Incidence of congenital heart diseases in the Neonatal Intensive Care unit in Al-Batool teaching hospital in Diyala Governorate – Iraq

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Abstract

Background: Congenital heart diseases are the most common cause of congenital anomalies in newborns. Congenital cardiac problems affect a great number of newborns and are a major cause of infant mortality in the world. However, there are regional differences in congenital heart disease prevalence and distribution patterns. In the neonatal critical care unit of Al-Batool Teaching Hospital, we assessed the prevalence, risk factors, and diagnostic indicators for congenital heart disease in infants.

Aim of study: Our aim in this study is to retrospectively show incidence among the infants monitored in the neonatal intensive care unit, of the patients with

congenital cardiac condition of our hospital in terms of frequency, distribution and diagnostic clues.

Patients and methods: There were 100 participants in this study .We collected a sample from the individuals who visited Al- Batool Teaching Hospital. Retrospective examination of infants with congenital cardiac abnormalities identified between 1-28 days after birth. Among 100 babies hospitalized in neonatal intensive care unit in Al-Batool teaching hospital between October 2023 and March 2024, 100 babies diagnosed with congenital cardiac disease were assessed after the fact. The reasons for the evaluation of these babies, their gender, and the diagnoses made through echocardiographic was recorded.

Results: In the research, 100 patient participated. Their fetal ages ranged between 1-28 days, 54 (54%) were males and 46(46%) females. The most frequent congenital heart diseases were ASD (n=29) followed by PFO(n=20), others(n=20), PDA(n=17),VSD(n=9) ,and TOF(n=5). While In cyanotic heart illnesses, cyanosis was the most frequent reason for patient examination by pediatric cardiology; in acyanotic heart diseases, it was respiratory distress and murmurs.

Conclusion and recommendation:

Congenital cardiac problems represent almost one-third of all congenital abnormalities, making them a significant health concern during the neonatal stage. For these patients, an early cardiac examination is crucial to the diagnosis and course of treatment. Compared to all live births, newborns under observation in the neonatal critical care unit had a higher prevalence of congenital heart disease.

Key words: neonate, critical care, congenital heart disease.

Introduction :

A gross anatomical anomaly of the heart or intrathoracic great vessels that is functionally significant that occurs alone or in conjunction with other congenital conditions is known as a congenital heart disease (CHD) occurs between the first 8 weeks of pregnancy (1). The prevalence of congenital heart diseases differed among studies and was typically reported at 3–5/1000 live births. According to recent studies, the incidence of CHDs ranges from 8 to 10 per 1000 live births. The most prevalent congenital fetal anomalies are congenital cardiac disorders, which are linked to a high rate of morbidity and mortality in children.

10% of infants are identified with CHD that is fatal, and 1% of neonates have some form of CHD (2). About 25% of newborns with CHD need to have their condition corrected within the first year of life, either by surgery or a catheter operation. Atrioventricular septal defect, entire atrioventricular septal defect, interventricular septal defect, patent foramen ovale, patent ductus arteriosus, and complex congenital heart disease are a few forms of congenital heart disease. The etiology of CHD is multifactorial and If it shows recurrence, it may be a familial genetic condition. indicates [3]. Genetic sporadic changes, spot mutations and duplications in some known etiological factors [4]. In addition to these, almost 5-8% Chromosomal anomalies in the patient group: trisomy 21, 18, 13 is seen(5).The CHD are approximately 30% of them are accompanied by other organ system anomalies. The CHD and other organ system anomalies together they may be parts of a genetic syndrome . Maternal illnesses (such as rubella) or diseases (such as obesity and gestational diabetes), the use of vitamin A, and the use of teratogenic medications, nicotine, alcohol, and cocaine during pregnancy are among the risk factors known to be associated with CHD (6,7) CHD is also linked to medically assisted reproduction (8) and having a mother with heart disease as a parent (9). The clinical findings of congenital heart diseases in the neonatal period findings

vary depending on the anatomical disorder. The severe symptoms, which include shock, cyanosis, and difficulty breathing. Additionally, there may be dysrhythmia or a solitary murmur (4).

Patients and methods

Among 100 babies hospitalized in the neonatal intensive care unit of Al-Batool teaching hospital between October 2023 and March 2024, 100 babies diagnosed with congenital heart disease were evaluated retrospectively. The gender of the patients, the reasons for their cardiological evaluation, whether they had additional anomalies, and their diagnoses were recorded. Those diagnosed with patent foramen ovale (PFO; defect of 3 mm or less in the interatrial septum) and those with preterm (under 37 weeks) patent ductus arteriosus (PDA) were included in the study.

The babies hospitalized in the neonatal intensive care unit in Al-Batool teaching hospital were first evaluated by a pediatric cardiology consultation was requested in cases such as heart murmur that is considered to be abnormal, cyanosis, suspicion of arrhythmia, respiratory distress that cannot be explained by lung disease, suspicion of Down syndrome, dysmorphic findings, and the baby of a diabetic mother. Congenital heart disease was diagnosed with cardiovascular system examination, echocardiography and electrocardiography (ECG) examinations performed by a pediatric cardiologist

Statistical analysis :

The date was examined using the statistical package for social sciences (SPSS) version 26. We utilized Pearson chi square to determine the association between the variables and the data reported in basic measures of frequency and range.

Results :

100 babies who were hospitalized in our neonatal intensive care unit and diagnosed with congenital heart disease were included in the study. 54 of these patients were male (54%) and 46 were female (46%) (Table 1). We found the frequency of congenital heart disease according to gender among the male babies admitted to our unit to be 54% more than female 46%.

