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FREQUENCY OF CARDIAC DEFECTS AMONG CHILDREN IN A TEACHING HOSPITAL OF KHYBER PAKHTUNKHWA PAKISTAN

1. MOHAMMAD FAZIL

Assistant Professor
Pediatric Department
Bacha Khan Medical College
Mardan.

Correspondence:
Dr. Mohammad Fazil
(MBBS, MCPS, FCPS)
Assistant Professor
Pediatric Department
Bacha Khan Medical College
Mardan.

ABSTRACT

Objective: To assess frequency of cardiac defects among children from birth to 12 years of age on echocardiography basis in a teaching hospital of Khyber Pakhtunkhwa Pakistan.
Methodology: This prospective study was conducted at pediatric unit of king Abdullah teaching hospital Mansehra Khyber Pakhtunkhwa (Pakistan) for one year from 1st January 2008 to 31st December 2008. A sample of 100 patients (<12 years age) were selected. The cardiologists performed echocardiography by Pediatric Transthoracic echo probe; 2-D color Doppler, Acuson CV-70 & Niemo-30 echocardiography machines. All consecutive patients with suspected cardiac problems on the basis of history and examination and confirmed by echo were included in the study.
Variables included were: A- Muscular plus Vascular defects; B- Valvular defects; C Pericardial effusion; D- Dextrocardia and E- Congestive cardiac failure. History of children for cynosis,breathlessness,cyanotic spells, sore throat followed by joint pains; history of mothers for drug intake (antihypertensive, antipyretic, anti-emetic, hypoglycemic) as well as chronic diseases (diabetes mellitus, hypertension, anemia) during pregnancy were surveyed. Parity of mothers, their cousin marriages, and family socio-economic status was also inquired. The results were tabulated, analyzed and finally subjected to suitable test of significant (SR of proportion) to find out statistical significant if any.
Results: Out of 100 patients, It was found that 53 (53%) were suffering from Cardiac muscular and Vascular defects which includes, Ventricular Septal Defect (VSD) 28.30% , Tetralogy of fallot,s (TOF) 24.52%, cardiomyopathies 24.52%, Patent Ductus Arteriosus (PDA) 15.09% and Atrial Septal Defect (ASD) 7.54%, and 42 (42%) Valvular defects which includes mitral valve defect 23.80%, combined aortic and mitral valve lesion 50%, aortic valve defect 19.05%, tricuspid valve defect 4.76% and pulmonary valve defect 2.38%.
1 (1%) Pericardial effusion, 1 (1%) Dextrocardia and 3 (3%) from Congestive Cardiac Failure. According to age, 36 (36%) were from birth to 3 years of age and 34 (34%) from 10 to 12 years. There was history of Rheumatic fever among 32 (32%) children. There were 72 (72%) children from lower socio-economic class and 53 (53%) parents had history of cousin marriages.
Conclusion: The most common cardiac muscular defects in this study are:
Ventricular Septal Defect (VSD) followed by Tetralogy of fallot,s (TOF) , cardiomyopathies, Patent Ductus Arteriosus (PDA) and Atrial Septal Defect (ASD) , and the most common valvular defect is mitral valve defect followed by combined aortic and mitral valve lesion, aortic valve defect , tricuspid valve defect and pulmonary valve defect.

Key Words: Tetralogy of Fallot, Ventricular Septal Defect, Pericardial Effusion, Dextrocardia,

INTRODUCTION

At birth the fetal circulation must immediately adapt to extra uterine life as gas exchange is transferred from the placenta to the lung[1].The ante-natal blood circulation pattern sometimes persists in certain forms due to congenital cardio vascular defects[2]. Certain

autoimmune diseases and rheumatic carditis affect the cardiac structure and hemodynamic circulatory functions. Congenital defects are underestimated but they are the most common congenital problem in children accounting for nearly 25% of all congenital malformations [3, 4]. Congenital heart defects affects approximately one percent of newborn infants [5,6] and accounts for one third of deaths due to congenital malformation[7]. Worldwide, parental consanguinity confers a two to three fold increase in risk for a broad range of CHD phenotypes, as reported in Saudi Arabia [8,9], Lebanon [10], and South India [11, 12]. CHD may present in different ages from birth to adolescent group [11].Most cases are asymptomatic and discovered during routine neonatal checkups. Other presentations can range from cyanosis, clubbing of fingers to full blown congenital heart failure [13, 14]. However, the rheumatic fever appears to be the commonest acquired factor for valvular cardiac lesions [15]. Cardiac defects may be valvular (stenosis or regurgitation), muscular (structure or motion) or pericardial (inflammation or fluid collection) which can be detected by transthoracic or transoesophageal echocardiography. The objective of this study was to assess frequency and distribution of cardiac defects among children on the basis of echocardiography.

