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Original Research Article

Burden of congenital heart diseases in a tertiary cardiac care institute of high altitude area

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ABSTRACT

Background: Congenital heart disease is one of the major causes of mortality and morbidity in the paediatric population of both the developing and developed countries. Variability in incidence and prevalence of CHD from various countries of Indian subcontinent and rest of the world could be because of genetic, cultural, and environmental factors. The objective of the study was to find the prevalence and pattern of CHD in a tertiary care hospital in Kashmir (Jammu and Kashmir).
Methods: All children admitted at territary care hospital with age 0-15 years were screened for congenital heart disease. The study was conducted for period of one year to ascertain the prevalence and spectrum of CHDs.
Results: A total of 232 patients out of 23000, were found having CHDs measuring a prevalence of 10.5/1000. About 170 (73%) were the acyanotics, and 62 (27%) were cyanotic heart patients. Among the acyanotic heart diseases ventricular septal defect was the most frequent lesion seen in 54 (23%), followed by patent ductus arteriosus in 50 (22%) children. Among the cyanotic heart diseases tetralogy of Fallot was the most frequent cyanotic heart disease seen in 15 (6.4%) patients.
Conclusions: Authors observed high prevalence of CHD in our population. The pattern and spectrum of CHD were comparable to national and international data.

Keywords: Acyanotic, Cyanotic, Congenital heart disease, High altitude area, Neonatal, Prevalence

INTRODUCTION

Congenital heart disease (CHD) is defined as a gross structural abnormality of the heart or intrathoracic great vessels that is actually or potentially of functional significance.[1] According to a status report on CHD in India, 10% of the present infant mortality may be accounted for by CHD.[2] In majority of the CHD cases, there is no identifiable cause that can be attributed as multifactorial defects, and the many cases are asymptomatic and discovered during routine neonatal checkups.[3] CHD accounts for 25% of all congenital malformations.[4] Early recognition helps in improving outcome.[5] Prevalence of CHD vary worldwide, may be due to differences in genetic, environmental, and cultural values. Congenital heart diseases are relatively common with a prevalence ranging from 3.7 to 17.5 per 1000 live births.[1,2] In Asia, estimated prevalence is 9.3/1000 live births, while estimated total CHD birth prevalence in Europe was significantly higher than in North America (8.2/1000 live births vs. 6.9/100 live births).[6] Incidence of CHD is underestimated due to home deliveries and

early discharge of mothers along with their neonates from hospitals without proper neonatal examination.[7] CHD has a wide spectrum of severity in infants: about 2-3 infants/1000 live births will develop symptom-related to cardiac defects during 1st year of life.[8] Prevalence studies of congenital cardiac disease are necessary to help better understanding the epidemiology of disease which will help in improving outcomes. The prevalence of CHD is not uniform across the country and setting. Authors conducted this study to assess the prevalence of CHD among patients attending a tertiary care hospital in North India. The aims and objectives of the study were to find the prevalence and pattern of CHD in a tertiary care hospital in Kashmir (Jammu and Kashmir).

METHODS

The study was a prospective non-randomized study conducted from September 2009 to August 2010. The study was conducted in the Department of Pediatrics, G. B. Pant Hospital, an associated Hospital of Government Medical College, Srinagar, which is a referral tertiary care hospital for the children of entire Kashmir valley.

Inclusion criteria

- All patients aged 0-15 years of age who were admitted in the hospital for various reasons from September 2009 to August 2010.

Exclusion criteria

- Age more than 15 years,
- Failure to obtain consent.

All patients aged 0-15 years of age who were admitted in the hospital for various reasons from September 2009 to August 2010 were screened to rule out congenital heart disease with detailed echo cardiogram if they had clinical, ECG and X ray suspicion of CHD. The history included age, sex, habitat, birth order of the child, consanguinity, place of delivery, mode of delivery and presenting features included irritability, fatigue, breathlessness, poor feeding, syncope or presyncope, puffiness of face, swelling of feet and/or legs and pain right upper abdomen. Clinical examination was recorded which included vital signs (HR, RR, BP and temperature), cyanosis, clubbing, distended neck veins, signs of right heart failure. A detailed examination of cardiovascular system was done in all cases which included findings of left parasternal right ventricular lift, an accentuated pulmonary component of second heart sound and presence or absence of murmurs. Examination of chest, abdomen and CNS was also recorded in the proforma. Chest X ray was done in all the patients. Those patients in which congenital heart disease was suspected on clinical examination or on ECG or chest X ray underwent transthoracic doppler echocardiography by a cardiologist having experience in pediatric cardiology using echocardiographic machine acuson.

Stastical analysis

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as Mean±SD and categorical variables were summarized as frequencies and percentages.

RESULTS

The total number of admissions during the study period were 23000.

Table 1: Distribution of CHD cases.

