

Profile and Clinical Spectrum of Congenital Heart Defects in NICU

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ABSTRACT

Introduction: Congenital heart defects are commonest birth defects and is an important cause of mortality and morbidity in newborns. The current study was done aiming at determining profile and clinical spectrum of various congenital heart diseases (CHD) in neonatal period.

Methodology: An observational study was carried out in the NICU, Department of Pediatrics, Jawaharlal Nehru Medical College, Aligarh from Feb 2014 to Aug 2015 with the objective to determine profile of various congenital heart defects. All patients with clinical suspicion of congenital heart defect were further evaluated with echocardiography. Patients who were preterm having PDA and PFO were excluded from cases. Prevalence of various congenital heart defects was calculated. Clinical Spectrum of various congenital heart defects was observed.

Observations: Total newborns screened 238 and 52 congenital hearts defect were detected. Acyanotic heart defect contributed 67% while cyanotic heart defect contributed 23%. VSD was the most common lesion while TOF (11.5%) was commonest among cyanotic heart defects. Most of the cyanotic heart defects were detected on screening as murmur on auscultation while PDA of bigger size presented as fast breathing. In cyanotic heart, defect classical TOF presented with only murmur while TOF with PA presented as cyanosis.

Conclusion: VSD was the most common congenital heart defect detected while Tetralogy of Fallot was commonest among the cyanotic heart defects.


Keywords: CHD, profile, NICU, prevalence, cyanosis

INTRODUCTION

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.^[1] It is the most common cause of major congenital anomalies, representing a major global health problem. Twenty-eight

percent of all major congenital anomalies consist of heart defect.^[2] The prevalence of congenital heart defects in neonates has been studied thoroughly and is usually reported to be 5-8/1000.^[3-5] Asian race is found to be more affected than non-Asian race due to high rate of consanguineous marriages.^[6] Khalil et al in a hospital based study in early 90s reported the incidence as 3.9/1000 live births.^[7] The worldwide prevalence of CHD is estimated to be 8-10 in every 1000 live births but the prevalence greatly varies between regions. Nearly 1/3rd of the congenital heart diseases (CHD) are critical requiring interventions in the first year of life.^[8] CHDs contribute to infant mortality significantly, as 7% of the neonatal deaths are due to congenital malformations, 25% of which are cardiovascular.^[8] In India, 10% of the present infant mortality may be accounted for by Congenital Heart Disease as reported by Saxena et al.^[9] The incidence of severe CHD requiring expert cardiologic care is around 2.5-3/1000 live births.^[10] It is imperative to have clear information of the

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disease burden for proper distribution of the resources.

MATERIALS AND METHODS

In this observational study, all children suspected of congenital heart disease presenting to Pediatric Nursery /NICU, on the basis of history and clinical examination were included. All children were then screened through ECG and Chest X-ray and the diagnosis was confirmed by Echocardiography. On the basis of echocardiography, profile of various congenital heart defects was studied.

A suspected case was defined as

- i. Any child with $spo_2 < 93\%$ at room air/or visible cyanosis
- ii. Unexplained CHF
- iii. Murmur
- iv. Abnormal ECG
- v. Abnormal heart sounds
- vi. Abnormal Blood Pressure
- vii. Differential Peripheral pulses
- viii. Abnormal chest X-Ray

RESULTS

Total numbers of inborn newborn (live birth) were 5911 during the study period. Out of which 238 were screened and 52 were found to have CHD. Preterms with PDA or PFO were excluded. Prevalence of CHD was found to be 8.79/1000 live births during the study period. Acyanotic heart defects contributed to 35(67.30%) cases while cyanotic heart defects contributed 17(32.70%) cases. Males were 32(61.54%) while females contributed 20(38.46%) of cases. VSD was the most common lesion. Profile of various CHDs was VSD 14(26.92%), ASD 11(21.15%), PDA 8(15.38%), TOF 6(11.53%), Single Ventricle 6(11.53%), TAPVC 3(5.77%), PS 2(3.84%), TGA 1(1.92%) and Tricuspid Atresia 1(1.92%).

Table 1: Spectrum of Congenital Heart Defects detected in NICU

S.No.	Diagnosis	Male n(%)	Female n(%)	Total
1.	Ventricular Septal Defect (VSD)	11(21.15%)	3(5.77%)	14(26.93%)
2.	Atrial Septal Defect (ASD)	5(9.61%)	6(11.53%)	11(21.15%)
3.	Patent Ductus Arteriosus (PDA)	3(5.77%)	5(9.61%)	8(15.38%)
4.	Tetralogy Of Fallot (TOF)	5(9.61%)	1(1.92%)	6(11.53%)
5.	Single Ventricle (SV)	5(9.61%)	1(1.92%)	6(11.53%)
6.	Total Anomalous Pulmonary Venous Connection (TAPVC)	2(3.84%)	1(1.92%)	3(5.77%)
7.	Pulmonary Stenosis (PS)	1(1.92%)	1(1.92%)	2(3.84%)
8.	Tricuspid Atresia (TA)	0	1(1.92%)	1(1.92%)
9.	Transposition Of Great Vessels (TGA)	0	1(1.92%)	1(1.92%)
	TOTAL	32(61.54%)	20(38.46%)	52(100%)

