Review Article

Congenital heart diseases: A review of echocardiogram records

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Abstract

Congenital heart defect (CHD) means an anatomic malformation of the heart or great vessels which occurs during intrauterine development, irrespective of the age at presentation. They can disrupt the normal blood flow through the heart. The blood flow can slow down, go in the wrong direction or to the wrong place, or be blocked completely. Broadly congenital heart defects can be acyanotic and cyanotic. We have reviewed retrospectively from echocardiogram record nearly two years of period & collected total 404 patients with congenital heart defects. Among them 329 (81.43%) was acyanotic and 75 (18.57%) was cyanotic congenital defects with variety of diagnosis. Ventricular septal defect was the most common acyanotic heart defect and Tetralogy of Fallot was the most common cyanotic heart defect. There was no significant gender deference.

Keywords: *Acyanotic, Congenital heart disease, Cyanotic.*

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Introduction

Congenital heart defects (CHD) are reported in almost 1% of live births, and about half of these children need medical or surgical management in infancy[1]. In the first decade, a further 25% require surgery to maintain or improve their life[1]. Only 10% survive to adolescence without specific treatment. Of these 10% many live a normal life for years before their abnormality is detected[1]. This would result in birth of 25,000 to 35,000 infants with CHD each year in the United States alone. Congenital heart defects are more common than others well-known congenital anomalies such as congenital pyloric stenosis, cleft lip, Down syndrome and congenital dislocation of the hip. About 500,000 patients in the USA alone have survived into adulthood with congenital heart disease with about 20,000 additional patients reaching adulthood each year[2-4]. The cause of congenital heart defects is largely unknown and the majority of them may be explained by multifactorial inheritance hypothesis. Extensive research on gene mapping that is currently in progress may explain previously unknown genetic mechanisms for CHD[5]. This study was done to find out the pattern & prevalence of congenital heart defects in a rural based tertiary care cardiac center at Department of Cardiology, Khwaja Yunus Ali Medical College & Hospital, Enayetpur, Sirajgonj.

Etiology

The cause of all congenital cardiac defects is not exactly known. The majority of the defects can be explained by multifactorial inheritance hypothesis which states that a predisposed fetus, when exposed to a given environmental trigger, to which the fetus is sensitive during the critical period of cardiac morphogenesis may develop the disease[5]. A variety of factors have association with certain heart defects and these may be termed risk factors. Maternal rubella, Coxsackie B virus infection during pregnancy, drugs like thalidomide, some anticonvulsant drugs, Lithium, folic acid antagonists, cocaine, excess alcohol during pregnancy have relationship with congenital heart defects. A higher incidence of cardiac abnormalities with maternal diabetes is well known. Gross chromosomal anomalies such as trisomy 21 (Down syndrome), trisomy D and E syndromes, Turner's syndrome (XO) are associated with a higher incidence of heart defects[6]. Both autosomal and sex-linked single mutant gene syndromes have been reported with CHD. In the presence of family history of congenital heart defect the probability of CHD in the offspring is higher than that seen in general population[6].

Classification

Congenital heart defects may be classified into acyanotic and cyanotic depending upon presence of cyanosis. The acyanotic defects may further be subdivided into obstructive lesions and left-to-right shunt lesions. The cyanotic defects, by definition, have right-to-left shunt. Although divided into cyanotic and acyanotic, there are several conditions that start acyanotic and

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become cyanotic with time. Table shows the most common lesions presenting in a neonate and those presenting in the infant and older child. Most congenital heart disease should be detected by a good neonatal examination or at a 6-week check-up[7,8].

Evaluation of patients

Not all patients are always symptomatic. Symptoms depend on types and severity of disease. Clinical signs also depend on underlying congenital defects. Some noninvasive testing are usually helps to reach the diagnosis. Cardiac catheterization and selective cineangiography are needed for selected cases.

