



Patterns of congenital heart disease in neonates in southern Libya

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ABSTRACT

Over one quarter of major congenital anomalies affect the heart. Delayed diagnosis of severe forms, especially after the neonatal period, is associated with up to twelve-fold increased mortality. Our study aims to assess the prevalence and pattern of congenital heart disease in high-risk neonates in southern Libya. A cross-sectional descriptive study was done at the pediatric echocardiography clinic of Sebha Medical Center from May 2019 to April 2020, and all newborns referred for echocardiographic screening were included. Over half of the congenital heart anomalies (58%) were of a simple type that might close spontaneously (PDA, VSD, ASD); 11% were severe forms that need early intervention (AV Canal, CO A, TOF). Early detection can save lives, so we recommend introducing universal postnatal echo screening for every newborn and also fetal echo screening for every mother with a high-risk pregnancy.

أنماط تشوهات القلب الخلقية لدى حديثي الولادة في جنوب ليبيا

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الكلمات المفتاحية:

أمراض القلب الخلقية
حديثي الولادة
الأنماط
تخطيط صدى القلب
الفحص

المخلص

أكثر من ربع التشوهات الخلقية الرئيسية تؤثر على القلب. يرتبط التشخيص المتأخر للأشكال الحادة، خاصة بعد فترة حديثي الولادة، بزيادة الوفيات بما يصل إلى اثني عشر ضعفا. تهدف دراستنا إلى تقييم مدى انتشار ونمط أمراض القلب الخلقية لدى حديثي الولادة المعرضين لخطر كبير في جنوب ليبيا. تم إجراء دراسة وصفية مقطعية في عيادة تخطيط صدى القلب للأطفال في مركز سبها الطبي من مايو 2019 إلى أبريل 2020، وتم تضمين جميع الأطفال حديثي الولادة المحالين لفحص تخطيط صدى القلب. أكثر من نصف التشوهات القلبية الخلقية (58%) كانت من نوع بسيط قد يغلق تلقائياً (القناة الشريانية السالكة، عيوب الحاجز البطيني، عيوب الحاجز الأذيني) 11% كانت أشكالاً حادة تحتاج إلى تدخل مبكر (القناة الأذينية البطينية، رباعية الفالوت، تجانس الشريان الأورطي). يمكن أن ينقذ الكشف المبكر الأرواح، لذلك نوصي بإدخال فحص الصدى العالمي بعد الولادة لكل مولود جديد وكذلك فحص صدى الجنين لكل أم لديها حمل عالي الخطورة.

Introduction

CHD as defined by Mitchell et al is a gross structural abnormality of the heart or intra thoracic great vessels that is actually or potentially of functional significance (4).

(CHD) is the most common cause of major congenital anomalies accounting 28.0%, with worldwide prevalence 5-8/1000 live birth(1,4).

Studies done in African countries shown prevalence rate of 1.9 per 1,000 live births (8).

although it is a common and important disease no studies on prevalence of CHD in Libyan neonates have been reported, most

studies includes all spectrum of paediatric age group not restricted only to neonatal age group.

In developing countries CHD have impaction on quality of life and life expectancy of people born with congenital heart defect. having a child with CHD often results in socioeconomic problems that affect the entire family.

Patients born with severe forms of CHD are at approximately 12 times higher risk of mortality in first year of life particularly if they are missed in the neonatal period (9).

However, if the problem are recognized at earlier age, and

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appropriate interventions done the chance of long term complications are less and the outcome is better.

In developed countries, early diagnosis and suitable treatment has significantly increased the survival rate and has decreased mortality from 85% to 15% in CHD patients. As such, the number of adults with CHD has increased(6).

Knowledge of epidemiology of congenital heart disease at our area result in improve quality of life by improving health policies that dealing with appropriate time detection and management of such problems.

Our study aimed to describe the prevalence and pattern of CHD in newborns referred to paediatric Echocardiography clinic-sebha medical center and to establish the relationship between CHD and certain parameters like gender and residency.

Method

This cross sectional study conducted in paediatric Echo clinic at sebha medical center ; sebha medical center is the only teaching and referral medical center at south of Libya .

Study conducted within the period of May 2019 until April 2020. All newborns age group referred for Echo screen due to different indication were included. newborn screened at private clinic at study area were not included. A total of 207 newborn were enrolled. Echo were carried out by 2D Echocardiography use 4 basic views and Doppler flow wave, and performed by single paediatric cardiologist. According to echo results participant classified to two groups; normal scan and abnormal scan.

Demographic data (Age-gender-residency) and echocardiographic conclusion were recorded into registration book .

Data was analysed by SPSS (V 25) with measure of frequencies and percentage.