Atrial septal defect (ASD) (29%), ventricular septal defect (VSD) (9%), and patent ductus arteriosus (PDA) (17%) are the most prevalent non-cyanotic heart illnesses, while cyanotic congenital heart diseases are were tetralogy of fallot (TOF) (5%), (Table 2).

While the most common reason for evaluation in patients diagnosed with cyanotic heart disease was cyanosis, the most common reason in acyanotic patients was unexplained respiratory distress and murmur.

Table 1. congenital heart disease according to gender.

Gender	Frequency	Percent
Male	54	54%
Female	46	46%

The CHD types and frequency show in table 2.

Table 2. The Congenital heart disease of the study group.

Category	Frequency	Percent
ASD	29	29%
VSD	9	9%
PDA	17	17%
PFO	20	20%
TOF	5	5%
Others	20	20%

Total	100	100%

The category of CHD and frequencies according to gender were as showed as in Table 3.

Table 3. Category of CHD of the study group.

Category	Male	Female	Percent
ASD	16	13	29%
VSD	3	6	9%
PDA	10	7	17%
PFO	12	8	20%
TOF	2	3	5%
Others	11	9	20%
Total	54	46	100%

There was significant association between the increasing of CHD and the residence due to early diagnosis as in table 4.

Table 4. The association between residence and frequency of CHD.

Residence	frequency	Percent
Baqubah	28	28%
Miqdadiyah	23	23%
Balad Ruz	8	8%
Khalis	18	18%
Khanaqin	9	9%
Khan Bani Saad	14	14%
Total	100	100%

Discussion

The congenital heart diseases are the most common cause of congenital anomalies, which is an important health problem. Its incidence varies between approximately 0.8-0.9% of all live births [11]. An increase in the prevalence of congenital heart disease has been reported over the years. The widespread introduction of echocardiography into clinical practice as a diagnostic tool, the increase in screening methods and neonatal intensive care follow-up are among the factors that cause this increase in prevalence [12].

In the sick newborn population, the frequency of congenital heart disease may vary depending on the density of the centers. I found the frequency of congenital heart disease among patients hospitalized in Al-Batool teaching hospital to be in male 54% and female 46%.

H. Güven et al. found the frequency of congenital heart disease in babies hospitalized in the neonatal ward as 4.9% [7]. G Bulut et al. also reported the frequency of congenital heart disease in babies hospitalized in neonatal intensive care as 1.6% [17]. These two study disagree with my study ; I think that this is due to the increasing use of echocardiography as a diagnostic tool over time and the introduction of pulse oximetry screening in the neonatal period, and the increase in the number of babies diagnosed with congenital heart disease, with even asymptomatic patients and patients with mild lesions being diagnosed.

The most prevalent acyanotic congenital heart diseases we see are ASD (29%), PDA (17%) and VSD (9%). In a study from India, VSD was reported as the most common lesion with a rate of 30.45%, and it differ from my results as I find ASD

most common 29% [13]. In a meta-analysis conducted in 2011, the prevalence of VSD among all live births was reported to be in the first place with 2.62/1000, ASD in the second place with 1.64/1000, and PDA in the third place with 0.87/1000 [12].

According to the literature, the most prevalent cyanotic heart disorders include pulmonary stenosis, tetralogy of fallot, and great artery transposition [1,4]. In my study, TOF was the most prevalent cyanotic cardiac condition. . However, Variations in the frequency of congenital cardiac disorders by region have been reported. For example, it has been reported that right ventricular outflow tract anomalies are more common in Asia, while left ventricular outflow tract anomalies are more common in Europe and the American continent [12]. When I look at my results, I see that left ventricular outflow tract anomalies are more common than right ventricular outflow tract anomalies.

When we look at the gender distribution in general, different results have been reported in various studies. In a study carried out at the newborn critical care unit of Çukurova University, 54.3% of babies with congenital heart disease were reported to be male [14]. In a study from China, it was reported that girls had a higher rate of all congenital heart diseases, but critical congenital heart anomalies were more common in boys [15]. In another study reported from Boston Children's Hospital, it was stated that congenital heart diseases were more common in boys with a rate of 64%, ASD and PDA were more common in girls, and anomalies such as tetralogy of Fallot was more common in boys [16]. In Al-Batool teaching hospital, I have seen that males have a higher rate of all congenital anomalies, but diseases such as VSD ,TOF are more common in girls.

Early cardiological assessment is recommended because of the neonatal period's rapid hemodynamic alterations is very important in patients in whom early

diagnosis and treatment are suspected. In Al-Batool teaching hospital, cyanosis is the most frequent cause of examination for infants admitted to the intensive care unit and diagnosed with cyanotic cardiac disease.. In acyanotic patients, cardiological evaluation was performed mostly due to murmur and tachypnea.

Congenital heart diseases are an important health problem. We can reduce morbidity and mortality with early diagnosis and treatment in the neonatal period. In our hospital, diseases such as cyanotic heart diseases, which need to be diagnosed at an early stage, are diagnosed at an early stage and surgical treatment is planned.

The main limitations for the study was the small size of the sample, and that we collected the data from only Al-Batool Teaching Hospital.

Conclusion and recommendation

This study concluded that congenital heart diseases are an important health problem. We can reduce morbidity and mortality with early diagnosis and treatment in the neonatal period. In our hospital, diseases such as cyanotic heart diseases, which need to be diagnosed at an early stage, and surgical treatment is planned. Congenital cardiac problems represent almost one-third of all congenital abnormalities, making them a significant health concern during the neonatal period. For these patients, an early cardiac examination is crucial to the diagnosis and course of treatment in these patients.