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CURRENT TRENDS OF CARDIAC SEPTAL DEFECTS IN CHILDREN IN EASTERN INDIA: AN OBSERVATIONAL STUDY

Paediatric Medicine

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ABSTRACT

Congenital Heart Disease (CHD) is the most common among all congenital anomalies. CHDs are majorly classified into either cyanotic or acyanotic variety and both may have septal defects. Isolated cardiac septal defects mainly constitute the acyanotic CHDs namely Ventricular Septal Defect (VSD), Atrial Septal Defect (ASD) and Endocardial Cushion Defects (ECD). With recent advances and ease of availability of diagnostic aids and specialists, CHDs have become a common disease entity faced by Paediatric practitioners today. Acyanotic cardiac septal defects are relatively easier to manage and treat as compared to the cyanotic and complex CHDs. Still data detailing the epidemiology of these defects in India are scarce. This study was aimed to typify findings from pediatric CHD patients with septal defects at a medical college hospital in northern part of West Bengal, catering to a previously understudied demographic. A sequence of CHD cases, picked contiguously from the pediatric indoor and outdoor patients over a period, were surveyed. Data was recorded under multiple headings including demographics, clinical findings, investigations and outcomes.

KEYWORDS

CHD, septal defect, Children

INTRODUCTION

Cardiac septal defects are congenital heart disease/defects (CHD) that occur as a failure of complete closure of the septum that separate the chambers of heart. Ventricular septal defects (VSDs) are openings in the ventricular septum and are classified according to their location into inlet, outlet, membranous and muscular. Atrial septal defects are classified into ostium primum, ostium secundum and the sinus venosus variety. ECD or Atrioventricular Septal Defect (AVSD) or AV Canal defects are a spectrum of defects present in a small portion of septum between the left ventricle and the right atrium. It is commonly associated with Down Syndrome. These defects are present at birth and may manifest at any phase of life. Most of the clinically significant CHDs become manifest either in the immediate neonatal period or late neonatal period and infancy. Pediatricians form the core specialists who may first suspect CHD in any individual and refer them for further evaluation and management. Fig. 1 depicts the common CHDs on a single heart diagram.

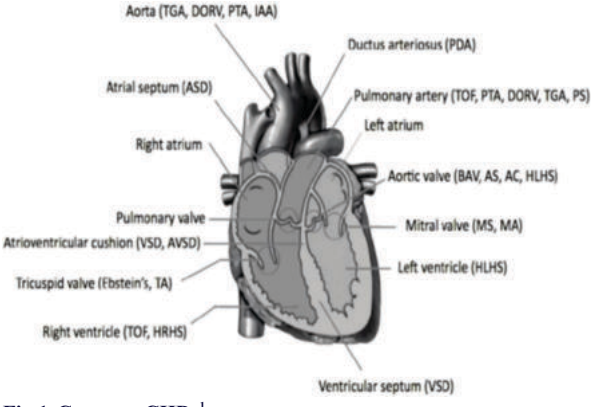

Fig.1. Common CHDs[1]

In India descriptive studies on CHDs have been carried out sporadically in narrow geographical frontiers. Incidence of CHDs in India has been described to be around 3.9 per 1000 live births[2]. In eastern India a study conducted in a tertiary care hospital in southern West Bengal found a prevalence of CHD of 1.4% among OPD patients[3]. No studies could be traced pertaining to population of North Bengal or specifically for cardiac septal defects in any population in India. Pooja M Vyas et al conducted a study in Western India and concluded that "majority of the patients with CHD had acyanotic CHD with most common anomaly being ventricular septal defect"[4].

STUDY METHOD

A cross sectional study was conducted at Malda Medical College & Hospital, a tertiary care center at the heart of Malda town. Malda is a district in West Bengal covering an area of 3733 sq Km. Malda district has a population of 42,48,000 according to the 2021 census. The hospital where the study was carried out caters to the diverse population of the neighboring districts as well as patients from Jharkhand and Bihar. Overall prevalence of CHDs is estimated to be around 1%. A relative precision allowed was 2 (d). With 98% level of confidence, calculating by the formula $n = Z^2P(1-P)/d^2$, adequate sample size turned out to be 135 which was rounded off to a value of 150.

