

Data Analysis: Data was analyzed using statistical package SPSS (version 12.0). Mean and standard deviation were calculated for quantitative variables e.g. (age) and frequencies and percentages for qualitative variables (like gender, significant structural heart disease, and cardiac lesions like PDA, ASD, VSD) in patients with significant structural heart disease.

Demographic details, clinical characteristics and other relevant data was analyzed using statistical package SPSS (version 12.0). Mean and standard deviation was calculated for quantitative variables e. g. (age) and frequencies and percentages for qualitative variables (like gender, significant structural heart disease, PDA, ASD, VSD

RESULTS

Seventy five (75) neonates with murmur collected from Nursery, Postnatal Gynae Ward and Out-Patient Department of Shaikh Zayed Hospital and were enrolled from July 2013 to December 2013.Out of these 75 patients, 12 were from NICU (16%), 14 were from Postnatal Gynae Ward (18.6%) and 49 from OPD (65.3%) (Table 1).

Our study revealed 10 (13.33%) murmurs as functional among 75 neonates and the remaining 65 (86.7%) were due to structural heart disease(table 2). In a similar study by Laohaprasitiporn, 83 neonates found to have cardiac murmur, 49 (59%) with confirmed CHD and 34 (41%) with no CHD[1]. In a study by Abdullah, King Fahd Hospital of the University, Saudi Arabia, 6333 healthy newborn babies were screened for the presence of a murmur during routine neonatal examination. Murmurs were detected in (87) babies (1.37%). Echocardiography and Doppler study confirmed a cardiac mal-formation in 37 (42.5%), 24 (27.58%) had an insignificant structural heart lesion and 20 (22.98%) with normal heart.[19]

A local study conducted in Peshawar by Rahim, murmur was detected in 91 (3.1%) neonates, of whom 47 (51.6%) had a congenital heart disease. and in 44 (48.4%) have innocent murmur[12].

The most frequent congenital heart disease detected in our study was VSD comprising of 57.3% followed by ASD 17.3% and PDA 8% which is consistent with the worldwide figures. Bansal found VSD as the most common lesion amounting to 65.63% of the lesions[16]. The high incidence of VSD could be because the preterm infants were not included in our study. In other study by Abdullah, King Fahd Hospital University, Saudi Arabia VSD was found to be 62% among acyanotic heart disease, ASD 13.5% and PS and PDA 8% each[19].

Table No.1: Distribution of Patients According to Mode of Admission

Mode of admission	No. of Patients	%age
NICU	12	16.0
Postnatal Gynae Ward	14	18.66
OPD	49	65.33
Total	75	100.0

Table No.2: Echocardiographic Diagnosis

	No. of Patients	Percentage
VSD	43	57.33
ASD	13	17.33
PDA	6	8.0
PS	1	1.3
ASD + PDA	1	1.3
VSD + ASD	1	1.3
Functional	10	13.33

Table No.3: Comparison of Clinical and Echocardiographic Diagnoses

	Clinical	Echocardiography
Innocent murmur	08(10.66%)	10(13.3%)
Murmur due to underlying structural heart disease	67(89.33%)	65(86.7%)
Total no. of patients	75(100%)	75(100%)

Most of the patients were AGA (82%) in our study.

Clinical diagnosis revealed 8 (10.66%) murmurs as functional and remaining 67 (89.33%) murmurs due to an underlying structural heart disease (table 3). On the other hand, echocardiography confirmed 10 (13.33%) neonates having functional murmur as compared to 65(86.7%) neonates having significant structural heart disease (table 3).

Echocardiography confirmed murmurs in 65 neonates due to significant structural heart disease and remaining 10 murmurs were functional (Table 3).

Out of 65 neonates with significant structural heart disease 43 (66.15%) were males and 22 (33.85%) were females.

Total number of live births in our hospital during the study period was 1800 and 26 out of these babies had murmur. The incidence of cardiac murmurs among these babies was 14.4 for 1000 live births. Whereas total number of neonates observed in OPD were 3500 out of which 49 neonates with cardiac murmur were included in the study.So the incidence of cardiac murmur among neonates enrolled from OPD was 14 per thousand live births.

Regarding frequencies of different heart defects VSDs were 43 (57.3%), ASDs 13 (17.3%), PDAs 6 (8%) and PS, ASD + PDA and VSD + ASD 1 (1.3%) each.

DISCUSSION

Congenital heart disease is one of the most common congenital malformations. Many present with this problem in the neonatal period. Cardiac murmur is an important clinical manifestation of congenital heart disease. The earlier the congenital heart disease is diagnosed better is the prognosis[7]. Therefore this study was done to evaluate the murmurs in otherwise healthy term neonates. Our clinical diagnosis was made based on the auscultatory findings in the neonates. Later, the clinical findings were confirmed by two dimentional echocardiography, which is the gold standard for diagnosis of congenital heart disease[5,14]. Total number of live births during the study period in our hospital were 1800 and 75 out of these had murmur. The incidence of cardiac murmurs among the neonates born in our hospital was 14. 4 for 1000 live births. Early studies of the incidence of CHD, as summarized by Hoffman[15]produced low incidences of about 4 to 5 per 1, 000 live births, but this figure has been rising steadily until recently when incidences of 12 to 14/1, 000 live births, or higher, have been reported in the literature. Bansal et al[16] in his study had shown an incidence of 23.81 per 1000 live birth having murmur. Farrer et al studied 8096 babies and found murmurs in 112 babies with a prevalence of 13.8 per 1000 live birth as against 14. 4 per 1000 live births in our study[17]. There were 13.5 per 1000 live births having murmurs in the study by Rakesh[18].

CONCLUSION

The congenital heart disease contributes to a high proportion (up to 25% in some studies) of congenital malformation that present in neonatal period. There is a misconception that murmurs are common in neonates and that most are innocent or functional. The clinician should have high index of suspicion regarding congenital heart disease especially in neonates presenting with murmur. These delayed or missed diagnoses can result in both disability and death. life So diagnosis of CHD at the earliest possible time is very important as early referral and appropriate intervention in some of these cases are life saving.

Author's Contribution:

Concept & Design of Study:	Aroma Tariq
Drafting:	Maryam Rafiq
Data Analysis:	Maryam Rafiq
Revisiting Critically:	Aroma Tariq
Final Approval of version:	Aroma Tariq

Conflict of Interest: The study has no conflict of interest to declare by any author.

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