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Congenital Heart Disease Diagnosed With Echocardiogram In Newborns With Asymptomatic Cardiac Murmurs

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ABSTRACT

Background: Congenital heart disease (CHD) is defined as a gross structural abnormality of the heart or intrathoracic great vessels that causes significant functional impairment. Twenty-eight percentage of all major congenital anomalies consists of heart defects and along with neural tube defects they account for two-thirds of all congenital malformations. The estimated birth prevalence of CHD is 8/1000 live births with a significant geographical difference. A recent systemic review reported that the highest prevalence (9.3/1000 live births) was in Asia due to high birth rate and consanguineous marriages and the lowest prevalence was in Africa (8.2/1000 live births). In India, over 180,000 children are born with CHD every year with state-wise variation and contribute to 10% of the present infant mortality. Nearly one-third of the CHD are critical requiring intervention in the 1st year of life.

Methods: This was a cross sectional study carried out in the Department of Paediatrics, Krishna Institute of Medical Sciences, Karad, Maharashtra, India, for one and half year. 100 term neonates with asymptomatic, non-syndromic cardiac murmurs noticed during routine neonatal examination were studied.

Results: Among the 100 newborns with ANCM, 81 newborns were diagnosed with Echo as having CHD, and atrial septal defect was the most common congenital malformation. 7 out of 100 newborns with ANCM diagnosed with CHD were referred to higher centre for cardiac intervention.

Conclusion: On the basis of present study, routine 2d echo screening is advised for all babies with ANCM since 81% of our ANCM's were diagnosed to have CHD, rest of which 8.6% cases require immediate cardiac referral.

Keywords: *Asymptomatic Non syndromic Cardiac Murmurs (ANCM), Congenital Heart Disease (CHD)*

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INTRODUCTION

Cardiac murmurs found in newborns are one of the important signs of potential CHD. CHD detection in newborns with ANCM is necessary for early diagnosis and prompt treatment. Recently, it has become easy to implement ECHO in neonatal care. Earlier studies reported variable CHD incidence in newborns with ANCM; however, there is no consensus on the use of ECHO for early detection of CHD in newborns with ANCM.

Cardiac assessments, including physical examinations, have been performed for newborns after birth, however, the use of ECHO for diagnosing CHD, especially in newborns with asymptomatic non-syndromic cardiac murmurs (ANCM), has been a subject of debate.

In this study, we aim to identify the incidence of CHD in ANCM and figure out whether ECHO should be used in the diagnosis of CHD in newborns with ANCM.

MATERIALS AND METHODS

This was a prospective cross-sectional study carried out in the Department of Paediatrics, Krishna Institute of Medical Sciences, Karad, Maharashtra, India, for one and half year. Eighty one newborn babies with cardiac murmurs were studied with 2D Echo cardiography.

Inclusion Factors

Term neonates with asymptomatic, non-syndromic cardiac murmurs noticed during routine neonatal examination.

Exclusion Criteria

- Newborns with absence of heart murmurs
- Preterm newborn babies
- Infants who were ill and require neonatal intensive care
- Newborns with symptomatic murmurs.
- Babies with known congenital heart disease
- Small for gestational age (SGA)

OBSERVATIONS AND RESULTS

TABLE 1: Incidence of congenital heart disease

	No Of Newborns	**Incidence**
CHD in ANCM (Asymptomatic non syndromic cardiac murmur)	81	81.0%
CHD Positive babies	81	1.2%
ANCM positive babies	100	1.5 %

Over a total of 18 months of study duration, the total of 6637 live births were delivered of which 100 live babies were diagnosed as ANCM. These 100 babies were screened by using 2D ECHO of which, 81 were diagnosed as CHD cases.

The incidence of CHD among ANCM cases among total live births was 1.5% whereas incidence of CHD was 1.2% among the total live births. The incidence of CHD among ANCM cases was 81%.

TABLE 2: Distribution of CHD as per type of congenital heart diseases

Type of CHD	**No of Newborns**	**Percent**
Acyanotic	74	91.35
Cyanotic	7	8.65
Total	81	100.0

Out of 81 CHD cases, 74 cases (91.35%) had acyanotic and 7 cases (8.65%) had cyanotic CHD.

