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# CLINICAL SPECTRUM OF CONGENITAL HEART DISEASES AMONG THE NEONATES IN NEONATAL INTENSIVE CARE UNIT OF A TERTIARY CARE HOSPITAL IN WESTERN UTTAR PRADESH

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**ABSTRACT** To Study the clinical spectrum of congenital heart diseases among the neonates in neonatal intensive care unit of a tertiary care hospital in Western Uttar Pradesh. There is lack of data about the present spectrum of congenital heart disease in the neonatal age group. This is a prospective cross- sectional study carried out for a period of one year (1st January - 31th December 2019) at tertiary care centre in NICU in Maxfort Multispecialty Hospital and Institute of Child Health with the aim to determine the incidence and also the spectrum of different congenital heart defects in newborns. All neonates (<28 days) suspected to have congenital heart disease admitted in NICU of the hospital were taken up of further assessment with detailed history, clinical examination, chest X-ray and electrocardiography. Final diagnosis was confirmed by echocardiography. Total numbers of newborn admitted in our NICU were 1146 during the study period out of which 889 were male and 257 female. 443 were screened with echocardiography and 42 were found to have CHD (9.4%). Preterms with PDA or PFO were excluded. Acyanotic heart defects contributed to 28(66.6%) cases while cyanotic heart defects contributed 12(28.6%) cases while 1 case was Ebstein's anomaly and 1 had Co-arctation of Aorta. Among CHD males were 26 (61.90%) while females contributed 16(38.09%) of cases. VSD was the most common lesion. Profile of various CHDs was VSD 10(23.80%), ASD 8(19.04%), PDA 7(16.66%), TOF 4(9.52%), Single Ventricle 3(7.14%), TAPVC 2(4.76%), PS 3(7.14%), TGA 1(2.38%), Tricuspid Atresia 2(4.76%), Ebstein's anomaly 1(2.38%) and Coarctation of Aorta 1(2.38%) . In this study a higher prevalence is reported because it was carried out in a tertiary care unit, which is a referral hospital and all the neonates admitted in the unit were included in the study.

**KEYWORDS :** Neonates, Congenital heart disease, Echocardiography.

## INTRODUCTION

Congenital heart disease (CHD) is the most common neonatal congenital malformation [1]. Recent studies have reported incidence of CHDs to range between 8 to 10/1000 live births [2].The congenital heart disease (CHD) is not fixed anatomic defects that appear at birth, but are instead a dynamic group of anomalies that originates in fetal life and changes considerable during the postnatal development.[3] The incidence of moderate to severe structural CHD in live born infant is 6–8 per 1000 live births.[4] About 2–3 per 1000 newborns will be symptomatic with heart disease in the 1st year of life. The diagnosis is established by 1 week of age in 40%–50% of patients. CHD is considered one of the leading causes of neonatal mortality.[4] According to a status report on CHD in India, 10% of the present infant mortality may be accounted to CHD. Heart murmur, central cyanosis and major congenital abnormalities were found statistically higher in the neonates with cardiac disorder [4,5]. Increase in the incidence of congenital heart disease in India may be due to increase of birth rate, earlier and more accurate diagnostic modalities, more awareness amongst parents due to social media. The clinical presentation of CHD varies according to the type and severity of the defect.

Clinical aspects of congenital heart defects vary from mild to critical. Severe CHD are life threatening and require immediate intervention. These forms, such as those requiring cardiac catheterization or surgery within the first year of life, represent 25% of all congenital heart disease.2 They are often ductus arteriosus (DA) dependent cardiopathies, because DA is the only way to ensure systemic and/or pulmonary perfusion.[6]

Although extensive effort has been done in the progress of screening programmes to notice congenital heart disease prior and after birth, a large proportion of infants with congenital heart defects remain unobserved by these programmes and come to the attention of the neonologists only after they build up symptoms. Advances in surgical technique have significantly reduced the preoperative death for neonates with congenital heart disease. In the top centres, mortality for patients who undergo the arterial switch operation for simple complete transposition of the great arteries are new approaches 1% [7].

The purpose of this study is to know the burden of heart diseases in neonates in a level 3 tertiary care centre.