Type of CHD	Total	Percentage
VSD	54	23.2
PDA	50	21.5
ASD	26	11.2
VSD ± ASD ± PDA	18	7.7
Idiopathic PAH	17	7.3
ToF	15	6.4
TGA	13	5.6
AV canal defect	6	2.5
Tricuspid atresia	4	1.7
Truncus arteriosus	3	1.3
TAPVC	3	1.3
PPHN	3	1.3
Other (PS, PA, AS, RVOT, DORV, Ebstein anomaly, hypoplastic left heart syndrome)	20	8.6

VSD: Ventricular septal defect, PDA: Patent ductus arteriosus, ASD: Atrial septal defect, ToF: Tetralogy of Fallot, TGA: Transposition of great arteries, TAPVC: Total anomalous pulmonary venous connection, PPHN: Persistent Pulmonary hypertension of newborn, PS: Pulmonary stenosis, AS: Aortic stenosis, RVOT: Right ventricular outlet Obstruction, DORV: Double outlet right ventricle.

Total number of congenital heart diseases diagnosed were 232 giving a prevalence of 10.5/1000. Males were 127 (55%) while as females were 104 (45%). The ages at diagnosis were also different, out of total 232 patients diagnosed as CHD; 58 (25%) patients were neonates, 104 (45%) were infants, between 2 years and 5 years were 37 (16%), 6-12 years were 16 (7%) and above 12 years were 17 (7.1%). About 170 (73%) were the acyanotics, and 62 (27%) were cyanotic heart patients. Among the acyanotic heart diseases ventricular septal defect was the most frequent lesion seen in 54 (23%), followed by patent ductus arteriosus in 50 (22%) children and ASD (11.2%) or in combination (7.7%). Among the cyanotic heart diseases tetralogy of Fallot

was the most frequent cyanotic heart disease seen in 15 (6.4%) patients, TGA 5.6% of cases. Rest of cases included AV canal defect (2.5%), tricuspid atresia

(1.7%), truncus arteriosus (1.3%), TAPVC (1.3%), PPHN (1.3%) and others (8.6%) as shown in (Table 1).

DISCUSSION

Present study was a prospective non-randomized study for period of one year. All patients aged 0-15 years of age who were admitted in the hospital for various reasons during this year were screened to rule out congenital heart disease. Authors noted a high prevalence of CHD (10.5 per 1000) in present study. Our institute is the major tertiary care institute in Kashmir; hence, this large prevalence in our institute can be explained due to large number of referrals from peripheral health centers. Pediatric cardiac care is still in infancy in India especially in our state Authors have very little data on CHD prevalence at birth or proportional mortality rate. Present study reflects high prevalence of CHD in our population, however it may have overestimated the prevalence as this is the major territary care center of state while on the other hand many diseases could have been missed as many succumb before proper diagnosis. Thus, there is need of large community-based state registry to fully understand the prevalence and patterns of CHD in our state. Most of CHDs were diagnosed between 1 month and 6 years (61%), which is comparable to other studies.[9,10] The highest number of cases was seen between 1 month and 6 years of age which could be because of a large number of referrals from different peripheral health center and more use of echocardiography. CHDs were more common among the male 55%. This has been reported earlier.[11-13] This male dominance pattern may be due to Indian social and cultural factors including neglect, differential treatment, or poor access to health care facilities among girl. Acyanotic group formed the major chunk (73%), of the total CHD patients which is in comparable with the other studies.[14,15] The most frequent type of CHD was VSD, which is in accordance with other studies.[16] As authors have included newborns in present study, the incidence of ventricular septal defect is much higher. This incidence of ventricular septal defect actually overestimates the true hemodynamically significant burden. Patients with atrial septal defect are usually asymptomatic in early age, and as they produce soft murmurs, these defects frequently do not lead to early diagnosis. Hence, the incidence of atrial septal defect in childhood actually underestimates the true incidence.

Tetralogy of Fallot according to natural history usually presents late and has favorable natural history, which may be the reason that it is the most common cyanotic CHD encountered in present study. A study by Patra et al, showed that tetralogy of Fallot was the most common cyanotic CHD (44% of total cyanotic CHD) followed by double outlet right ventricle (14% of total cyanotic CHD.[17] Our data of cyanotic and acyanotic CHD are quite similar to other Indian data) western study. The frequency of the complex and rare types of CHDs was less when compared to the western data but similar to other Indian studies.[18,19] This could be due to the severity of the defects which might have led to the death of the patients before accessing the medical facilities. However racial and genetic factors may also be responsible for this difference.

CONCLUSION

Burden of CHD is highly underestimated so, it is important to estimate the current burden of CHD. A national registry for CHDs is the need of the hour which will help in understanding the actual burden of the diseases and in turn help in reducing mortality and morbidity of these patients.

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