TABLE 3: Association between congenital heart disease with Gestational Diabetes Mellitus among asymptomatic nonsyndromic cardiac murmurs (ANCM)

Gestational Diabetes	With CHD	Without CHD	Total
Absent	66	18	84
Present	15	1	16
Total	81	19	100

Chi-Square value - 2.012, P value- 0.16, non-significant

Out of total 81 CHD cases 15 cases were seen in mothers with gestational diabetes mellitus, which is statistically insignificant.

TABLE 4: Distribution of newborns with congenital heart disease based on 2D ECHO Report

ECHO Result	No of Newborns	Percent
ASD	28	34.5
VSD	17	21.0
PDA	14	17.3
Ebstein anomaly	1	1.2
Coarctation of aorta	2	2.4
ASD & PDA	6	7.4
Mitral Regurgitation	7	8.6
Tetralogy of fallot	4	4.9
Transposition of the great artery	2	2.4
Total	81	100.0

Out of 81 CHD cases, ASD was the predominant CHD (n=28, 34.5%) followed by VSD (n=17, 21%), PDA (n=14, 17.3%), mitral regurgitation (n=7, 8.6%), ASD with PDA (n=6, 7.4%), coarctation of aorta (n=2, 2.4%), and 7(8.6%) cases were cyanotic CHD (TOF-4, TGA-2, Ebstein anomaly-1).

TABLE 5: Proportion of newborn with asymptomatic cardiac murmur having cyanotic congenital heart disease requiring referral for cardiac intervention

Need For Cardiac Referral	ANCM Cases	Percentage
No Referral	93	93
Referred	7	7
Total	100	100

7 out of 100 cases of ANCM diagnosed with cyanotic congenital heart disease were referred to higher centre for cardiac intervention.

DISCUSSION

Out of total 6637 deliveries during study period, 100 babies had ANCM. These babies were screened by 2d Echocardiography out of which 81 newborns turned out to have CHD with an incidence of 1.2 %. Zhao Q M et al.[1] Study showed A total of 180 infants were diagnosed with CHD, of which 0.71% were classified as major CHD. Chen K et al.[2] Study showed out of 517 newborns were screened by color Echocardiography, and 65 newborns were identified with CHD.

Type of Congenital heart disease (CHD)

Out of 81 newborns 74 (91.35%) newborns were acyanotic whereas 7 newborns (8.65%) were cyanotic. Pillai P S et al.[3] Study showed of the 72 newborns included in the study, 75% had cardiac disease, of which 94.5 % had acyanotic heart

disease and 5.5 % had cyanotic heart disease. Chen K et al.[2] Study showed acyanotic CHD was encountered in 79.2% whereas cyanotic CHD in 20.8%.

Gestational diabetes

Out of 81 newborns with CHD, 15(18.5%) were borns to mothers with gestational diabetes which is statistically insignificant. This study is similar to Shaad adqari et al[4] which showed that maternal diabetes was not found to be significantly associated with heart defect.

2D ECHO

Out of 100 newborns with ANCM, 2D ECHO screening was done, 81 newborns turned out to have CHD, 28 newborns had ASD which is the most common CHD, followed by VSD. Abou-Taleb A et al.[5] Study showed Echocardiography findings of the studied cases, the most frequent type of CHD was d-transposition of great arteries (D-TGA) (66%), followed by complex CHD (12%) and hypoplastic left heart syndrome (HLHS) (12%) then single ventricle (4%) and pulmonary atresia (4%), whereas the less common type was hypoplastic right ventricle (2%). Complex CHD included 3 cases of D-TGA with pulmonary atresia and 3 cases of D-TGA with tricuspid atresia.

Need for cardiac referral

7 out of 100 cases of cyanotic congenital heart diseases referred to higher centre for cardiac intervention. Shin Ae Yoon et al [6] (2020) studied 1928 newborns with ANCM, 2.5% had severe CHD requiring immediate cardiac intervention.

CONCLUSION

we advise 2D Echocardiography to all children with asymptomatic nonsyndromic cardiac murmurs to diagnose and do early intervention whenever required in cases of congenital heart diseases.

Limitations

- Sample size is inadequate.
- Observer bias in auscultating murmur and diagnosing asymptomatic nonsyndromic cardiac murmurs.
- No follow up for asymptomatic babies due to short duration of study.

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