## METHODOLOGY

This is a prospective cross- sectional study carried out for a period of one year (1st January - 31th December 2019) at tertiary care centre in NICU in Maxfort Multispecialty Hospital and Institute of Child Health which is a 110 bedded tertiary care hospital and referral center of western UP, with 30 bedded NICU which comprises 15 dedicated intensive care beds, with the aim to determine the incidence and spectrum of different congenital heart defects in newborns. All neonates suspected to have congenital heart disease attending the hospital were undergo further assessment with detailed history, clinical examination, chest X-ray and electrocardiography. Final diagnosis was confirmed by echocardiography. All the data, related to history, clinical examination, investigation were noted in a preformed data sheet with structured questionnaire. All patients having murmur, cyanosis, tachypnea were screened through ECG and Chest X ray then subjected to echocardiography. The presence or absence of CHD and its character was confirmed by echocardiography. The data of all patients regarding age of presentation, gender, signs and symptoms, clinical features and echo findings were documented. Interatrial septum opening less than 5 mm and the patent ductus arteriosus (PDA) presenting in first 72 hours is not taken into the study [8, 9].

A suspected case was defined as

i. Any child with spo2 less than 95
ii. Unexplained CHF
iii. Murmur
iv. Abnormal ECG
v. Abnormal heart sound on auscultation
vi. Abnormal Blood Pressure
vii. Differential Peripheral pulses
viii. Abnormal chest X-Ray

## RESULTS

Total numbers of newborn admitted in our NICU were 1146 during the study period out of which 889 were male and 257 female. 443 were screened with echocardiography and 42 were found to have CHD (9.4%). Preterms with PDA or PFO were excluded. Acyanotic heart defects contributed to 28(66.6%) cases while cyanotic heart defects contributed 12(28.6%) cases while 1 case was Ebstein's anomaly and 1 had Co-arctation of Aorta. Among CHD males were 26 (61.90%) while females contributed 16(38.09%) of cases. VSD was the most common lesion. Profile of various CHDs was VSD 10(23.80%), ASD 8(19.04%), PDA 7(16.66%), TOF 4(9.52%), Single Ventricle 3(7.14%), TAPVC 2(4.76%), PS 3(7.14%), TGA 1(2.38%), Tricuspid Atresia 2(4.76%), Ebstein's anomaly 1(2.38%) and Coarctation of Aorta 1(2.38%).

**Table 1: Clinical Spectrum Of Congenital Heart Disease**

| S.No. | Diagnosis | Male | Female | Total=42 |
|---|---|---|---|---|
| 1. | VSD | 7 | 3 | 10(23.80%) |
| 2. | ASD | 3 | 5 | 8(19.04%) |
| 3. | PDA | 3 | 4 | 7(16.66%) |
| 4. | TOF | 3 | 1 | 4(9.52%) |
| 5 | COA | 0 | 1 | 1(2.38%) |
| 6. | TAPVC | 2 | 0 | 2(4.76%) |
| 7. | PS | 2 | 1 | 3(7.14%) |
| 8. | TA | 1 | 1 | 2(4.76%) |
| 9. | TGA | 1 | 0 | 1(2.38%) |
| 10. | Ebstein's | 1 | 0 | 1(2.38%) |
| 11 | SV | 2 | 1 | 3(7.14%) |

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 1-5).

**Table 2: Clinical Spectrum Of Acyanotic Heart Disease**

| S.No. | Diagnosis | Murmur | Fast Breathing | Total=29 |
|---|---|---|---|---|
| 1. | VSD | 7 | 3 | 10 |
| 2. | ASD | 6 | 2 | 8 |
| 3. | PDA | 4 | 3 | 7 |
| 4. | PS | 2 | 1 | 3 |
| 5 | Coarctation of aorta | | 1 | 1 |

**Table 3: Clinical Spectrum Of Cyanotic Heart Disease**

| S. No. | Diagnosis | Murmur | Cyanosis with fast breathing | Total=13 |
|---|---|---|---|---|
| 1. | TOF | 2 | 2 | 4 |
| 2. | SV | 1 | 2 | 3 |
| 3. | TAPVC | 1 | 1 | 2 |
| 4. | TA | 2 | 0 | 2 |
| 5. | TGA | 0 | 1 | 1 |
| 6 | Ebstien anomaly | 0 | 1 | 1 |

**Table 4 : Distribution Of Chd By Birth Weight And Gestation**

| Gestation age | Number of children | Weight (in gms) | | |
|---|---|---|---|---|
| | | >2500gms | 1500-2500 | <1500 |
| | (No. Per 1000/live births) | >2500gms | 1500-2500 | <1500 |
| <37 weeks (n=332) | 08 | | 07 | 01 |
| >37 weeks (n=814) | 34 | 30 | 04 | |
| Total | 42 | 30 | 11 | 01 |

