Original Article

Pattern and Diagnosis of Congenital Heart Disease in Patients attending Ahmed Gasim Cardiac Centre

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Abstract:

Objective: To study the pattern of Congenital Heart Diseases (CHD) in children referred to Ahmed Gasim Cardiac Center) in Khartoum.

Methods: This is a prospective cross-sectional, clinic based study conducted over a six months period. The children were referred to the Cardiac Centre because of suspected heart problems. Cases of congenital heart disease were identified via history taking, clinical examination and echocardiography.

Results: Of the 180 patients suspected to have heart problems were seen in the centre, 37of them were excluded because they either had acquired heart disease (n=20) or innocent murmur (n=17). Out of the 143 remaining patients, ventricular septal defect (VSD), was found to be the commonest [n = 49 (34.3%)] CHD, followed by tetrology of Fallot (TOF) [n = 19 (13.3%)]. The male to female sex ratio was 1.2:1.0. Males were predominant in VSD, multiple lesions, TOF and Coarctation of Aorta (COA). Females were predominant in ASD, PS, PDA, Complete Atrio Ventricular Septal Defect (CAVSD) and Transposition of the Great Arteries (TGA) but there was equal sex distribution in Single Ventricle, Primary Pulmonary Hypertension (PPHTN) and Total Anomalous of Pulmonary Venous Return TAPVR. Down syndrome is the most common extra-cardiac anomaly associated with CHD [n =23(16.1%)] of the study group.

Conclusion: The frequency of CHD reported in this study is in consistent with other studies done in Sudan and other part of the world. Although congenital heart diseases are diagnosed in the neonatal period, but a significant number of CHD (83.3%) presented throughout infancy and childhood. The association of CHD and extra-cardiac anomalies is found in a significant number (22.4%) of patients in this study. Echocardiography proved to be important for confirmation of CHD in this study. Early referral of suspected cases of congenital cardiac anomalies is mandatory for better management till establishment of cardiac centers at different regions of the country.

Keywords: tetrology of Fallot, ventricular septal defect, coarctation of aorta

Congenital heart disease (CHD) is the commonest type of heart disease among children[1]. It is a gross structural abnormality of the heart or intrathoracic great vessels[2]. The incidence of congenital heart disease is approximately eight per 1000 live birth, with a higher rate in stillbirth, spontaneous abortion and prematurity[3,4]. It is believed that this incidence has remained constant worldwide[5].From population survey in Sudan, the prevalence of CHD was found 2/1000 live births and accounted for 3.9% of the total hospital admissions for cardiovascular disease[6,7]. The prevalence rate in developing countries was 3/1000 live birth in Uganda, 3.6/1000 live births in Nigeria, 4.1/1000 live births in Oman and 11.5/1000 in Lebanon[8-10].

The objectives of this prospective cross-sectional clinic-based study were to study the pattern of congenital heart disease and examine the associations of congenital heart disease with extra-cardiac anomalies.

Material and methods:

The study was conducted in Ahmed Gasim Cardiac Centre, Khartoum north, Sudan, in a

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period of five months All children aged 16 years or less, suspected to have congenital heart disease attending Ahmed Gasim Cardiac Centre, were interviewed, examined and investigated. Patients with acquired heart disease and normal heart on Echo were excluded. Echocardiographic diagnosis was made using color flow Doppler Echo machine model (Mylab 50 X vision esaote, Ontario Canada). Statistical Package for Social Science (SPSS) version 16, was used for the analysis. Square test with P value of > 0.05 is taken to be significant.

Results:

During the study period, 180 patients were seen in the Cardiac Center 37 (10.6%) of them were excluded because they either had acquired heart disease (n=20) or innocent murmur (n=17).
The age of the remaining 143 (89.4%) was divided into five groups. 36(25.2%) were under one year, 47 (32.9%) were between 12 to 59 months, 36(25.2%) were aged 60-119 months. Median age was 33 months. Male 77 (53.8%) and female 66 (46.2) ratio was 1.2:1

Clinical presentations:

Major clinical presentations were breathlessness122 (85.3%), cough 87 (60.8%), recurrent chest infection 89(55.6%), fever79 (55.2%) and significant number of poor weight gain74 (51.7%), cyanosis41 (28.7%) and anemia41 (28.7%) [Table1]. Murmurs in 129 (90.2%) with or without thrill and cardiomegaly were the most important cardiac finding in different types of CHD with significant P value = 0.000 [Table 2].
The main causes of admissions were recurrent chest infections in 81(56.6%), and heart failure in about 99(69.2%) of the cases while the cyanotic spells were present in 11(7.7%) of admissions [Table 3]
The extra-cardiac anomalies represented about 32(21.6%) of the study group, 23(16.2%) of them were diagnosed as Down syndrome, 2(1.3%) Noonan syndrome, 6(4.1%) other dysmorphic features - such as cleft lip, palate, hypertolerism, depressed nasal bridge and low set ear- and 112(78.4%) without dysmorphic features [Table 4].

