

Pattern of Cardiac Diseases in Children Attended at Dhulikhel Hospital, Nepal

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ABSTRACT

Background

Congenital Heart Disease and Rheumatic Heart Disease are the most common childhood cardiac disease encountered in developing countries.

Objective

To study the pattern and the prevalence of cardiac diseases, its age wise distribution and to determine their risk factors for mortality in children presented to Dhulikhel Hospital, Kathmandu University Hospital.

Method

A study of cardiac diseases in children, since birth to 16 years of age attending the department of pediatrics in Dhulikhel Hospital, Kathmandu University Hospital was done over a period of 30 months (Jan 2014 to June 2016). The pattern of disease was studied. Detailed clinical examination of all cases was done followed by the necessary relevant investigations including electrocardiography, chest x-ray, echocardiography and supportive laboratory investigations.

Result

In this study period, 218 pediatric cardiac cases were encountered, among which 144 cases (66.05%) were Congenital Heart Disease, 57 cases (26.14%) were Rheumatic Heart Disease, 14 cases (6.42%) were Pericardial Disease and 3 cases (1.37%) were classified as Dilated Cardiomyopathy. Majority of Congenital Heart Disease were of isolated Ventricular Septal Defect (25%) and isolated Atrial Septal Defect (20.13%) followed by Patent Ductus Arteriosus (9.02%), Tetralogy of Fallot (6.94%) and Complex Congenital Heart Disease (6.25%). All of the Rheumatic Heart Disease primarily involved the Mitral Valve; however combined Aortic Valve involvement was seen in 26.31% of cases. All the 14 cases of pericardial disease presented with pericardial effusion and two cases presented with constrictive pericarditis. All the cases of pericardial disease were investigated to be of tubercular in origin.

Conclusion

Septal defects are the most common Congenital Heart Disease encountered in children. Although the prevalence of Rheumatic Heart Disease is decreasing worldwide, it is still a big burden in our community. Tubercular pericardial effusion is still not uncommon and should be suspected with a child presenting with pericardial effusion. Increased level of cardiac care and corrective surgeries are needed for children with cardiac disease in Dhulikhel Hospital, Kathmandu University Hospital.

KEY WORDS

Children, congenital heart disease, pericardial effusion, rheumatic heart disease

INTRODUCTION

Cardiovascular Diseases (CVD) have emerged as a major public health problem and impose an increasing burden on the health care system of Nepal. Due to the improved diagnostic modalities, the diagnosis of cardiac disease is increasing in children. The present status of CVD in Nepal is not well known, only few studies have been performed on CVD in children, which is also limited in the capital. Congenital Heart Disease (CHD) and Rheumatic Heart Disease (RHD) are the most common childhood cardiac disease encountered and is a serious cause of morbidity and mortality in developing countries like Nepal. According to current scenario of CVD in Nepal, the prevalence of CHD and RHD are 1.3 per 1000 and 1.2 per 1000 in school children respectively.¹ In developing countries Rheumatic Fever (RF) is a common cause of CVD in 5-15 years old children and results in significant morbidity and mortality in low resource settings. CHD represents a large part of CVD during the first years of life but little is known about the incidence and patterns of children with CVD encountered in Dhulikhel Hospital, Kathmandu University Hospital (DH, KUH). No studies have been done to determine the pattern and the prevalence of pediatric cardiac cases attending Dhulikhel hospital. Therefore this study is conducted to assess the prevalence and to describe the spectrum of cardiac disease, its age wise distribution and to determine their risk factors for mortality in children encountered at DH, KUH.

