



PROFILE OF CONGENITAL HEART DISEASES IN NEWBORNS AT A TERTIARY CARE CENTER IN WESTERN INDIA.

Neonatology

Dr Lalit Mali Associate Professor, Department of Pediatrics, J.L.N. Medical College, Ajmer, Rajasthan.

Dr Mamta Bajad Assistant Professor, Department of Pediatrics, J.L.N. Medical College, Ajmer, Rajasthan.

Dr Jaiprakash Narayan* Associate Professor, Department of Pediatrics, J.L.N. Medical College, Ajmer, Rajasthan.
*Corresponding Author

ABSTRACT

Introduction : Neonates as a group is significant proportion of population. Their intact and healthy survival is important. Congenital malformations (CMs) occur very frequently in this population. And congenital heart diseases (CHDs) is biggest subgroup accounting for 21.65%; has considerable morbidity and mortality. This has major load on health infrastructure and at the same time it needs to be expanded. **Objective:** The objective of the study was to know the epidemiological features and prevalence of CHDs at our center. **Materials and Methods:** This retrospective study was conducted in the department of pediatric of a medical college of Rajasthan. The study population included live births born in our institution between 1990 and 2018. A register was maintained after delivery to document the particulars of neonates with congenital birth defect and their mothers. We had taken neonatal record from this register and analyzed the data of the past 28 years, retrospectively. **Results :** Of 241,848 live births, 6623 cases were identified with a primary diagnosis of one or more congenital anomalies giving a prevalence rate of 274/10,000 live births (95% confidence interval [CI]: 262.2–285.8). CHDs were diagnosed in 1434 neonates; of these 58.51 % were males and 41.49 % were females. The prevalence of CHDs was 59.29/ 10,000 live births (95% CI: 18.69 – 20.71). VSD was most common and found in 453 (31.59%) neonates. Among cyanotic CHDs, TOF was most common comprising 79 (05.51%). **Conclusion :** CHDs were most common congenital malformations and VSD was most common among it.

KEYWORDS

Congenital Heart Disease, Newborn, Western India.

INTRODUCTION

A congenital malformation (CM) or birth defect is defined as a structural or chromosomal malformation with a significant impact on the health and development of a child [1]. With regard to morbidity, CMs account for 12% of all pediatric hospitalizations [2]. This subset of patients with CMs has longer hospital stays and incurs higher hospitalization costs, compared to other patients [3,4]. Studies published worldwide report a birth prevalence of CM that ranges 20–55/1000 live births with significant variation, depending on the demographics of the study population, the study design, and the method of case ascertainment [1,4,5-8].

Congenital heart disease (CHD) is the most common congenital malformation and leading cause of infant mortality. The global incidence rate of CHD is 6.8 to 9.0 per 1000 live births [9–11].

Its most common subtypes are atrial septal defect (ASD), ventricular septal defect (VSD), patent ductus arteriosus (PDA), pulmonary stenosis (PS), and tetralogy of Fallot (TOF) [12,13]. The World Health Organization statistics in 2014 shows that 1.5 million infants are born with CHD in the world each year.

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 [14]. The incidence of moderate to severe structural CHD in liveborn infant is 6–8 per 1000 live births [15]. CHD is considered one of the leading causes of neonatal mortality [16]. According to a status report on CHD in India, 10% of the present infant mortality may be accounted to CHD [17]. Many cases are asymptomatic and discovered incidentally during routine health checkup [18].

MATERIALS AND METHODS

This retrospective cross-sectional study was conducted in the Department of Pediatrics of a tertiary care teaching institution of Rajasthan, Western India. The study population included live births born in our institution between 1990 and 2018. This hospital serves both urban and rural population. The study was planned and permission was taken from the Institutional Ethical Committee and Institutional head to use hospital data for research.

The data were taken from a register (congenital anomalies register) which was maintained by resident doctors to document particulars of neonates with a congenital birth defect and their mothers after delivery.

In this register, resident doctors filled particulars of mothers and their babies, risk factors if available, weight and gestational age of mother, history of consanguinity, referral and outcome of baby, and duration of stay.

We took total live birth data from the register maintained by labor room resident doctors. Finally, the data of neonates with CHDs of the past 28 years were analyzed.

RESULTS

Of 241848 live births, 6623 cases were identified with a primary diagnosis of one or more congenital malformation; out of them, 54.91% were male and 44.83% of female. It gives a prevalence rate of 274/10,000 live births (95% confidence interval [CI]: 262.2–285.8). CHDs accounted for 21.65 % of total neonates with congenital malformation.

CHDs were diagnosed in 1434 neonates; of these 58.51 % were males and 41.49 % were females (Table 1). The prevalence of CHDs was 59.29/10,000 live births (95% CI: 18.69 – 20.71). Among the live born neonates with CHDs, 90.37 % were born vaginally and; 79.77 % were born to primigravida.

