

Spectrum of Congenital Heart Disease in Neonates Admitted in an Intermediate Care Unit of a Tertiary Level Hospital

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Abstract

Introduction: Congenital Heart Disease is the most common cause of major congenital anomalies accounting 28.0%, representing a major global health problem. Prevalence of Congenital Heart Disease is 1.3 per 1000 in school children of Nepal. **Material and Methods:** A cross sectional prospective study was carried out in the neonatal intermediate care unit of Kanti Children's Hospital, Nepal from Jan 2016 until Dec 2016 to see the spectrum of CHD. **Results:** Out of admitted 831 neonates, 85 were found to have CHD with prevalence of 102.28 per 1000 admitted neonate. Respiratory distress was the commonest symptom (51.8%) followed by cyanosis (11.8%) and reluctant to feed (10.6%) at presentation. ASD was the commonest (87.1%) cases followed by PFO 23.5%, PDA 21.2%, Complex congenital heart disease 11.8% and TOF 1.2%. Cleft lip and Cleft Palate was found in 5.9%, Down's syndrome 3.5% of cases, polydactyly and syndactyly was detected in 2.4% newborn with CHD. The mode of delivery was spontaneous in 71.8% followed by Elective LSCS were 14.1% and Emergency LSCS were 9.4%. **Conclusions:** Prevalence of CHD was the 102.28 per 1000 neonates admitted in NIMCU. Atrial Septal Defect was the commonest congenital heart diseases. Cleft lip and Down's syndrome were the most extra cardiac anomaly associated with CHD. Respiratory distress was the commonest presentation of CHD for hospital admission.

Key words: Congenital, Heart disease, Prevalence

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Introduction

Congenital heart disease (CHD) is the most common cause of major congenital anomalies accounting 28.0%, representing a leading global health problem with prevalence in neonate of be 5-8/1000^{1,2,3,4}. Studies done in Pakistan and India showed a prevalence rate of up to 4/1000 live births^{5,6}. Literature review could not find any prevalence study in neonates of Nepal as such, but some showed that the prevalence of CHD in school children was 1.3 per 1000 and 5.8 per 1000 hospitalized patients^{7,8}. Worldwide the prevalence of CHD has increased substantially from <1 per 1,000 live births in 1930 to 9 per 1,000 live births in recent years due to changes in diagnostic methods and screening modalities rather than representing a true

increase^{9,10}. Thus, the aim of this study was to find out the spectrum and prevalence of CHD presented in a Neonatal Intermediate care unit of a tertiary care paediatric hospital of Nepal.

Material and Methods

This prospective study was carried out over a period of one year from January 2016 until December 2016 among the admitted neonate in the Neonatal Intermediate Care Unit (NIMCU) age ranging from newborn to 28 days. A thorough clinical examination was carried out within first 24 hours of admission. Congenital Heart Disease (CHD) was suspected in the presence of following criteria defined by Mitchell et. al¹. Presence of cardiac murmur, presence of cyanosis or feeding difficulty only, cyanosis associated with feeding difficulty, presence of congestive heart failure or failure to thrive. Detailed history was collected from parents or attendant regarding family history of congenital heart disease in siblings, parents. The questionnaire also enquired about; significant history of ingestion of drugs, hormone, exposure to radiation, history of fever with rash prior six months of conceptions and in 1st trimester, maternal age and parity of the mother. The birth weight, age, sex and gestational age of babies were also recorded. All suspected patients were investigated by doing a chest X-ray and 2D, M-mode echocardiography with colour Doppler. Additional screening for babies of diabetic mothers, all babies with Down's syndrome and babies with congenital malformations were also screened.

Results

There were 831 neonates admitted during the study period out of which 85 were found to have CHD. The prevalence was 102.28 per 1000 admitted neonates, seventy six (89.41%) were term and 9 (10.58%) were preterm.

Table 1 shows respiratory distress was the commonest symptom (51.8%) followed by cyanosis (11.8%) and reluctance to feed (10.6%). Other nonspecific and non-significant symptoms like fever, cough, tachypnoea etc were also noted.

Table 2 shows types of structural defect in new-borns. Significant ones were ASD 87.1%, PFO 23.5%, PDA 21.2%, Complex Congenital Heart Disease in 11.8% and TOF in 1.2%.