Result

Total of 207 newborns attended paediatric echo clinic during 12 months period. a total of 57 one were found to have abnormal screen consistent with CHD (27.5%) out of them 30 (52.6%) were girls with M: F ratio is 1:1.1. the most frequent a cyanotic heart defect was PDA 22(38.6%) of total congenital heart defect followed by VSD and ASD 8, 3 (14% , 5.3%) respectively . and TOF was the most frequent cyanotic heart defect (3.5%) .

Table 3 and figure 2 shown distribution of congenital heart defect pattern .

Table 2 and Figure 4 displays residency distribution of CHD cases, 42 newborns were resident from sebha (73.3%), sebha was dominant place for each isolated type of CHD except TR and TOF as shown in table 5.

Table 4 and figure 5 represent the Relationship between congenital heart defect pattern and gender, shown predominance of female in VSD, ASD, AV Canal, TOF but male predominance in PDA and TR.

Discussion

A study done in sebha medical center showed the prevalence of 275 per 1000 neonate attended paediatric Echocardiography clinic. This high prevalence might be attributed to the study method, it was hospital based study done only on suspected or symptomatic neonates referred for screening by Echocardiography and not reflecting prevalence of CHD per total live birth.

In our study prevalence through female gender slightly higher with male to female ratio is 1:1.1 but that in contrast to study done by Hussain, A. M., Hussain, A. J., & Hmood, Q. K that have shown male: female ratio is 1.6:1(2).

The commonest congenital heart disease in our study was PDA (38.6%) followed by VSD (14%) then ASD, AV Canal and TR (5.3%) for each one, which not correlate to other studies that have shown VSD as commonest type (2,3,5,7), that can be explained by in our study Premature newborn with haemodynamically insignificant PDA were included , and other studies exclude PDA from CHD except if persist beyond certain age or are haemodynamically significant .

We found female neonate predominant in VSD, ASD, AV Canal, and TOF respectively in our study, while male neonates more frequent

in PDA,TR, and Co A and this is different with that reported by Hussain, A. M., Hussain, A. J., & Hmood, Q. K Al-Diwaniyah(2).

in our study most cases came from city where hospital is present that not reflecting truly higher prevalence of CHD at city but reflecting most of newborns at rural area have not post natal examination to pick up suspected cases and even if have ,the economic state of family may not make them to transport and reach the center .

sebha was dominant place for each isolated type of CHD except TR and TOF, the former mainly came from murzuk and later from shatti.

Conclusion

Our observations show, prevalence among neonates referred for echo screen was 275/1000. PDA was the commonest heart Defect followed by VSD. Lesions that have chance of spontaneous closure without intervention and don't causing any impact on health (PDA, VSA, ASD) account for 57.9% of total cases.

Recommendations

1. Every newborn baby should be examined for any evidence of CHD at first week of life and at risk baby should be referred to paediatric echocardiography clinic mandatory even from far areas from sebha.
2. Early detection can save lifes by increase the success rate of management, so we advise to introduce universal echocardiography screening for every newborn delivered at maternity ward at SMC .
3. Fetal echocardiography screening in second trimester (18-24 gestational weeks) must be advised by obstetricians for every mother with risk factor.
4. In next research will focus on risk factors that associated with most cases of CHD at our area, as initial step to start Primary preventive programs to reduce CHD rate by control that risk factors.

