

Pattern of cardiac diseases in children in Pokhara, Nepal

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Abstract

Objective: The objective of the study was to point out the relative public health problems of cardiac diseases in childhood.

Material and methods: A study of the cardiac diseases in children attending the Paediatric OPD of Manipal Teaching Hospital, Pokhara, Nepal was done over a period of 2 years. The idea was to see the pattern of diseases, as being a developing country, these diseases would be a large public health problem. 107 cases had been studied and it was found that 52% were congenital heart diseases and 25% were rheumatic heart diseases. Other cases included dilated cardiomyopathy, Pericardial diseases and a few cases of hypertension. All the cases were investigated by ECG, X-ray and echocardiographic studies. These cases are under follow up and some have undergone surgical treatment.

Results: In this study in a short period of 2 years we had 107 cases of heart diseases of which 51% were CHD, 25% RHD and others were pericardial disease, DCM, hypertension and some had no demonstrable lesions. All the cases of RHD are being followed by regular Penicillin prophylaxis. Among them one has had mitral valve replacement done and 2 had mitral valvotomy. Of the CHD cases 5 cases have had VSD operated upon, one PDA also had surgery and one case of Fallot's is shortly going to undergo corrective surgery.

Conclusion: Heart disease in neonates could be benign or very significant and a high level of suspicion and knowledge of physiology will differentiate between the two. Early recognition of CHD will help to treat the child and if possible get corrective surgery done. Similarly a history of rheumatic fever is important and all children need to be followed up till at least 18 years of age.

Key words: CHD-congenital heart diseases, RHD- rheumatic heart diseases, DCM- dilated cardiomyopathy, VSD-Ventricular septal defect, ASD-atrial septal defect, PDA-patent ductus arteriosus.

This study comprised children attending the Paediatric outpatient department of the Manipal Teaching Hospital from October 2001 till December 2003. All the children included in the study had a detailed cardiac evaluation done including ECG, X-Ray and Echocardiography. In the case of Rheumatic heart diseases, supportive laboratory investigations were also done.

This study was carried out to point out the relative public health problems of cardiac diseases in childhood. Congenital heart disease (CHD) affects almost 8/1000 live births¹. This accounts for a high rate of morbidity and mortality of infants below 1 year of age. In addition, the cost of investigating and treating these children is colossal and not many can afford it. In the USA 3/1000 live births will require cardiac catheterization or surgery. 5/1000 will require specialized treatment at some time of their lives and altogether 10/1000 form the patient material of a paediatric cardiology practice².

In India the relatively high birth rate leads to at least 150,000 children being born with cardiac abnormalities with 50,000 requiring surgery in the 1st year. Of these only 1000 cardiac surgeries are done in early infancy³. This means that many of the babies who could be saved by surgery do not have the chance due to the high cost and inadequate facilities. The situation is no different in other South Asian countries including Nepal.

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Rheumatic heart disease (RHD) also is a big health problem especially in the developing countries due to poverty and non-availability of treatment for streptococcal throat infections. This illness has been all but eliminated in the developed countries though in the late 80's there was a re-emergence in some parts. RHD accounts for 1-5/1000 of school going children aged 5-15 years, which again is a great strain on all resources of the family and the country³.

Materials and method

A total of 107 children ranging from birth to 14 years comprised the study. They attended the paediatric outpatient department of this hospital from Oct 2000 to Dec 2002. All the children had come to the OPD with cardiac related or non-related symptoms. Some had come for a routine check-up. Every case was subjected to a detailed clinical examination, followed by relevant investigations that in all cases included X-Ray, ECG and Echocardiography. The children were classified as CHD, RHD, pericardial disease, cardiomyopathy, primary hypertension and innocent systolic murmurs. They were divided in to four age groups—0-1yr, >1-5yr, >5-10yr and over 10years.

Results

The results of the break up of cases are given in Table 1. It can be seen that the maximum number of cases were the CHD and RHD accounting for 78% of the cases followed by pericardial disease, innocent murmurs, cardiomyopathy, and hypertension. Table 3 gives the age at which a child with CHD first presented with symptoms. As it can be seen, most of the cases 36 (65.5%) were below 1 year at the time of presentation. Only one case was over 10 years at the time of onset of symptoms and surprisingly it was a case of Fallot's physiology. Six children were detected to have a cardiac lesion on routine examination for some other disorder. Table 4 shows the symptoms with which the children with CHD came to the hospital. Failure to thrive-13 cases (27%). The other symptoms were development delay-7cases (13%) of which 2 cases were of Down syndrome, 1 of Congenital Rubella Syndrome and 2 had facial dysmorphism. The symptoms that the children with RHD presented with were as follows: 18 (64%) had a history of rheumatic fever, similar number had dyspnoea. The other symptoms were palpitations (28%), recurrent cough (21.4%), failure (17.8%), easy fatigue and chest pain in 10.7% each and PND and haemoptysis in 7% each.