Significantly associated non-cardiac anomalies (Table 3) were also seen, like Cleft lip and Cleft Palate in 5(5.9%), Down's Syndrome in 3(3.5%), polydactyly and syndactyly were detected in 2 (2.4%) new-borns and renal anomaly was found in 1 (1.2%) of the cases.

Table 4 shows pattern of risk factors in cases of babies with congenital heart disease. Maternal infection was noticed in 3(3.5%) cases. The commonest mode of delivery was spontaneous (71.8%), Elective LSCS were done in 12(14.1%) and Emergency LSCS were done 8(9.4%).

Table 1: Presentation of congenital heart disease on admission

| Presentation | No. of patients (n= 85) |
|----------------------|-------------------------|
| Respiratory distress | 44 (51.8) |
| Cyanosis | 10 (11.8) |
| Reluctant to feed | 9 (10.6) |
| Others | 22 (25.8) |

Table 2: Types of structural defect in CHD in new-borns (n=85)

| Types | Numbers (n=85) |
|---|----------------|
| ASD | 94 (87.1) |
| PDA | 18 (21.2) |
| VSD | 14 (16.5) |
| Myxomatus Valve | 14 (16.5) |
| Complex Congenital Heart Disease | 10 (11.8) |
| Pulmonary Stenosis | 5 (5.9) |
| Double outlet right ventricles (DORV) | 4 (4.7) |
| Persistent left superior venacava (PLSVC) | 4 (4.7) |
| Transposition of great Arteries (TGA) | 2 (2.4) |
| Atrio ventricular septal Defect (AVSD) | 2 (2.4) |
| Tetralogy of Fallots (TOF) | 1 (1.2) |
| Total Anomalous pulmonary venous connection (TAPVC) | 1 (1.2) |
| Hypertrophic Cardiomyopathy | 1 (1.2) |

Table 3: Associated non cardiac anomalies (n=85)

| Non cardiac Anomalies | No of patients (%) |
|-----------------------------|--------------------|
| Cleft lip cleft palate | 5 (5.9) |
| Down's syndrome | 3 (3.5) |
| Polydactyly with syndactyly | 2 (2.4) |
| Renal Anomaly | 1 (1.2) |

Table 4: Maternal History and Mode of delivery

| Maternal History | Total number of mothers (n=85) |
|--------------------|--------------------------------|
| Maternal infection | 3 (3.5) |
| Antipyretic | 1(1.2) |
| Mode of delivery | |
| spontaneous | 61(71.8) |
| Elective LSCS | 12(14.1) |
| Emergency LSCS | 8(9.4) |
| Vacuum | 4(4.7) |

LSCS= Lower Section Caesarean Section

Discussion

Congenital heart disease has already been recognized as one of the important risk factor for neonatal morbidity. Ferencz et. al. reviewed seven major studies from Europe and North America and concluded that confirmed CHD prevalence had been remarkably constant at 4/1000 live births over 40 years time span from 1940-1980¹¹. A study done in tertiary centre in Kathmandu, Nepal showed the incidence of CHD to be 5.8 per 1000 hospitalized patients and a community study showed the prevalence of Rheumatic Heart disease and Congenital Heart Disease combined were 1.2 per 1000 and 1.3 per 1000 in school children^{12,13}. The present study showed the ratio of 1 per 9.7 neonate admitted in the NIMCU. This could be attributed to the neonate having CHD is prone to trivial illnesses and being admitted to hospital as compared to a normal neonate.

Clinically Respiratory distress (51.8%) was the commonest presenting system followed by Cyanosis (11.8%) and reluctant to feed (10.6). Similar observation were also detected by others^{9,12,14}.

The commonest congenital heart disease in our study was ASD (87.1%) which was similar to the observation by Rahman S et.al and Siddique FM^{15,16} yet our study did not correlate to the other studies which shows VSD as the commonest congenital heart defect^{1,12,14}.

Our study showed significant association of non cardiac anomalies and somatic anomalies in 11(12.9%) cases, among which cleft lip cleft palate, Down's syndrome, polydactyly with syndactyly and renal anomaly were the commonest. Studies done by Hofman, Sah GS et.al and Rahaman S et.al. also showed similar results^{13,15,17}.