METHODS

This hospital based, prospective study included all children, since birth to 16 years of age attending the department of pediatrics in DH, KUH with cardiac disease from 1st Jan 2014 to 30th June 2016. Every case was subjected to a detailed clinical examination followed by the necessary relevant investigations, including electrocardiography, chest x-ray, 2D echocardiography, color Doppler and supportive laboratory investigations. Pre-terms with patent ductus arteriosus were followed up and not included in the study if it was closed spontaneously within the period of hospital stay or by managing conservatively. The children were classified as CHD, RHD, pericardial disease and cardiomyopathy. They were divided into four age groups, 0 – 1 years, >1 – 5 years, >5 – 10 years and >10 years. The research proposal was submitted and approved from the Institutional Review Board of Kathmandu University School of Medical Sciences. A written informed consent from parents or guardians of the enrolled child was taken prior to participation in the study. Data was entered and analyzed using SPSS (Statistical Package for Social Scientists) version 20. Data analysis was done using descriptive (mean and percentage) statistics to describe the incidence of the disease.

RESULTS

In this study period of 30 months we encountered a total of 218 pediatric cardiac cases, among which 144 cases (66.05%) were CHD, 57 cases (26.14%) were RHD, 14 cases (6.42%) were pericardial disease and 3 cases (1.37%) were classified as Dilated Cardiomyopathy (DCM). Table 1 shows the pattern of cardiac disease and the age at which the child first presented to the hospital.

Table 1. Pattern of cardiac diseases presented in different age groups

Pattern of disease	No. of cases (%)	0 - 1 yrs	1 - 5 yrs	5 - 10 yrs	> 10 yrs
CHD	144 (66.05%)	86 (59.72%)	26 (18.05%)	18 (12.50%)	14 (9.72%)
RHD	57 (26.14%)	0	0	14 (24.56%)	43 (75.43%)
Pericardial disease	14 (6.42%)	0	4 (28.57%)	7 (50.00%)	3 (21.42%)
DCM	3 (1.37%)	1 (33.33%)	1 (33.33%)	1 (33.33%)	0

CHD

Acyanotic heart disease were present in 113 cases (78.47%) and cyanotic heart disease in 31 cases (21.52%) (figure 1). The male to female sex ratio of children with CHD was 1.3:1 and majorities were diagnosed as isolated Ventricular Septal Defect (VSD) in 36 cases (25%) and isolated Atrial Septal Defect (ASD) in 29 cases (20.13%) followed by Patent Ductus Arteriosus (PDA) in 13 cases (9.02%), Tetralogy of Fallot (TOF) in 10 cases (6.94%) and complex CHD in nine cases (6.25%). Details of acyanotic and cyanotic CHD found are given in figure 2 and figure 3 respectively. Most of the CHD cases (77.77%) were diagnosed before 5 years of age (table 1). More than 26 cases (18%) needed intensive care. Among all the CHD cases, eight cases have successfully undergone corrective surgery.

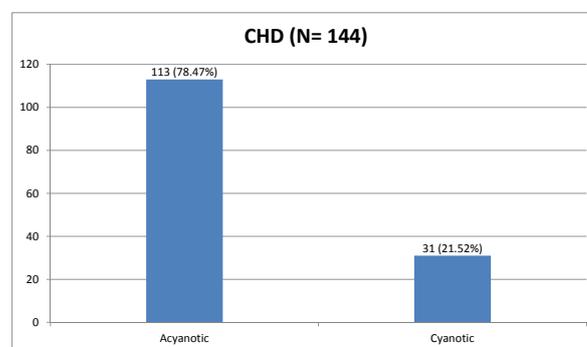


Figure 1. Acyanotic Vs Cyanotic CHD.