- Noninvasive evaluation- ECG, Chest x-ray, Echocardiogram
- Invasive- Cardiac catheterization and selective cineangiography

Materials and methods

This review study was done at Echocardiography lab. at Department of Cardiology, Khwaja Yunus Ali Medical College & Hospital, Enayetpur, Sirajgonj. All patients who had a congenital anomaly on transthoracic echocardiography were included in the study despite of age and sex. Echocardiography was done with Philips Affinity 70C. The machines have capabilities to perform M-mode, two-dimensional, and Doppler examinations. The echocardiographic examinations were performed and interpreted by consultant cardiologists. All measurements were taken from standard echocardiographic views according to the recommendation of the American Society of Echocardiography[9]. Data obtained from the echo register included age, gender, clinical diagnosis, and specific congenital defects & were analyzed with a computer using SPSS version 21 software.

Results

We have analyze total 404 patient with congenital heart disease over nearly two years of period presented at our Echocardiography lab, among them 329 (81.43%) patients had acyanotic congenital heart defect and 75 (18.57%) patients had cyanotic congenital heart defect. Among the acyanotic patients, 164 (49.85%) was male and 165 (50.15%) was female and among the cyanotic patients, 42(56%) was male and 33(44%) was female. (Table I)

Table I: Types and gender distribution of Congenital heart defects (n=404)

Congenital Heart Disease	Acyanotic (n=329)		Cyanotic (n=75)	
	Male	Female	Male	Female
	164(49.85%)	165 (50.15%)	42(56%)	33(44%)

Among the acyanotic congenial heart defects ventricular septal defect was more common 142 (43.16%) followed by Atrial septal defect 93(28.2%) & Patent Ductus Arteriosus 30(9.1%). 43 (13.07%) had combined defects. (Table II) (Figure 1, 2, 3)

Table II: Distribution of Acyanotic congenital heart defects (n=329)

Diagnosis	0-10 years	11-20 years	>20 years	Total,n (%)
Ventricular Septal Defect	102	21	19	142 (43.16%)
Atrial Septal Defect	22	11	60	93 (28.26%)
Patent Ductus Arteriosus	21	06	03	30 (9.11%)
Mitral Valve Prolapse	01	00	07	08 (2.43%)
Bicuspid Aortic Valve with AS	01	00	01	02 (0.6%)
Pulmonary Stenosis	02	02	01	05 (1.5%))
Dextrocardia	01	00	05	06 (1.82%)
Combined defects	23	07	13	43 (13.07%)

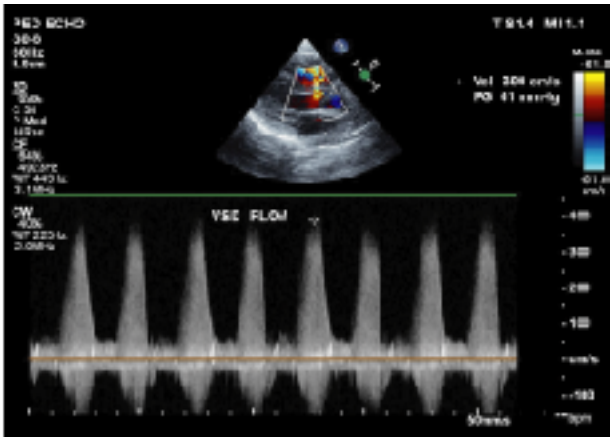

Figure 1: Doppler Echocardiography shows VSD flow.

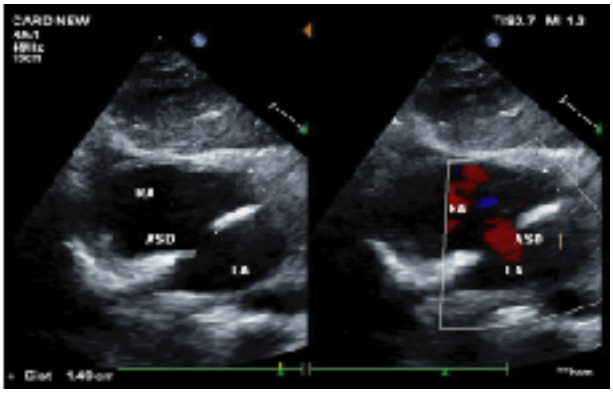

Figure 2: Doppler Echocardiography shows ASD (Secundum) flow.