Table 1 : sex wise distribution of CHDs

Gender	Total anomalies (%)	CHDs (%)
Male (%)	3637 (54.91)	839 (58.51)
Female (%)	2969 (44.83)	595 (41.49)
Ambiguous genitalia	17 (0.002)	0 (00.00)
Total	6623	1434

CHDs were commonest in the weight group 1.5 – 2.499 kg as shown in table 2.

Table 2 : distribution of neonates according to birth weight

Birth weight (kg)	Male		Female	
	Total anomalies (%)	CHDs (%)	Total anomalies (%)	CHDs (%)
< 1	281 (7.726)	28 (03.34)	237 (7.98)	33 (05.55)
1 – 1.499	292 (8.02)	99 (11.80)	209 (7.03)	83 (13.95)
1.5- 2.499	1309 (35.99)	661(78.78)	1096 (36.91)	377 (63.36)
2.5- 4.000	1698 (46.68)	51 (06.08)	1337 (45.03)	102 (17.14)
> 4	57 (0.0156)	00 (00.00)	90 (3.03)	00 (00.00)
Total	3637	839	2969	595

Similarly CHDs were most common in 32- < 37 week gestation age group (table 3). Overall CHDs were more common in preterm low birth weight (LBW) babies compared to CMs. But if we see distribution in females, it is most common in gestation age group 37-42 week.

Table 3 : distribution of neonates according to gestational age

Gestational age (week)	Male		Female	
	Total anomalies (%)	CHDs (%)	Total anomalies (%)	CHDs (%)
< 32	371 (10.2)	137 (16.33)	355 (11.96)	76 (12.77)
32 - <37	1192 (32.77)	437 (52.09)	419 (14.11)	251 (42.18)
37 - 42	1871 (51.44)	265 (31.58)	1705 (57.43)	268 (45.04)
>42	203 (5.58)	00 (00.00)	490 (16.50)	00 (00.00)
Total	33637	839	2969	595

Table 4 shows the outcome of CHD neonates. It shows 923 (64.37%) neonates were discharged whereas 61 (4.25%) expired. It also shows that 61.14 % of males and 68.91% of females were discharged. 23 (02.74%) males and 37 (06.22%) females went LAMA. Considering that most of LAMA patients expired, the mortality in females becomes higher.

Table 4 : distribution of CHD neonates according to outcome

Outcome	TOTAL CHD	Male (%)	Female (%)
Discharge	923 (64.37)	513 (61.14)	410 (68.91)
Expired	61 (04.25)	36 (04.30)	25 (04.20)
LAMA	60 (04.18)	23 (02.74)	37 (06.22)
Referred	390 (27.20)	267 (31.82)	123 (20.67)
Total	1434	839	595

Table 5 shows the overall profile of CHDs in terms of number and percentage. It shows that VSD was found in 453 (31.59%) neonates. And almost same number of patients were complex/ unclassified CHDs 457 (31.87%). Among cyanotic CHDs, TOF was most common comprising 79 (05.51%).

Table 5 : distribution of CHDs according to type

Type	Number (%)
Acyanotic (total)	860 (59.97)
VSD	453 (31.59)
ASD	207 (14.43)
PDA	153 (10.67)
Coarctation of aorta	47 (03.28)
Cyanotic 117 (total)	117 (08.16)
TOF	79 (05.51)
TGA	36 (02.51)
TAPVC	02 (00.14)
Complex/unclassified	457 (31.87)

DISCUSSION

In the present study, 6623 cases were diagnosed with congenital malformation; out of them, 54.91% were male and 44.83% of female. Egbe *et al.* reported CM in 51% of male [2].

In this study CHDs were most common accounting for 21.65 %. Study by Dolk H *et al* states that Congenital heart disease (CHD) is the most frequently occurring congenital disorder, responsible for 28% of all congenital birth defects [19].

Among CHDs 58.51 % were males and 41.49 % were females. Acyanotic CHDs were found in 59.97% neonates out of total CHDs and VSD was most common single isolated defect overall (31.59%). Another study in India by Mir *et al* reported acyanotic CHDs 72.20% and VSD 32.10% [20]. In our study cyanotic CHDs were found in 08.16% and TOF was most common. Study by Patra *et al* also reported TOF being the most common cyanotic CHD [21].

The overall mortality of CHD diagnosed neonates was 04.25%. But the actual mortality may even be higher if we consider that many of the patient who went LAMA might had have adverse outcome. And also we did not have information about the outcome of patients who were referred.

The limitations of our study was that we did not had follow up of discharged, referred and LAMA patients. Another limitation was that

2D echo was not performed in critically ill ventilated patients because of unavailability of portable bedside machine, so in them diagnosis of CHD was clinical only. Some asymptomatic cases might had been missed.

CONCLUSION

Congenital malformations in neonates are very common and have considerable morbidity and mortality. Congenital heart diseases are most common group. For proper and prompt medical care, there is a urgent need of improving health infrastructure in terms of both quantity and quality.

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