Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 85.10

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Prevalence and Clinical Characteristics of Congenital Heart Diseases in children of Khorezm region of The Republic of Uzbekistan

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ABSTRACT:
Currently, congenital pathology of the heart and great vessels is becoming increasingly important, which is the root cause of early disability and death of children, especially the first year of life. The article presents the results of a retrospective analysis of outpatient records of 64 children born with congenital heart defects for the period 2019-2020. in the Khorezm region of the Republic of Uzbekistan. The most common heart defect in children is the ventricular septal defect. The highest frequency of congenital malformations was registered in Khozarasp (21.9%) and Yangiarik (18.8%) districts, the lowest in Yangibazar district (1.6%) of Khorezm region. Complicated obstetric history of mothers of children born with congenital heart defects, as well as acute viral diseases in the first trimester of pregnancy and laboratory confirmed carriage of high Ig G titers to such TORCH infections as herpes, toxoplasmosis and cytomegalovirus, probably influenced the formation of congenital heart defects in children.
Key words: congenital heart defects, newborns

Received: 4 January 2021 Accepted: 8 February, 2021

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This article may be cited as: Agzamova SA, Babadjanova FR, Marsovna KG. Prevalence and Clinical Characteristics of Congenital Heart Diseases in children of Khorezm region of The Republic of Uzbekistan. J Adv Med Dent Scie Res 2021;9(4):63-67.

INTRODUCTION

Congenital malformations are the most common pathology in newborns, of which a third are congenital heart defects. According to a large number of researchers, congenital heart defects occur in 8-10 children per 1000 newborns [1]. Over the past few decades, there has been an increase in this pathology, which is associated with both exogenous (age, health status of the mother before and during pregnancy, peculiarities of the ecology of the region of residence) and endogenous factors (fetoplacental insufficiency, intrauterine growth retardation, chromosomal mutations, viral and bacterial infections in the first trimester of pregnancy, etc.) [2]. The study of the frequency of occurrence, the type of congenital heart defects, as well as the risk factors for their development can be the basis for the development of treatment and prophylactic programs in order to reduce this pathology in the region.

Purpose of the study. Study of the frequency of occurrence, type and risk factors for the development of congenital heart defects in children of the Khorezm region of the Republic of Uzbekistan for the period 2019-2020.

MATERIALS AND METHODS

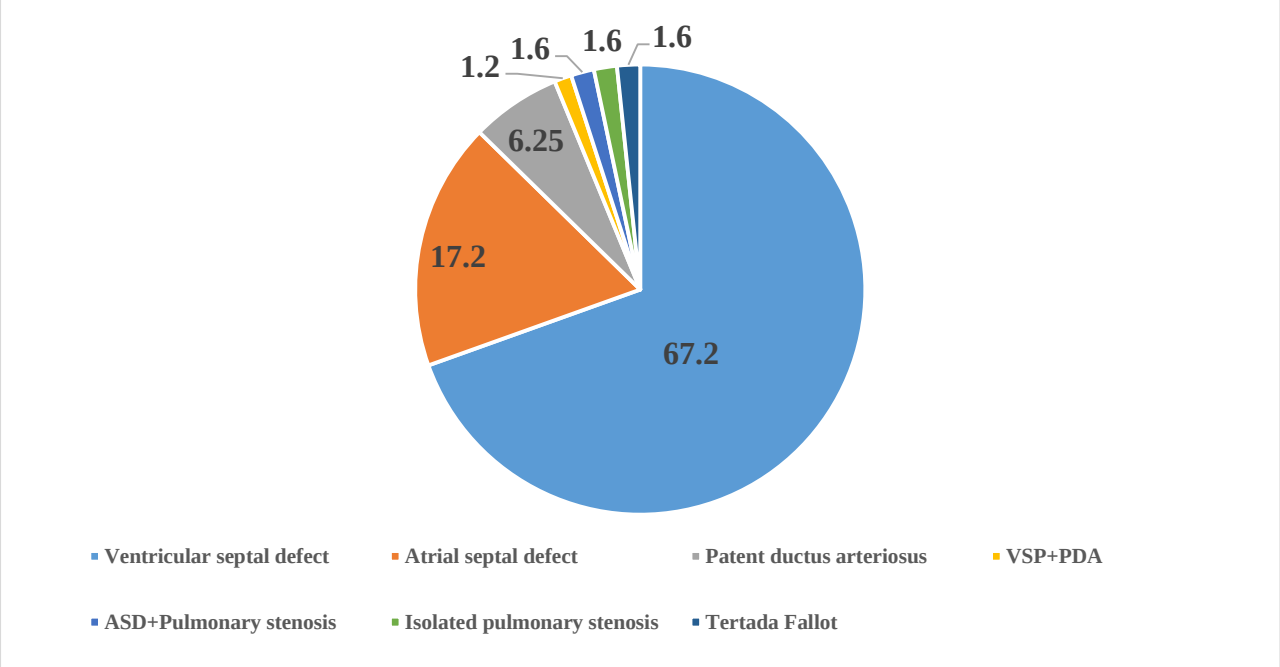
On the basis of the Khorezm Regional Multidisciplinary Children's Medical Center, a