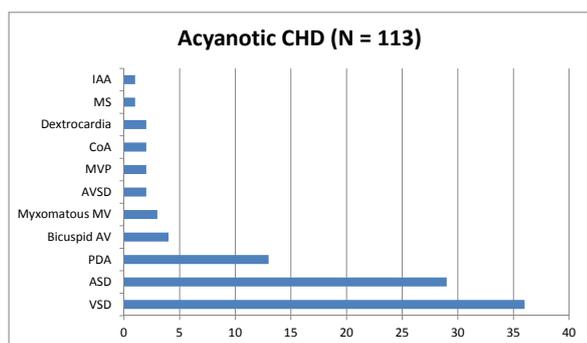


Figure 2. Number of children distribution with types of acyanotic CHD

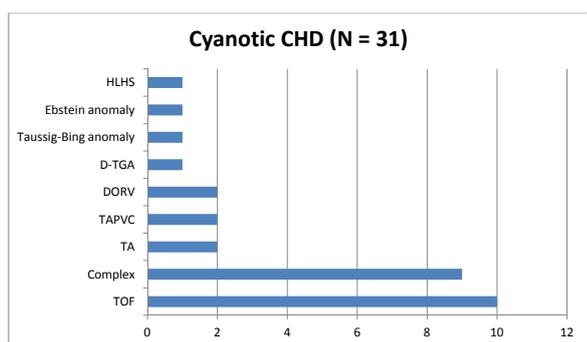


Figure 3. Number of children distribution with types of cyanotic CHD

RHD

All of the 57 cases of RHD were above five years of age and primarily involved the Mitral Valve (MV); however combined Aortic Valve (AV) involvement was seen in 15 cases (26.31%). The male to female sex ratio of children with RHD was 0.8:1. Two cases (3.50%) presented with Sydenham's chorea. All the cases are being followed on regular penicillin prophylaxis. Among the RHD cases, one case underwent aortic valve replacement during the study period.

Pericardial Disease

All the 14 cases of pericardial disease presented with moderate to severe pericardial effusion and two cases also presented with constrictive pericarditis. The male to female sex ratio of children with pericardial disease was 2.5:1. Half (seven cases) of the pericardial disease cases were between 5-10 years of age. All the cases of pericardial disease were further investigated and managed as tubercular pericardial effusion.

DCM

Two male and one female child presented with DCM and were suspected to be of viral in etiology. (Facilities for viral tests were not available in the hospital).

Six cases of complex CHD, one case of primary pulmonary hypertension and one case of DCM expired during the study period. All the remaining cases are on follow up in the hospital.

DISCUSSION

The epidemiological patterns of CVD in children differ greatly between developed and developing countries, where RHD remains a public health issue and many CHD still bears a poor prognosis. In our study period over 30 months, it can be seen that the maximum number of pediatric cardiac cases were CHD and RHD accounting for 92% of the cases followed by pericardial disease and cardiomyopathy. Due to the limited antenatal screening for CHD, majority of CHD are not diagnosed before birth in developing countries.² Early recognition of CHD will help to treat the child and if possible get corrective surgery done. The limited access to diagnostic and surgical modalities in the developing countries has increased sending children abroad for treatment. CHD are relatively common with a prevalence ranging from 3.7 to 17.5 per 1000 live births.³ In community based studies from India, the prevalence of CHD ranges from 0.8 – 5.2/1000 patients.³ In the USA 3/1000 live births will require cardiac catheterization or surgery.⁴ This constitutes a big public health problem and as facilities for treatment are expensive or not available, many children die before getting optimal treatment in developing countries. It can result in intrauterine, childhood or adulthood death.⁵ Many can't afford the cost of investigating and treating these children. Among all the children with CVD, the number of CHD was the highest in our study accounting for 66.05% of cases, among which 77.77% were diagnosed before 5 years of age. The prevalence of CHD was similar with previous study done in Kathmandu, Kanti Children Hospital by Basnet et al. in 2006.⁶ In our study, acyanotic CHD encountered for more than 2/3rd of all the CHD cases, which was similar to a study done by Kapoor et al in a multi-specialty corporate hospital of India, where acyanotic heart disease was present in 222(79%) children and 59(21%) had cyanotic heart disease.³ In our study, the commonest type of CHD was VSD accounting for 25% of cases, which is comparable to other study reports of 28.3%, 30.5%, 25-30%, which was followed by ASD, PDA, TOF and complex CHD.⁷⁻⁹ The commonest cyanotic CHD was TOF which accounted for 6.94% while most of the other reports also had similar figures of 6.8%, 5-8%, 5-7%.⁷⁻⁹ The age of onset of various CHD was found to be also quite similar to that in our study where 59.72% were below 1 year, 18.05% between 1-5 years, 12.50% between 5-10 years and 9.72% over 10 years of age. In another study the age of referral for CHD was 44.8% before 1 year, 21.8% in 1-5 years, 14.9% in 5-10 years and 18.4% were over 10 years of age.¹⁰