Abbreviations and Acronyms

CHD = Congenital Heart Disease

PDA = Patent Ductus Arteriosus

VSD = Ventricular Septal defect

ASD = Atrial Septal Defect

AV CANAL = AtrioVentricular Canal

CO A = Coaractation of Aorta

TR = Tricuspid regurge

TOF = Tetralogy of fallot

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Figures and Tables

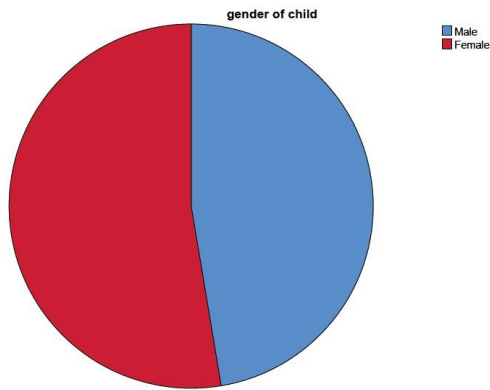


Fig. 1: Participants Gender

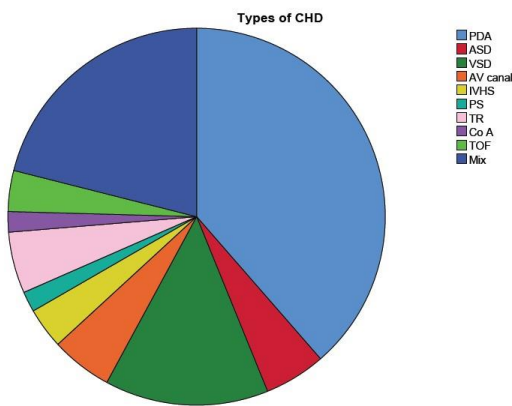


Fig. 2: proportion of CHD Types

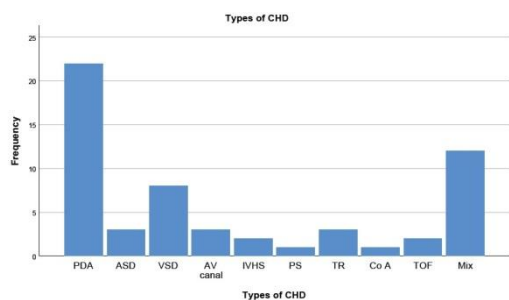


Fig. 3: Frequencies of CHD Types

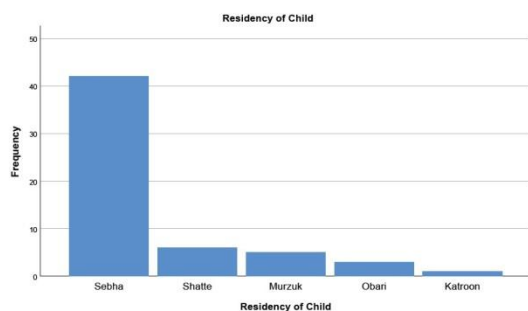


Fig. 4: Distribution of CHD Types according to Residency

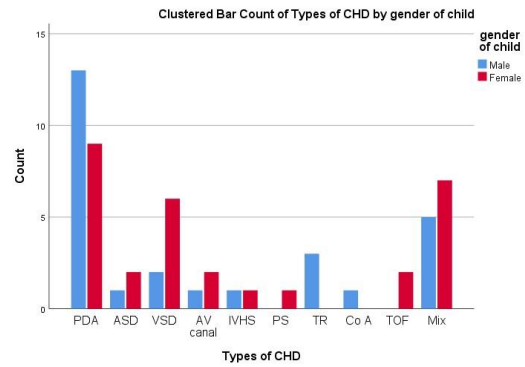


Fig. 5: Distribution of CHD Types according to Gender

Table 1: Frequency and Percentage of Participants According to Gender

		gender of child			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	27	47.4	47.4	47.4
	Female	30	52.6	52.6	100.0
Total		57	100.0	100.0	

Table 2: Frequency and Percentage of Participants According to Residency

		Residency of Child			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sebha	42	73.7	73.7	73.7
	Shatte	6	10.5	10.5	84.2
	Murzuk	5	8.8	8.8	93.0
	Obari	3	5.3	5.3	98.2
	Katroon	1	1.8	1.8	100.0
Total		57	100.0	100.0	

Table 3: Frequency and Percentage of Participants According to

		Types of CHD			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	PDA	22	38.6	38.6	38.6
	ASD	3	5.3	5.3	43.9
	VSD	8	14.0	14.0	57.9
	AV canal	3	5.3	5.3	63.2
	IVHS	2	3.5	3.5	66.7
	PS	1	1.8	1.8	68.4
	TR	3	5.3	5.3	73.7
	Co A	1	1.8	1.8	75.4
	TOF	2	3.5	3.5	78.9
	Mix	12	21.1	21.1	100.0
	Total		57	100.0	100.0

CHD type

Table 4: Distribution of CHD types according to Gender

Types of CHD * gender of child Crosstabulation

Count

		gender of child		Total
		Male	Female	
Types of CHD	PDA	13	9	22
	ASD	1	2	3
	VSD	2	6	8
	AV canal	1	2	3
	IVHS	1	1	2
	PS	0	1	1
	TR	3	0	3
	Co A	1	0	1
	TOF	0	2	2
	Mix	5	7	12
Total		27	30	57

Table 5: Distribution of CHD types according to Residency

Types of CHD * Residency of Child Crosstabulation

Count

		Residency of Child					Total
		Sebha	Shatte	Murzuk	Obari	Katroun	
Types of CHD	PDA	18	2	1	1	0	22
	ASD	2	0	0	1	0	3
	VSD	4	2	1	0	1	8
	AV canal	3	0	0	0	0	3
	IVHS	2	0	0	0	0	2
	PS	1	0	0	0	0	1
	TR	1	0	2	0	0	3
	Co A	1	0	0	0	0	1
	TOF	0	2	0	0	0	2
	Mix	10	0	1	1	0	12
Total		42	6	5	3	1	57