Most of the ASD and VSDs were detected on screening as murmur on auscultation while large PDA presented with bounding pulses and fast breathing. However, in most cases of ASD it was an accidental detection of the defect when the child was screened for fast breathing as we don't expect for ASD to become symptomatic in newborn period. In cyanotic

heart defect, classical TOF was detected by murmur on auscultation while TOF with PA presented as cyanosis. Single ventricle with significant PS presented as fast breathing and cyanosis. TAPVC with obstructive type lesion had complaints of cyanosis and fast breathing.

Table 2: Clinical Presentation of Acyanotic Heart Defects in NICU

S.No.	Diagnosis	Murmur on screening	Fast breathing	Total
1.	Ventricular Septal Defect (VSD)	14(40.00%)	0	14(40.00%)
2.	Atrial Septal Defect (ASD)	8(22.86%)	3(8.57%)	11(31.42%)
3.	Patent Ductus Arteriosus (PDA)	5(14.29%)	3(8.57%)	8(22.86%)
4.	Pulmonary Stenosis (PS)	2(5.71%)	0	2(5.71%)
	Total	29(82.86%)	6(17.14%)	35(100%)

Table 3: Clinical Presentation of Cyanotic Heart Defects in NICU

S.No.	Diagnosis	Murmur on screening	Cyanosis with fast breathing	Total
1.	Tetralogy of Fallot (TOF)	3(17.65%)	3(17.65%)	6(35.30%)
2.	Single Ventricle (SV)	1(5.88%)	5(29.42%)	6(35.30%)
3.	Total Anomalous Pulmonary Venous Connection (TAPVC)	1(5.88%)	2(11.76%)	3(17.65%)
4.	Tricuspid Atresia (TA)	1(5.88%)	0	1(5.88%)
5.	Transposition of Great Vessels(TGA)	0	1(5.88%)	1(5.88%)
	Total	6(35.29%)	11(64.71%)	17(100%)

DISCUSSION

Acyanotic defects contributed 67% while cyanotic contributed 33% of total case diagnosed. We found prevalence of CHDs as 8.79 / 1000 live birth. It was more than the study done by Khalil^[7] who found prevalence to be 3.9/1000 live birth. But the study done by Hussain^[12] in 2014 found even higher prevalence of 15/1000 live births. In our study, VSD constituted upto 26.93% CHDs while the study done by Khalil^[7], Islam^[11] and Hussain^[12] showed higher prevalence of VSD as follows 34.8%,29% and 31.3%. We found TOF as the commonest cyanotic heart defect followed by TGA. Prevalence of TOF in our study was 11.53% which was higher than the studies done by Khalil^[7], Islam^[11] and Hussain^[12] which shows following prevalence of TOF 4.6%, 6% and 6.89%. In our study, TGA showed smaller contribution of 1.92% which was similar to the study of Khalil^[7] and much less than the study done by Islam^[11]. Most of the acyanotic defects were detected on screening as murmur while cyanotic presented mainly as cyanosis and fast breathing. The spectrum of heart defects detected were similar to previous studies, however the prevalence may not be true representative of the community as this study was done at the hospital setting. Secondly in our study only newborns suspected of heart defect on clinical basis were subjected to echocardiography and we know many complex heart defects can be absolutely silent on clinical examination which can be missed, moreover there was a large group of newborns with pulmonary hypertension which were not considered. Ideally for true prevalence each newborn

delivered should be screened for CHD by echocardiography but practically it is not possible in a limited resource country

like India where majority of deliveries are still conducted at home.

Table 4: Comparison of Prevalence and spectrum of CHD with Other Studies

AUTHOR Year and Place of study	Type of Study	Prevalence /1000 live births	Number of cases	VSD%	ASD %	PDA %	TOF %	TGA %
Khalil ⁷ 1993 New Delhi	Prospective	3.9	n = 43	34.8	2.3	18.6	4.6	2.3
Islam ¹¹ 2013, Bangladesh	Cross sectional	7.8	n=51	29	24	10	6	8
Hussain ¹² 2014 Rawalpindi	Prospective	15	n=87	31.3	22.9	14.94	6.89	4.59
Our Study	Prospective	8.79	n=52	26.93	21.15	15.38	11.53	1.92

CONCLUSION

VSD was the most common congenital heart defect detected while Tetralogy of Fallot was commonest among the cyanotic heart defects. Majority of the acyanotic heart defects were asymptomatic but detected on auscultation, while cyanotic heart defect with significant pulmonary artery stenosis had cyanosis and fast breathing as their presentation.

What this study adds:

1. What is known about this subject?

Incidence of CHD in live births was already known.

2. What new information is offered in this study?

This Study highlighted Incidence, profile and mode of presentation of various CHDs in NICU setting.

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