retrospective analysis of the outpatient cards of 64 children born with congenital heart defects for the period 2019-2020 was carried out. and registered in dispensary. Of these, 57 babies were full-term (89.1%) and 7 were premature (10.9%). In the course of this study, special attention was paid to the anamnesis of mothers: complaints, occupational hazards, the presence of chronic diseases (age at the time of onset of the disease, duration of the disease, taking medications, etc.); gynecological history (past diseases, outcomes of previous pregnancies, the course of this pregnancy, gestosis during pregnancy, taking medications during this pregnancy, information about the present birth). In children, the analysis of the early neonatal period was carried out: assessment on the Apgar scale, the provision of resuscitation care in the delivery room, the presence of a syndrome of respiratory disorders and the clinic of congenital heart disease at the time of birth. We also analyzed the data of electro-and echocardiographic studies, as well as neurosonography.

RESULTS AND DISCUSSION

For the period 2019-2020 in the Khorezm region of the Republic of Uzbekistan, out of 64 newborns with congenital heart defects, 43 (67.2%) children had a ventricular septal defect. Atrial septal defect was diagnosed in 11 children (17.2%), patent ductus arteriosus - in 4 children (6.25%), combination of ventricular septal defect with patent ductus arteriosus - in 2 children (3.1%), the lowest specific gravity Among the identified defects were: atrial septal defect in combination with pulmonary artery stenosis, isolated pulmonary artery stenosis, tetralogy of Fallot and aortic valve stenosis, which occurred in an equal percentage - 1.6% (Fig. 1)