METHODOLOGY

This prospective study was conducted in pediatric unit at King Abdullah Teaching Hospital Mansehra Khyber Pakhtunkhwa (Pakistan) for one year from 1st January 2008 to 31st December 2008. A sample of 100 patients suspected of having cardiac problems were selected on the basis of history and examination and referred to echocardiography centre. The cardiologists posted at the centre performed echocardiography. Children declared normal on echo report were excluded. History of children for cynosis, breathlessness, sore throat followed by joint pains; history of mothers for drug intake (antihypertensive, antipyretic, antiemetic, hypoglycemic) as well as chronic diseases (diabetes mellitus, hypertension, anemia) during pregnancy were asked. Parity of mothers, their cousin marriages, and family socioeconomic status were also inquired. The results were tabulated, analyzed and finally subjected to suitable test of significant (SR of proportion) to find out the statistical significant if any. Variables included for specific cardiac defects in this study were classified and divided into groups as;

A- Muscular plus Vascular defects; B- Valvular defects; C- Pericardial effusion; D_ Dextrocardia and E- Congestive cardiac failure.

RESULTS

Total numbers of 100 children with cardiac defects were studied. The cardio-vascular defects were categorized as:

Group-A: It consisted of 53 (53%) patients suffering from muscular

TABLE-I:
Frequency of cardiac defects among Children (N=100)

	No. of Patients
Group – A Cardiac Muscular & Vascular Defects	
1 Ventricular Septal Defects (VSD)	15 (28.30%)
2 Tetralogy of Fallot's (TOF)	13 (24.52%)
3 Atrial Septal Defects (ASD)	4 (7.54%)
4 Patent Ductus Arteriosis (PDA)	8 (15.09%)
5 Cardiomyopathies	13 (24.52%)
Total	53 (53%)
Group – B Cardiac Valve Defects	
1 Aortic Valve Defects	8 (19.04%)
2 Mitral Valve Defects	10 (23.80%)
3 Aortic + Mitral Valve Defects	21 (50%)
4 Pulmonary Valve Involvement	1 (2.38%)
5 Tricuspid Valve lesion	2 (4.76%)
Total	42 (42%)
Group – C Pericardial Effusion	1 (1%)
Group – D Dextrocardia	1 (1%)
Group – E Congestive Cardiac Failure	3 (3%)
Grand Total (A to E)	100

TABLE-II:
Age distribution of children with cardiac defects (N=100)

Sr. No.	Age Group	Total No. of Children
1	Birth to 3 years	36 (36%)
2	4 to 6 years	10 (10%)
3	7 to 9 years	20 (20%)
4	10 to 12 years	34 (34%)

TABLE-III:
Frequency Distribution of Cardiac Defects by Gender, Rheumatic Fever and Mother Factors

Variable	Subgroups	Total No. of Patients
A. Gender of child	a. Male	60 (60%)
	b. Female	40 (40%)
B. History of Rheumatic fever	a. Present	30 (30%)
	b. Absent	70 (70%)
C. Parity of Mother	a. Primipara	51 (51%)
	b. Multipara	49 (49%)
D. Socio-economic status of parents	a. Lower Class	71 (71%)
	b. Middle Class	23 (23%)
	c. Higher Class	6 (6%)
E. Parent Relation	a. Cousins	53 (53%)
	b. Relative but not Cousins	15 (15%)
	c. Out of family	32 (32%)

TABLE-IV:
History of Drugs and Diseases during Pregnancy (N=100)

Variable	Type of drug and Disease during pregnancy	Total mothers
1. History of Drug intake during Pregnancy	A. Can not recall (Not available)	65 (65%)
	B. Anti-hypertensives	13 (13%)
	C. Anti-Emetics	7 (7%)
	D. Anti-Pyretics	6 (6%)
	E. Analgesics	(9%)
2. History of Diseases during Pregnancy	A. Can not recall (Not available)	57 (57%)
	B. Diabetes Mellitus	9 (9%)
	C. Hypertension	21 (14%)
	D. Anaemia	19 (19%)

and vascular defects of heart. Further stratification revealed that Tetralogy of Fallot (TOF) was found in 13 (24.52%) patients, ventricular septal defects (VSD) in 15 (28.30%), atrial septal defects (ASD) in 4(7.54%), patent ductus arteriosis (PDA) in 8 (15.09%) and cardiomyopathy was found in 13 (24.52%) patients as shown in Table-I.