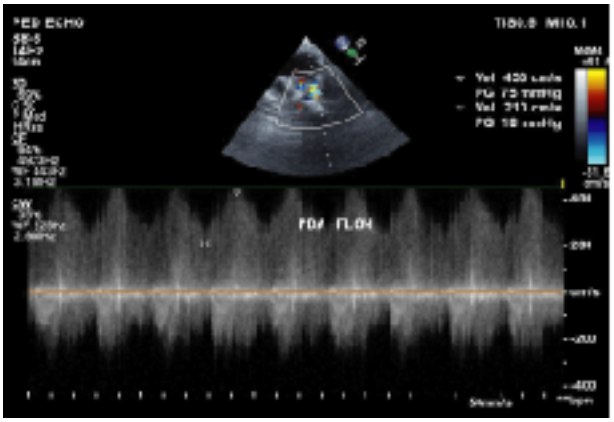

Figure 3: Doppler Echocardiography shows PDA flow.

Among the cyanotic congenial heart defects commonest disease was Tetralogy of Fallot 59(78.7%). Cyanotic heart disease are mostly presented in earlier age. (Table III) (Figure 4)

Table III: Distribution of Cyanotic congenital heart defects (n=75)

Diagnosis	0-10 years	11-20 years	>20 years	Total, n (%)
Tetralogy of Fallot	40	16	03	59 (78.7%)
Transposition of great vessels	02	00	00	02 (2.7%)
Complex Congenital	04	00	00	04 (5.3%)
Tricuspid Atresia	02	00	01	02 (2.7%)
Pulmonary Valvular atresia with VSD/PDA	06	00	00	06 (8.0%)
Severe Ebstein anomaly	00	00	02	02 (2.7%)

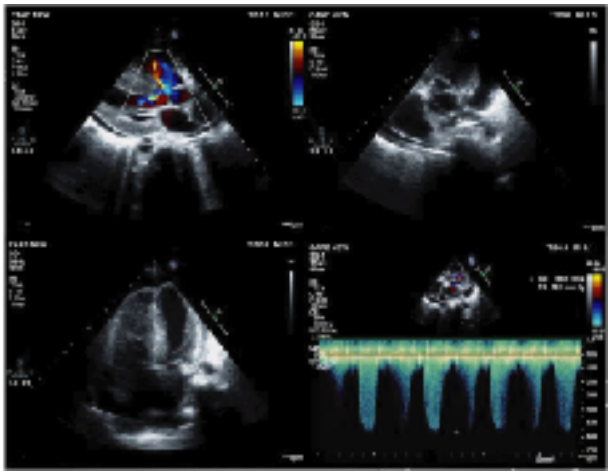

Figure 4: Doppler Echocardiography shows typical findings of TOF- VSD, overriding of aorta, RV outflow tract obstruction & RV hypertrophy.

There was no significant gender deference but incidence of ASD & PDA was higher in female and VSD was more in male. In cyanotic heart disease incidence of TOF was slightly higher in male.

Discussion

Many study done previously based on congenital heart disease. We have reviewed echo reports of congenital heart disease at out Echocardiography lab. to see our current status. This study showed there was no statistically significant difference in the mean ages of males and females affected by the different congenital heart diseases, or in the frequency between both genders. VSD, ASDs, and TOF, in that order, were the most common congenital abnormalities seen in adults in this study. Our findings are similar to the studies done elsewhere[10]. Atrial septal defects were significantly more prevalent in females in this study, and this finding has been documented both in children and adults by previous studies[11]. Persistent ductus arteriosus was also more frequent in females, but the difference was not statistically significant, most of the study in past found that PDA is more frequent in female. It is noteworthy that bicuspid aortic valve was found only in one patient in this study. Combined defects are also not uncommon. TOF was more frequent in males. Varying results have been documented in the past by different researchers on the gender differences in the prevalence of TOF[12,13]. Frequency of Tricuspid atresia and Complex congenital heart diseases are next to TOF.

Conclusion

Ventricular septal defect (VSD) is the most common acyanotic congenital defect followed by Atrial Sepal Defect (ASD) & Patent Ductus Arteriosus (PDA). VSD and PDA mostly present in earlier age & ASD mostly present in adult age. Among the cyanotic heart diseases Tetralogy of Fallot is commonest & present in early age group. There is no statistically significant gender difference.

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