**Table 5: Symptomatology Of CHD**

| Symptoms | ACHDs (N=29) n (%) | CCHDs (N=13) n (%) | Total (N=42) n (%) |
|---|---|---|---|
| Murmur | 14(48.4%) | 9 (60%) | 23(54.7%) |
| Cyanosis | 00 | 13 (100%) | 13 (30.9%) |
| Respiratory distress | 20(66.8%) | 7(53%) | 27(64%) |
| CHF | 9 (30%) | 4(30%) | 13 (30%) |
| Abnormal Chest X ray | 10 (32.1%) | 9 (65%) | 19 (45%) |

## DISCUSSION

In our study, VSD constituted upto 26.93% CHDs while the study done by Islam [9] ,Hussain [10] and Khalil [11], 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 Islam [9], Hussain[10] and Khalil [11], 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 [11] and much less than the study done by Islam [9]. In our study CHDs in preterm was around 19 % and 29 % in low birth weight babies. Archer et al. reported that CHD is probably more frequent in very low birth infants treated in neonatal intensive care units than in the general liveborn population [12,13].

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 [14]. 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 [15].

## CONCLUSION

In the present time, expertise, funds, and allocation of expertise do not usually allow access to rapid postnatal diagnosis in symptomatic neonates with suspected congenital heart disease. Moreover, although training in prenatal diagnosis of congenital heart disease is improving, Most cases of congenital cardiac abnormalities are therefore unexpected. Early discussion with a cardiac centre and institution of appropriate treatment in suspected cases may avoid the search of other less likely diagnosis, the treatments for which may worsen the clinical situation.

## REFERENCES

1. Mitchell SC, Korones S B, Berendes H W. (1971). "Congenital heart disease in 56,109 births incidence and natural history". Circulation. 43(3): 323-332.
2. Yu Z, Xi Y, Ding W, Han S, Cao L, Zhu C et al. (2011). Congenital heart disease in a Chinese hospital: pre- and postnatal detection, incidence, clinical characteristics and outcomes. Pediatr Int. 53(6):1059-65.
3. Bhalla S, Javidan Nejad C, BierhalsAJ, WoodardPK, Gutierrez FR. (2008). CT in the evaluation of congenital heart disease inchildren, adolescents, and

young adults. Current Treatment Options Cardiovascular Med.10:425-32.
4. Gupta A, Abqari S, Shahab T, Rabbani MU, Ali SM, Firdaus U. (2016). Profile and Clinical Spectrum of Congenital Heart Defects in NICU. Int Arch BioMed Clin Res. 2(2):25-27.
5. Hoffman JI, Kaplan S. (2002).The incidence of congenital heart disease.J Am Coll Cardiol 39:1890-900
6. Giovanna Mangili, Elena Garzoli, Youcef Sadou. (2018). Feeding dysfunctions and failure to thrive in neonates with congenital heart diseases. La PediatriaMedica e Chirugica. 40:196.
7. U Theilen and L Shekerdemian. (2005). The intensive care of infants with hypoplastic left heart syndrome. Arch Dis Child Fetal Neonatal Ed.90(2): F97–F102
8. Bakr AF, Habib HS. (2005). Combining pulse oximetry and clinical examination in screening for congenital heart disease. Pediatr Cardiol. 26(6): 832-5.[PubMed]
9. Islam MN, Hossain MA, Khaleque MA, Das MK, Khan MRH, Bari MS, Bhuiyan MKJ. (2013). Prevalence of Congenital Heart Disease in Neonate in a Tertiary Level Hospital. Nepal Journal of Medical sciences.2(2):91
10. Hussain S, Sabir MU, Afzal M, Asghar I. (2014). Incidence of congenital heart disease among neonates in a neonatal unit of a tertiary care hospital. J Pak Med Assoc. 64: 175-178.
11. Khalil A, Aggarwal R, Thirupuram S, Arora R. (1994). Incidence of congenital heart disease among hospital live births in India. Indian Pediatr.31(5):519-2.
12. WrenC, RichmondS, Donaldson L. (1999). Presentation of congenitalh e a r t disease in infancy: Implications for routine examination. ArchDis Child Fetal Neonatal Ed;80:F49-53.
13. Ufuk Kursat Korkmaz, Esra Akyuz Ozkan, Ayse Neslin Akkoca, Ebru Sivaslioglu. (2015). Incidence and Clinical Characteristics of Congenital Heart Disease among Neonates in Neonatal Intensive Care Unit. American Journal of Health Research. 3(3).161-165.
14. Saxena A. (2005). Congenitalheartdiseasein India: A status report. Indian J Pediatr 72:595-8.
15. Shima Y, Takechi N, Ogawa S, Fukazawa R, Fukumi D, Uchikoba Y, et al. (2001) .Clinical characteristics of congenital heart disease diagnosed during neonatal period. JNihonMedSch.68:510-515.