

Echocardiographic evaluation of simple versus complex congenital heart disease in a tertiary care Paediatrics Hospital

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ABSTRACT

Background & Objectives: Congenital heart diseases are treatable either by catheter based intervention or open heart surgery according to their quality. In our study we aim to analyze congenital heart disease echocardiographically into simple versus complex heart disease at a tertiary care centre with a public health planning and policy making perspective. **Materials & Methods:** This hospital based study was done on 1010 patients, both from in-patient and out-patient, who were clinically suspected to have heart disease from January 2015 to September 2016 at Dr.B.C.Roy P.G.I.P.S. Kolkata and echocardiographically categorized. **Results:** A VSD was the commonest acyanotic heart disease (17.08%). Tetralogy of Fallot (TOF) was commonest complex cyanotic heart disease (10.64%), VSD + ASD was the commonest combined lesion (8.12%). Simple heart lesions (63.1%) were commoner than complex (36.9%) congenital heart diseases. **Conclusion:** Health policy makers should give due care to manage Congenital Heart Disease either catheter based or surgically keeping in mind about 63.1% of the lesions are simple cardiac lesions and 36.9% lesions are complex cardiac lesion where complex surgery is required.

Key words: Catheter based intervention; complex congenital heart disease; congenital heart disease (CHD); simple congenital heart disease

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INTRODUCTION

The burden of congenital heart defects are considerable problem which are yet to be solved.¹ In India this burden is likely to be enormous with high mortality and morbidity due to a high birth rate. Congenital heart diseases are leading cause of mortality in first year of life.^{2,3,4} Saxena A⁵ reported 10% mortality in infancy is due to CHD in India. The prevalence of CHD varies in different studies in India. The incidence of CHD is 3.9/1000 live births as recorded in large hospital based study by Khalil et al⁶ from India, whereas prevalence of CHD in community based studies range from 0.8 to 5.2/1000 patients.^{7,8} Of these heart diseases some are simple, some complex.^{1,2} Simple lesions are defined as a hole in the septum, narrow valve and

vessels.⁹ Complex defects are a combination of these simple defects, problems with location of blood vessels leading to and from the heart and more serious problems associated with how the heart develops. Complex heart disease needs surgery. Some lesions are very small without any hemodynamic significance, only observation and follow-up is required. Patent Foramen Ovale was thought to be inconsequential until 1987, when Cohnheim postulated that a venous thrombus may paradoxically traverse foramen ovale and give rise to systemic embolism.^{9,10} For proper management, categorisation into simple or complex heart disease is needed. Simple defects are usually managed by catheter based device closure but some require surgery. Secundum ASD is currently amenable to

surgery. Multiple ASD can be treated with single or multiple devices as and when necessary. Closure of large ASD may be done either by device or surgery, which has been shown to increase exercise tolerance.¹² VSD accounts for about 20% of all forms of CHD. Muscular VSD most amenable to device closure. Transcatheter PDA occlusion is indicated for the treatment of a moderate to large sized PDA with left to right shunt that results in any of the following- congestive heart failure, failure to thrive, pulmonary over circulation or an enlarged left atrium or left ventricle, provided the anatomy and ductus size are suitable. Our aim of this study is to determine the incidence of congenital cardiac lesions and categorization of them into simple and complex types.

MATERIALS AND METHODS

This study was conducted at Dr. B.C. Roy P.G.I.P.S. Kolkata, India from January 2015 to September 2016. This is a retrospective descriptive study. Total number of patients evaluated echocardiographically (transthoracic -2D, M mode, colour Doppler) is 1010 aged up to 12 years from pediatric outpatient and in-patient department. Only clinically suspected cardiac diseases were evaluated echocardiographically and those with defects were classified into simple and complex heart disease. Acquired heart disease like rheumatic heart disease, Kawasaki diseases were excluded from the study.

RESULTS

Out of 1010 patients studied, 357(35.34%) had congenital cardiac lesions. Among these 357 patients, 231 (64.7%) were male and 126 (35.3%) were female. Most of them were detected in infancy 274(76.75%) and some were diagnosed late beyond five years 28(7.85%). Some defects were simple 224 (63.1%) some were complex 133 (36.9%). Among the significant lesions, VSD was the most common 61(17.0%) followed by ASD 43 (12.0%) and PDA 42(11.8%). We had isolated PS in five patients, coarctation of aorta in two and bicuspid aortic valve in two patients. Amongst the

complex lesions, TOF 38(10.6%) was the commonest followed by DORV 13(3.6%) and TGA seven (1.9%), AVSD six, TAPVC three, Truncus arteriosus two and Tricuspid atresia in two patients. Some of the cardiac lesions were multiple in a single patient which might be device closurable or require surgery to be determined by further study like VSD plus ASD 29(8.1%), VSD plus PDA 13 (3.6%), VSD plus ASD plus PDA 11(3.0%). Some of the lesions require minimal follow up only like PFO 69(19.3%).

DISCUSSION

In our study 64.7% were male with male/female ratio 1.8:1. In the study of Baspinor Q et al,¹⁸ male/female was 1:1. Shah GS et al¹⁹ found male to female ratio 1.5:1. In our study most of the CHD were detected in infancy (76.7%) and 7.8% of beyond five years. Saleh HK²⁰ observed CHD in 39.8% in infancy. Kiran B et al²¹ also detected CHD 35.7% in infancy. In our study VSD was the commonest acyanotic heart disease (17.0%) followed by ASD & PDA. Our findings are as per Hajela S et al.²² In our study, Tetralogy of Fallot was commonest cyanotic heart disease (10.6%) followed by DORV, TGA, AVSD, TAPVC. This findings are similar to Hajela Set al.²² About the combined lesion we found VSD+ASD in 8.1% patients which tallies with Kiran B et al.²¹ We found PFO in 19.3% cases, whereas it is 12% in Kiran B et al.²¹ We found simple congenital cardiac lesion in 63.1% and complex in 36.9%. This finding is similar to Hajela S et al²² where simple and potentially correctable heart defects like VSD 29%, ASD 13%, PDA 5%, which cumulates to 47%.

CONCLUSION

In the era of technical advancement, cardiac intervention has reduced the cost, morbidity and mortality by making congenital cardiac lesions accessible in minimally invasive fashion. Majority of congenital heart disease are simple heart defects and can be managed by minimally invasive technique with a good outcome. Though some of the single lesions may be the domain of CTVS

Table 1: Age-wise and disease-wise distribution

Age (years)	Simple heart defect	Complex heart defect	Total, n (%)
0-1	160	114	274(76.7%)
1-5	45	10	55(15.4%)
5-12	19	9	28(7.9%)
Total n (%)	224(63.1%)	133(36.9%)	357(100%)

Table 2: Specific disease-wise distribution of simple and complex heart defects

Simple heart defect	No.	Percent
VSD	61	17
ASD	43	12
PDA	42	11.8
Isolated PS	5	2.2
PFO	69	19.3
Complex heart defect		
TOF	38	10.6
DORV	13	3.6
TGA	7	2.0
AVSD	6	1.8
TAPVC	3	0.9
Truncus arteriosus	2	0.6
Tricuspid atresia	2	0.6
VSD+ASD	29	8.1
VSD+PDA	13	3.6
VSD+ASD+PDA	11	3.0

surgeon due the size, position or pressure dynamics yet minimally invasive catheter based interventions form an integral part of treatment of these CHD also. Our attempt is to delineate the problem primarily from the policy-maker's point of view specially in developing countries but more multicentric trials are required to find more data as a guide to national health policy.

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