Table 1: Types of cardiac diseases

Type of Disease	No. of Cases	0-1yr	>1-5yr	>5-10yr	>10yr
Congenital Heart Disease	55 (52%)	23 (41.8%)	11(20%)	12 (21.8%)	9 (16.6%)
Rheumatic Heart Disease	28 (26%)	0	0	8 (28.6%)	20 (71.4%)
Pericardial Disease	9 (8%)	0	3 (33.3%)	4 (44.4%)	2 (22.2%)
Dilated Cardiomyopathy	5 (5%)	0	2 (40%)	3 (60%)	0
Innocent Systolic Murmur	8 (7%)	2 (28.6%)	1(14.3%)	3 (42.9%)	1 (14.3%)
Hypertension	2 (2%)	0	0	0	2 (100%)

Table 2: The different types of CHD that were found

Nature of Defect	No. of Cases	%
VSD	21	38%
ASD	4	7.3
Tetralogy of Fallot	5	9.1
Pulmonary Stenosis	2	3.6
Ebstein's	2	3.6
PS with Tricuspid regurgitation	1	1.8
TAPVD	1	1.8
PDA	4	7.5
Endocardial Cushion Defect	1	1.8
Aortico-pulmonary Window	2	3.6
Aortic Stenosis	1	1.8
TGA	1	1.8
Coarctation of Aorta	1	1.8
Branched Pulmonary Stenosis	1	1.8
Bicuspid Aortic Valve	2	3.6
Primary Pulmonary Hypertension	1	1.8
Dextrocardia (alone)	1	1.8
Complex Cardiac Defects	4	7.5
Total	55	100

Table 3: Age of onset of symptoms

Disease	0-1yr	1-5yr	5-10yr	>10yr
VSD	14	7	1	0
Ebstein's	2			
TOF	4			1
Tricuspid Atresia	1			
ASD	1	1	2	
TAPVD		1		
PDA		3	1	
Endocardial Cushion Defect		1		
APW	2			
Aortic Stenosis		1		
TGA	1			
Coarctation		1		
Branched Pulmonary Stenosis	1			
Bicuspid Aortic Valve		2		
Primary Pulmonary Hypertension	1			
Pulmonary Stenosis	2	1		
Complex Heart Diseases	4			

Table 4: Symptoms in cases of congenital heart diseases

Symptoms	No. of Cases	%
FTT	13	26.6
Chest Pain	1	1.8
Recurrent Respiratory Infections	32	58.2
Developmental Delay	7	12.7
Congenital Abnormalities	2	3.6
Palpitations	2	3.6
Dyspnoea	9	16.4
Squatting	3	5.5
Fatigue	3	5.5
Found on RE	5	9.1
Increased sweating	2	3.6

Discussion

The detection of heart diseases early in childhood will lead to better treatment and reduction in the mortality and morbidity. Children with heart disease are brought to the hospital with a variety of symptoms, both related and not related to the heart. The type of symptoms that should be of significance include cyanosis, evidence of congestive failure, associated syndromes and dysmorphism. In older children presence of a systolic murmur, cyanosis, signs of failure, rheumatic fever, hypertension,

infective endocarditis and any systemic diseases that are likely to affect the heart are all modes of presentation⁴. In our study out of all the children who attended the paediatric OPD in a period of a little over 2 years, 107 were found to have significant findings that warranted a full pattern of investigations including ECG, X-Ray and Echocardiography. Out of these 99 had heart lesions and 8 were finally labelled as innocent murmurs.

The number of CHD was the highest accounting for 52% of cases and then 28% were RHD. The incidence of CHD has been reported as 8/1000¹ live births and RHD as 1-5/1000 school going children³. In the developed countries RHD has been almost wiped but in Asia it still accounts for a large number of cases. The commonest type of CHD in our study was VSD (31%) which is similar to other reports of 28.3%, 30.5%, 25-30%^{1,5,6}. ASD was 7.27% in this study while in other reports it has been 6-8%, 9.8%, and 6.7%^{6,5,1}.

Fallo't's accounted for 9.09% while most of the other reports had slightly lower figures of 5-7%, 5-8%, 6.8%, 8%^{6,5,1,7}. Age of onset of various congenital

lesions was found to be quite similar to that in our study. Most of the VSD cases 14 (66%) presented in the first of life, 4 cases (19.5%) between 1-5 years and 3 (14.5%) were found on routine examination for some non-cardiac related illness. In the Boston Hospital study, there were 54% were seen below 1 year, 22% between 1-5 years, 12% between 5-10 years and 12% over 10 years⁸.