RHD is almost nonexistent in the developed countries.⁴ Recent studies from India and other developing countries have shown a decline in prevalence of RF and RHD.³ 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 country.⁴ RHD is an important cause of global morbidity and mortality, estimated to account for over 350,000 deaths per annum.¹¹ The detection of heart diseases early in childhood will surely lead to better treatment and

reduction in the mortality and morbidity. In the USA, RF has come down from 10-20/1000 at the turn of the century to as low as 0.5/100,000.¹² Being a disease of poverty and inadequate treatment facilities, getting rid of this from the developing countries is a very difficult proposition.⁴ Nepal continues to carry the heavy burden of RHD in children and young adults. In our study, RHD was the next most common disorder after CHD accounting for 26.14% of cases, which was comparable to a similar study done by Ramachandran et al. in 2006 in another tertiary care center of Nepal.⁴ Most of the cases in our study presented with history of RF, dyspnea, palpitation and joint pain and two cases (3.50%) presented with Sydenham's chorea. RHD refers to chronic cardiac valvular disease, predominantly of the mitral valves (MV) and less frequently aortic valves (AV), as a result of a severe first episode or multiple recurrent episodes of RF. In our study, all of the 57 cases of RHD were above five years of age and primarily involved the MV; however combined AV involvement was seen in 26.31% of cases. The high prevalence of AV involvement on presentation seen in our study may be contributed by the huge disease burden in the community, disease progression and the lack of awareness and access to medical facilities. Regular medical surveillance, echocardiography based screening programs for RHD and providing education and awareness to the community regarding RHD may be highly effective in early detection and preventing disease progression. It is currently estimated that at least 15.6 million people have clinically recognized RHD, which has an annual mortality rate between three and 12.5%.¹³ Even more concerning, is the potential volume of unrecognized cases detectable by echocardiographic screening. Echocardiography may emerge as the method of choice for active surveillance in highly endemic regions in this rapidly moving field.¹⁴

Pericardial disease presenting with pericardial effusion were seen in 6.42% of cases. All the cases were investigated and treated as tubercular pericardial effusion. In the study of Ramachandran et al. pericardial disease including pericarditis and pericardial effusion were seen in 8.4% of cases.⁴ In our study, among the 14 pericardial effusions seen, two cases presented again with constrictive pericarditis. In high tuberculosis prevalence populations,

tuberculosis is still the most likely treatable cause of pericardial effusion. DCM in this study accounted for 1.37% of cases. All the three cases of DCM were presumed to be of viral in etiology.

Present status of children with CVD in the nation indicates the need for increased levels of cardiac care, corrective surgeries and their long term follow up. Since there are only few cardiac centers in the country, which is also limited in the capital and because patients cannot afford the cost of treatment, pre and post-surgical follow up has been very challenging. There is a need to establish specialized units for delivering better information to the parents about the disease and the importance of proper follow up of their children.

A single center, hospital based, descriptive study involving limited sample size and short follow up duration may be some of the limitations of the study. Therefore, further studies are needed involving large number of cases to draw definitive conclusion.

CONCLUSION

Despite all the limitations we conclude that, septal defects are the most common CHD encountered in children. Early recognition of CHD will help to treat the child and if possible get corrective surgery done. Although the prevalence of RHD is decreasing worldwide, it is still a big burden in our community. Primary and secondary prevention programs for RF should be strengthened and expanded to further reduce the burden of the disease. Tubercular pericardial effusion is still not uncommon and should be suspected in high tuberculosis prevalence populations. Increased level of cardiac care and corrective surgeries are needed for children with CVD in Dhulikhel Hospital.

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