A total of 150 contiguous cases of CHD were surveyed over a period of 18 months. The septal defects were studied separately. Data was recorded under multiple headings including demographics, clinical findings, investigations and outcomes. Attempt was made to observe and analyze the common types of CHD known to us, individually.

RESULTS

Septal defects were present in 92.67% of all CHDs and isolated septal defects formed 60% of all CHDs. Prevalence of isolated cardiac septal defects in indoor patients of our hospital was found to be 9 per 1000. Male to female ratio of patients was almost equal (M:F=1.13). Consanguinity was found in 22% cases. Mean age at diagnosis was around 5 months. Septal defects were significantly more likely to be diagnosed in pediatric wards than in the neonatal units (p value 0.005), likely due to high pulmonary vascular resistance in the neonatal period. Pneumonia and congestive cardiac failure were found more common in isolated septal defects than in cyanotic CHDs (p value 0.012 and 0.006 respectively). On chest X-rays, pulmonary field hyperemia was more common in isolated septal defects than in cyanotic variety (p value 0.035). In our study ASD (49.67%) was found to be the most common septal defect in the pediatric population ahead of VSD (46.33%).

The mean age at presentation for ASD was around 9 months while the mean age at diagnosis was around 6 months. Females (55%) were more commonly affected than males. Mean mothers age at conception was 23, while consanguinity was positive in 18% of cases. Most common type of ASD was ostium secundum variety (90%) followed by ostium primum (7%) and sinus venosus (3%). In 70% of cases the ASD was isolated and in the rest 30% it was associated with another defect. RVH (Right ventricular hypertrophy) was evident in 21% of ASD patients. Syndromic associations included Down syndrome, VACTERL association and Holt Oram Syndrome.

The mean age at presentation for VSD was around 5 months while the mean age at diagnosis was around 3 months. Males (53%) were more commonly affected than females. Mean mothers age was 22, while consanguinity was positive in 23% of cases. The most common type of VSD was that of perimembranous variety (83%) followed by muscular (13%) and then supracristal (2.5%) and AV canal type (1.5%). In 52%

of cases VSD was isolated and in the rest 48%, it was in association with another defect. Mild to moderate Pulmonary Artery Hypertension (PAH) was found on echocardiography in 32% of VSD patients while 10% had associated severe PAH.

Endocardial cushion defect was the least common septal defect (3%) in our study. It was found in significant association to Down Syndrome. VSD was the most common septal defect associated with cyanotic CHDs. Among all cyanotic CHDs, with a single shunt, the most common was VSD, in 46.6% of cases followed by ASD in 32.2%.

DISCUSSION

The study has described the local epidemiological and clinical trends of cardiac septal defects. The relative incidence of the clinical and investigation findings gives us an oriented mindset for early identification of CHD in a patient. Any child presenting with respiratory distress, presence of a cardiac murmur and cardiomegaly on chest X ray are all red flag signs that should alert the pediatrician to the possibility of CHD. In our study ASD was found to be more common than VSD but in most studies in India, like this one from central India[5] have actually found VSD to be most common followed by ASD. The reason for this departure of findings from the norm could have been various. Firstly, many studies chose to ignore ASDs smaller than 5mm, considering it trivial. For this study however, ASDs of all sizes were included. Secondly, in this study isolated ASDs and the ones in association with another defect were clustered, pushing up the percentage. Other factors may have been an underdiagnosis of small asymptomatic VSDs. Further local epidemiological and diagnostic factors may have played a role.

The mean age of diagnosis for the septal defects found in the study were later than theoretically expected even though reliable practical data is scarce. This represents the fact that more CHDs are being diagnosed after clinical presentation rather than being caught at screening or routine checkups. These findings warrant need for routine screening of all inborn neonates as well as those coming for well-baby/ immunization visits for CHD for better outcomes.

Our study was faced with certain limitations. Even though a tertiary care center, the place for this study, until the time of writing had no specialized pediatric cardiology department or facilities. It stands true for most peripheral medical colleges in India. Still, echocardiography findings used for the study were only from reliable pediatric cardiologists done at a reputed hospital currently in a public private partnership sponsored by JSSK (Janani Shishu Suraksha Karyakram) under National Health Mission. Most of these children were referred to higher centers after diagnosis for further surgical intervention when needed and hence their ultimate outcomes could not be recorded.

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