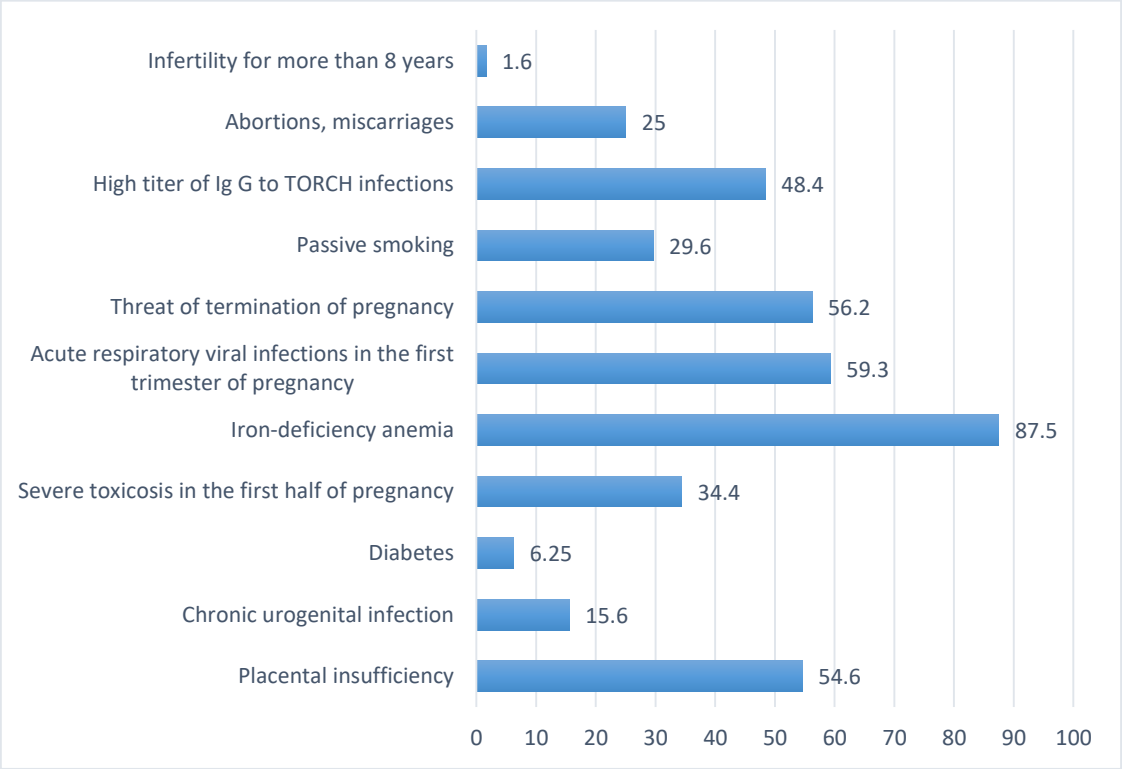
Figure 1. The incidence and form of congenital heart defects in children of the Khorezm region for 2019-2020



Among children diagnosed with congenital heart defects, girls accounted for 51.6%, boys - 48.4%. It should also be emphasized that in remote rural areas the prevalence of congenital heart defects is significantly lower than in the administrative centers. So for the period 2019-2020. In the Yangibazar district of the Khorezm region, only one child was born with a congenital heart defect - a defect of the interventricular septum, most often children with congenital heart defects were born in the Khozarasp (14 children) and Yangiarik (12 children) districts. These differences, in our opinion, are associated with the health status of the population of reproductive age, the level of perinatal screening for fetal malformations during pregnancy, demographic factors, and also with a lower level of pollutant emissions into the environment in rural areas.

During the analysis of the anamnestic data of mothers of children born with congenital heart defects, the reasons were identified that could have an impact on the formation of anatomical disorders of the structures of the heart in the prenatal period - Fig. 2.

Figure 2. Characteristics of the anamnesis of mothers of children born with congenital heart defects (%)



As follows from the data presented, a real pregnancy in the vast majority of mothers (87.5%) proceeded against the background of iron deficiency anemia, which is known to cause chronic hypoxia and fetal growth retardation syndrome. A burdened obstetric history in the form of spontaneous miscarriages and abortions was established in 25% of mothers, threats of early termination of pregnancy - in 56.2% and placental insufficiency - in 54.6% of mothers. Researchers have proven that the presence of spontaneous miscarriages in the early stages of gestation in the obstetric history increases the risk of developing such congenital heart defects as tetrad of Fallot in the fetus by 1.5 times, and atrial septal defect by 2 times [3]. It should also be noted that 59.3% of expectant mothers had acute viral diseases in the first trimester of pregnancy and 48.4% of mothers had high titers of Ig G to such TORCH infections as herpes, toxoplasmosis and cytomegalovirus according to the results of enzyme immunoassay. It was found that bacterial and viral diseases occurring with an increase in body temperature in the first trimester of pregnancy increase the risk of developing congenital heart disease in the fetus by 2-3 times, and the most common forms of congenital heart defects are interventricular septal defect, coarctation of the aorta, defects pulmonary valve [4]. It has also been proven that the presence of persistent opportunistic and viral infections of the mother is the most significant risk factor for the formation of congenital heart defects in children. In this case, herpes and cytomegalovirus infections most often lead to developmental disorders of primary and secondary interatrial septa during embryonic formation [5,6].

The authors have demonstrated the relationship between chronic urogenital infection in mothers and the risk of having children with congenital heart defects occurring with obstruction of the right parts [7]. In our study, 15.6% of mothers had pregnancies with persistent urogenital infection.