Group-B: It comprised of 42 (42%) children having valvular heart defects. Further stratification of this group revealed that mitral valve defect was in 10 (23.80%), aortic valve defect was found in 8 (19.04%) children,), combined Aortic and Mitral valvular lesion in 21 (50%), Pulmonary valve defect in 1 (2.38%) and Tricuspid valve defect in 2 (4.76%) patients.

Group-C: It included Pericardial Effusion patients, they were 1 (1%) in number.

Group-D: It consisted of Dextrocardia patients. They were 1 (1%) in number.

Group -E having Congestive Cardiac Failure (CCF). They were 3(3%) in number. In age distribution it was found that there were 36 (36%) patients having ages from birth to three years, 10 (10%) from 4 to 6 years, 20 (20 %) from 7 to 9 years and 34 (34%) from 10 to 12 years of age. (Table-II)

The gender difference was also noted and it was found that 60 (60%) were male and 40 (40%) were female. The history of Rheumatic fever was present in 30 (30%) patients. It was observed that 51 (51%) patients were from Primipara and 49(49%) from multipara mothers. (Table- III)

Regarding socio-economic status of parents, it was found that 71 (71%) patients belonged to lower socio-economic class, while 23 (23%) to middle class and only 6 (6%) to higher socioeconomic class. 53 (53%) parents had cousin marriages while 15 (15%) parents were close relatives but not cousins and 32 (32%) were married out of family. The history of drugs intake during pregnancy revealed that 65 (65%) patients had a positive history but they could not recall type of drugs taken. Among those who recalled drugs intake during pregnancy, anti-hypertensive were taken by 13 (13%), anti-emetics by 7 (7%), anti-pyretic by 6 (6%) and analgesics by 9 (9%). (Table-IV)

The history of chronic diseases during pregnancy was also taken. It was found that 57 (57%) parents of affected children could not recall their diseases during pregnancy. While 9(9%) mothers were diabetics, 14 (14 %) hypertensive and 19 (19%) mothers gave a positive history suggestive of Anemia.

DISCUSSION

In our study VSD was found in 28.30% of patients to be the commonest acyanotic heart disease and TOF was found in 24.52% of patients as commonest cyanotic heart disease. These findings are in line with those reported previously [18, 19]. In one study done in Saudi Arabia the VSD reported were very high i.e. 46.3% [20]. We have found in our study that cardiac defects were more common in the children of primipara mothers as compared to multipara ones. This finding is similar to that made by Parween F and Twab S [17]. However, the cousin marriages were found among 53% of our study population parents as compared to 44.74% consanguineous marriages found in the study quoted above. In our study 60% of children were males. This finding is the same as already reported in previously done study [21]. But it is contradictory to the finding made by Burki MK and Babar GS [22], who reported both sexes to be equally affected. This difference may be due to a number of factors such as socio-economic, cultural, ecological and genetic factors. It was noted in our study that history of Rheumatic fever was present among 30% children which is higher than 17.14% as described by Ejaz MS and Billoo AG [23]. This difference may be attributed to low socio-economic condition prevailing in our area.

Similarly, we have found more cardiac defects in two age group patients; those from birth to three years and another upsurge in age group ranging from 10 to 12 years. This type of bimodality has also been reported in another study [23].

In our study it has been found that majority of women could not recall use of any drug during pregnancy. Just 7% in our study told that they used anti-emetics and 9% used analgesics during pregnancy. These percentages are less than those worked out by Rizka MA and Abdel-AF [15]. This difference may be due to the fact that in our area, the patients are reluctant to take allopathic medicines as these are thought by them to be "HOT" medicines.

CONCLUSION

The most common cardiac muscular defects in this study are: Ventricular Septal Defect (VSD) followed by Tetralogy of fallot,s (TOF) , cardiomyopathies, Patent Ductus Arteriosus (PDA) and Atrial Septal Defect (ASD) , and the most common valvular defect is mitral valve defect followed by combined aortic and mitral valve lesion, aortic valve defect , tricuspid valve defect and pulmonary valve defect.

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