Maternal diseases like diabetes mellitus, maternal infection, hypertension and drugs could affect the increase occurrence of CHD in neonates. Our study found that only 3.5% mothers had history of infections during pregnancy and only one mother had history of using antipyretic drugs.

Neonates with CHD are more prone to develop intrauterine foetal distress that could mean frequent LSCS either elective or emergency during delivery but our study showed the frequency of normal delivery higher than the LSCS.

Conclusions

Our observations show, prevalence of CHD was the 102.28 per 1000 neonates admitted in NIMCU. ASD was the commonest CHD. Cleft lip and Down's syndrome were the most extra cardiac anomalies associated with CHD and that respiratory distress and cyanosis were the commonest presentation of CHD.

References

- Mitchell SC, Korones SB, Berendes HW. Congenital heart disease in 56, 109 births. Incidence and natural history. *Circulation* 1971;43:323-32.
- Dolk H, Loane M, Garne E. For the European Surveillance of Congenital Anomalies (EUROCAT) working Group. Congenital heart defects in Europe: prevalence and perinatal mortality, 2000-2005. *Circulation* 2011;123:841-9.
- Samanek M, Voriskova M. Congenital heart disease among 815,569 children born between 1980 and 1990 and their 15 year survival: a prospective Bohemia survival study. *Pediatr Cardiol* 1999;20:411-17.
- Wren C, Richmond S, Donaldson L. Presentation of congenital heart disease in infancy: implications for routine examination. *Arch Dis Child Fetal Neonatal Ed.* 1999; 80:49-53.
- Hassan I, Haleem AA, Bhutta ZA. Profile and risk factors for congenital heart disease. *J Pak Med Assoc* 1997;47:78-81
- Chadha SL, Singh N, Shukla DK. Epidemiological study of Congenital heart disease. *Indian J Pediatr* 2001;68:507-10.
- KC MB, Sharma D, Shrestha MP. Prevalence of rheumatic and congenital heart disease in school children of Kathmandu valley in Nepal. *Indian Heart J* 2003;55(6):615-8.
- Shah GS, Singh MK, Pandey TR, Kalakheti BK, Bhandari GP. Incidence of congenital heart disease in tertiary care hospital. *Kathmandu Univ Med J* 2008;6(1):33-6
- Khalil A, Agarwal R, Thirupuran S. Prevalence of congenital heart disease among hospital live births in India. *Indian Pediatr* 1994; 31:519-26.
- Mollah MAH, begum NA, Islam MN. Clinical profile of congenital heart diseases (CHD): an Analysis of 218 cases. *Bangladesh Heart J* 2002;17:62-7.
- Ferencz C, Rubin JD, Meconter RJ. Congenital Heart Diseases. Prevalence at live birth. The Baltimore Washington infant study. *Am J Epidemiol* 1985;121:31-36.

12. Shah GS, Singh MK, Pandey TR, Kalakheti BK, Bhandari GP. Incidence of congenital heart disease in tertiary care hospital. *Kathmandu Univ Med J* 2008;6(1):33-6.
13. KC MB, Sharma D, Shresth MP et al, Prevalence of rheumatic and congenital heart disease in school children of Kathmandu valley in Nepal, *Indian Heart J* 2003;55(6):615-8.
14. Islam MN, Hussain MA, Khaleque MA, Das MK, Khan MRH, Bari MS and et al. Prevalence of congenital Heart Disease in Neonatal in a Tertiary Level Hospital. *NJMS* 2013;2(2):91-95.
15. Rahman S, Ahmed MN, Rahmatullah KHI. The prevalence of congenital heart diseases diagnosed by Non-invasive technique- Ten years study in Bangladesh. *DS (Child) HJ* 1992;8:5-15.
16. Siddique FM, Kamal SMM, Huq KMSS. Clinical presentation of congenital heart diseases in hospitalized patients. *Bangladesh Heart J* 1989;4:13-17.
17. Hoffman JIE. Congenital heart disease: Prevalence and inheritance. *Pediatr Clin North Am* 1990;37:25-43.