Another study showed that most of CHD children presented between 3 months to 1 year. In another one the age of referral for CHD was before 1 year in 44.8%, 1-5 years in 21.8%, 5-10 years 14.9% and 18.4% were over 10 years⁹. In our study 60% of CHD were below 1 year, 20% between 105 years, 1.8% between 5-10 years and 5.4% were over 10 years. Children with critical heart lesions like TGA, single ventricle and severe PHT with VSD presented within the first week of life. The symptoms with which the children presented were recurrent respiratory infections in 58.8%, FTT in 26.6%, dyspnoea in 16.4% and development delay in 12.7%. The lesions were detected on routine examination in 9.1% of cases. Those CHD, which, without treatment or intervention are likely to survive to adulthood, are mild Pulmonary Valve Stenosis, Bicuspid Aortic Valve, moderate Aortic Stenosis, small VSD, ASD PDA, Mitral Valve Prolapse, Ostium Primum ASD and Ebstein's anomaly¹⁰. Those with treatment, which could survive to adulthood, are Dextrocardia with Situs Inversus, corrected TGA and Lutembacher syndrome. As far as Fallo't's is concerned, untreated only 6% are alive at 30 years and 3% at 40 years¹⁰. VSD are often not seen in adults as they may close spontaneously or have been operated upon. In PDA after the second decade the risk of endocarditis is

more than that of CCF while in the third decade death is mainly due to CCF. Coarctation, when it does not produce symptoms in early infancy usually, presents around 20-30 years. RHD was the next most common disorder accounting for 25.2% of cases. In developing countries rheumatic fever is the most common cause of heart disease in 5-15 year-olds accounting for >30/1000 of all CVS diseases¹¹. RHD is almost non-existent in the developed countries. In the USA, rheumatic fever has come down from 10-20/1000 at the turn of the century to as low as 0.5/100,000¹². Being a disease of poverty and inadequate treatment facilities, getting rid of this from the developing countries is a very difficult proposition. The symptoms with which RHD cases presented included a history of rheumatic fever and history of dyspnoea in 18 (64%) of cases each. This is similar to that of 60% cases of cases of rheumatic heart diseases having history of rheumatic fever¹³. Other symptoms were palpitations, cough, signs of failure, chest pain and PND. Haemoptysis was seen in only 2 (7.2%) cases. Rheumatic fever itself can be prevented otherwise almost 50-60% of cases develop damaged valves and must be followed up. Pericardial disease including pericarditis and pericardial effusion were seen in 8.4% of cases. Normally 10-15 ml of fluid is found in the pericardial space but can increase to 1litre in a large effusion. Causes are mostly of viral origin but in our study we had Tubercular effusion in 4 cases and one had constrictive pericarditis also due to Tuberculosis. The remaining 4 were of presumed viral aetiology (facilities for viral tests are not available in this hospital). DCM in this study accounted for 4.7% of cases. They are mostly idiopathic with a familial history in 20%. Viral infection and endocrine diseases also are likely to produce DCM. The incidence of DCM increases with age and males are affected more than females¹⁴. Very few population-based studies have been attempted to define the incidence and prevalence of DCM in children. The difficulty of determining these relates to frequent under diagnosis. Many tests are available but in developing countries most cannot be done as these are not available or are too expensive. Minimum tests are X-Ray, ECG and Echocardiography.

Myocardial biopsy and viral studies also are done. These cases usually present with CCF, fatigue, dyspnoea, palpitations and hepatomegaly. Cardiomegaly with pulmonary venous congestion is seen on X-Ray and ST and T changes on ECG. Echocardiography may show ventricular dilatation and ventricular dysfunction. All the cases in our study showed these findings. Innocent murmurs were very few in this study because only those who had

what appeared to be significant lesions were fully studied. Only those cases where echocardiography was done were taken into this study. Most of the other cases of innocent murmurs were diagnosed by clinical examination, ECG and X-Ray and hence were not included in this study. Innocent murmurs have been reported as high as 40-60%, and with exercise these may go up to 90%. Children below 2 years need to be followed up every 2-3 years but over 2 years need not be. Diagnostic tests for innocent murmurs are more for reassuring the parents. Most children above 1 year can be evaluated by history, thorough examination and ECG. In case of doubt X-ray and Echocardiography can be done.

Conclusion

Paediatric cardiology was formally established in USA in 1961 and has been responsible for huge strides in the treatment of severe CHD in very early infancy. Echocardiography has also revolutionized paediatric cardiology and many children do not need any invasive investigations. Large amount of information regarding morphology and haemodynamics can be obtained by echocardiography and Doppler study. In this study as Doppler was not done routinely in all the cases (due to its being too expensive) it was not taken into consideration for the scope of this study.

Heart disease in neonates could be benign or very significant and a high level of suspicion and knowledge of physiology will differentiate between the two. Many lesions are amenable to surgery and early diagnosis will help to do these at the optimal time. In the developing countries the rate of heart disease is high, both CHD and RHD. This constitutes a big public health problem and as facilities for treatment are expensive or not available, many children die before getting optimal treatment. Early recognition of CHD will help to treat the child and if possible get corrective surgery done. Similarly a history of rheumatic fever is important and all children need to be followed up till at least 18 years of age.

In this study in a short period of 2 years we had 107 cases of heart diseases of which 51% were CHD, 25% RHD and others were pericardial disease, DCM, hypertension and some had no demonstrable lesions. All the cases of RHD are being followed by regular Penicillin prophylaxis. Among them one has had mitral valve replacement done and 2 had mitral valvotomy. Of the CHD cases 5 cases have had VSD operated upon, one PDA also had surgery and one case of Fallot's is shortly going to undergo corrective surgery.

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