Echocardiographic findings:

The commonest lesion was VSD 49(34.3%) followed by TOF19 (13.3%) [Figure 6]. Males were predominated in VSD 26, TOF15 and COA 3. Females were predominated in ASD 6, PS 8, PDA 7, CAVSD5 and TGA2 but equal distribution in single ventricle1, PPHTN2 and TAPVR1.

Table 1: Important physical findings in CHD in the study group (n=143)

Physical finding	N	Percentage
Murmur	129	90.2
Dyspnea	99	69.2
Cardiomegaly	63	44.1
Tachycardia	56	39.2
Crackles	54	37.8
Thrill	54	37.8
Wheeze	40	28.0
Cyanosis	41	28.7
Anemia	41	28.7
Left-Parasternal heave	28	19.6
Enlarged tender Liver	26	18.2
Clubbing	20	14.0
Fixed splitting	12	8.4
Chest Deformity	10	7.0
Single second heart sound	10	7.0
Sacral Edema	8	5.6
Polycythemia	4	2.8
Absent femoral pulse	3	2.1

Table 2: Relation between type of CHD and murmur in the study group(n = 143)

Type of CHD	Heart Murmur		P. value
	Yes n (%)	No n (%)	
VSD	47 (32.9)	2 (1.4)	0.000
ASD	7 (4.9)	3 (2.1)	0.000
TOF	18 (13.3)	0(0.0)	0.000
PDA	11(7.7)	2 (1.4)	0.000
PS	8(5.6)	2 (1.4)	0.000
COA	3(2.1)	0(0.0)	0.000
CAVSD	8(5.6)	0(0.0)	0.000
TGA	1(0.7)	1 (0.7)	0.000
Single ventricle	2 (1.4)	0(0.0)	0.000
Multiple lesion	18 (12.6)	2 (1.4)	0.000
PPHTN	3 (2.1)	1 (0.7)	0.000
TAPVR	1 (0.7)	1 (0.7)	0.000
Total	129 (90.2)	14 (9.8)	0.000

Discussions:

This study was undertaken to describe the pattern, clinical presentations and diagnosis of patients who were referred to Ahmed Gasim Paediatric Cardiac Centre. Although it is clinic-based study, it would be reasonable to believe that it reflects the picture of CHD in Sudan for the reason that the hospital in which the study was conducted is a tertiary health care center with appropriate facilities to assess children suspected having CHD.

There's significant number of detected cases of CHD in the age group < 60 months with a peak at 12 -59 months of age (32.9%). This is in agreement with a study done in India[19], but is different from a study done in Londrina, Brazil[12,19].

Table3: Distribution of the study group according to the main cause of admission (n=143)

Main cause of admission	N	Percentage
Heart failure	99	69.2
Recurrent chest infection	81	56.6
Cyanotic spell	11	7.7

Table 4: Associated dysmorphic features in patients with CHD.(n=143)

Nature of dysmorphic features	N	Percentage
Down syndrome	23	16.2
Noonan syndrome	2	1.3
Other*	5	4.1
No dysmorphic features	112	78.4
Total	143	100.0

*Others: cleft lip and palate, hypertolerism, depressed nasal bridge, microcepaly and low set ear.

Table 5: Frequencies of types of CHD as reported from Sudan and other parts of the world

Type of CHD	This study	Elhag[11] Sudan	Mohammed S[12] Sudan	Fuad[13] Saudi Arabia	Tan JC et al[14] Cameroon	Caddel JM[15] Nigeria	SchrireV[16] Cape Town	NidalS[17] Jordan	Saleh HK[18] Yemen
VSD	34.3%	45%	16.1%	32.5%	38.8%	38%	21.8%	37%	26.5%
TOF	13.3%	13%	17.7%	4.5%	26.1%	3%	12.2%	5.6%	8.9%
ASD	7%	4%	6.2%	10.4%	2.8%		17%	14.3%	15.8%
PDA	9.1%	5%	4.6%	15.8%	12.4%	20.9%	16.1%	17.7%	17.3%
PS	7%	8%	6%	10.1%	2.6%	6%	9.1%	12.6%	17.6%
CAVSD	5.6%	5%	8.6%	3.6%	7.3%	9%		1.7%	
PPHTN	2.8%								
TGA	1.4%		6.6%	1.8%		1.5%	1.8%		3.1%
TAPVR	2.1%		0.9%		1.5%	1.5%	0.5%		
Single Ventricle	1.4%		0.9%	2.7%			0.7%	0.7%	
COA	2.1%		0.7%	3.3%	1.1%		6.1%	1.5%	
Multiple lesion	13.9%		18.1%	14.4%			15.3%	9.6%	

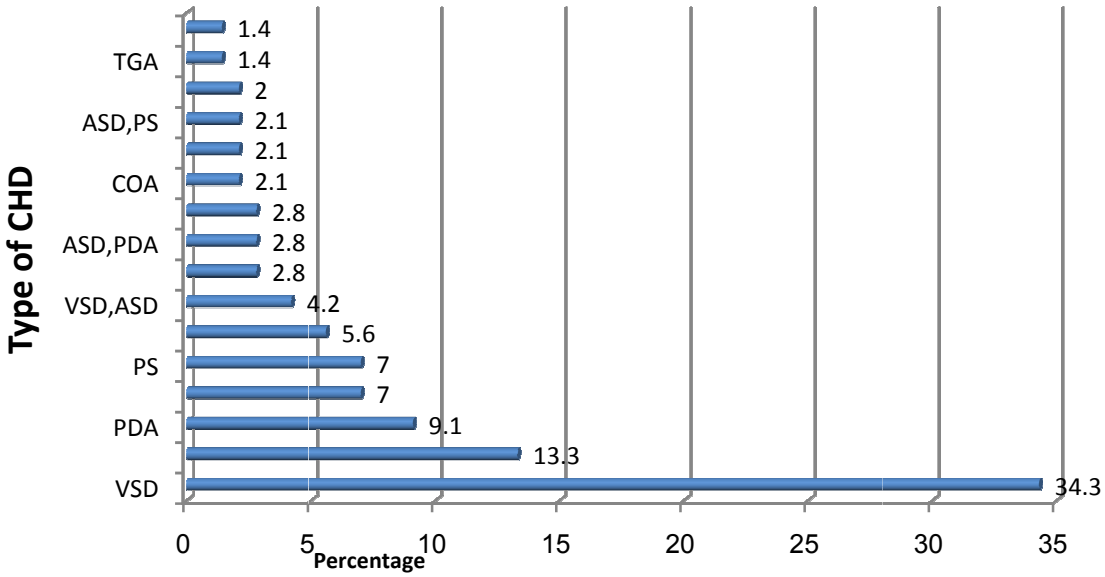

Figure 1: Type of congenital heart disease among study population (n = 143)

Gender distribution in this study showed that males predominated (53.8%) over female (46.2%). The ratio was 1.2:1. This is in agreement with previous studies from Sudan[11,12].

Residence distribution of the study: showed that 60.1% of the patients were residing in rural areasreflecting the lack of proper cardiology care in rural areas. This finding is supported by the study conducted by Bassili[20].

Normal developmental history was found in about two thirds of the study group which is in agreement with that reported elsewhere[21], however, it is different from that reported by Morten[22]. The main presenting symptom was breathlessness (85.3%), followed by cough (60.8%) beside other symptoms with varying percentage of presentation. The important physical signs were mumur (90.2%), dyspnea (69.2%) with other signs, this clinical picture is in agreement with that reported by others [11,23].

About 21.6% of the study population had extracardiac malformations which is consistent with Mitchell[3]. Trisomy 21 is the most common syndrome associated with CHD in this study which goes with reported literature[3,24]. The frequency of different congenital heart disease in this study is consistent with that reported in previous studies. The most common form of CHD is VSD (34.3%), which is consistent with some previous reports and differ from others from Sudan[11,12,25,26]. Although the 13.3% rate of TOF reported in this study is much higher than that reported in Saudi Arabia, it does not match the findings in some reports from Africa[11-18].

Patent ductus arteriosus (PDA) is present in about 9.1% of our patients which is higher than that reported in studies done by Elhag and Mohammed while lower than that reported in other studies[11-13,16-18]. Pulmonary stenosis (PS) represented about 7% of the study population as reported in some studies[11,12,15],however, this is lower than that reported in other studies[13,16-18].

The 7% of patients with atrial septal defect (ASD) is consistent with some and different from some studies[11-13, 15-18]. Although complete atrioventricular septal defect (CAVSD) in our study agrees with Elhag and Fuad findings[11,21], it is lower than that reported in other studies[12,14,15].

The frequencies of types of congenital heart disease as reported in different studies from Sudan and other parts of the world; Saudi Arabia, Jordan, Yemen, Cameroon, Nigeria and Cape Town showed in table 5.

Conclusion:

The frequency of CHD reported in this study is in consistent with other studies done in Sudan and other part of the world. Although

congenital heart diseases are diagnosed in the neonatal period, but a significant number of CHD (83.3%) presented throughout infancy and childhood. The association of CHD and extra-cardiac anomalies is found in a significant number (22.4%) of patients in this study. Echocardiography proved to be important for confirmation of CHD in this study. Early referral of suspected cases of congenital cardiac anomalies is mandatory for better management till establishment of cardiac centers at different regions of the country.

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