To determine the significance of the relationship between the above factors, a logistic regression analysis was carried out. The calculation of the odds ratio made it possible to identify the most significant risk factors for the formation of congenital malformations in children, presented in Table 1.

Table 1. Factors associated with the formation of congenital heart diseases in children

Indicator	Odds ratio	95% Confidence interval	p
Threat of termination of pregnancy	2,54	1,1 – 5,88	0,029
High titer of Ig G to TORCH infections	3,63	1,92 – 6,87	0,0001
Placental insufficiency	1,17	1,1 – 1,25	0,0001
Severe toxicosis in the first half of pregnancy	2,46	1,01–5,97	0,001
Chronic urogenital infection	3,21	1,84 – 6,25	0,031
Diabetes mellitus of mother	1,16	1,06–1,26	0,0001
Acute respiratory viral infections in the first trimester of pregnancy	4,37	1,35–14,11	0,0001

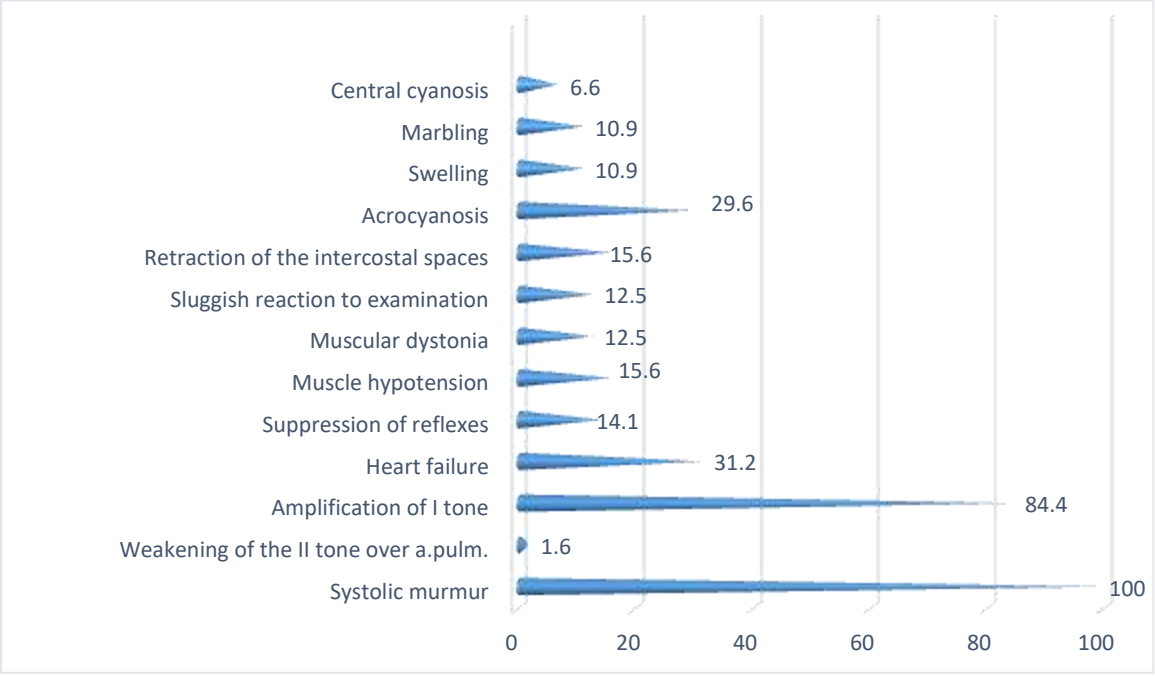
Note: p is the statistical significance of the differences

As can be seen from the presented table, the formation of anatomical disorders of the structures of the heart in the prenatal period is largely associated with the characteristics of the anamnesis of mothers of children with congenital heart defects. According to the results of logistic regression analysis, the most significant factors were: ARVI in the first trimester of pregnancy (OR 4.37; CI 1.35-14.11), a high titer of Ig G to TORCH infections (OR 3.63; CI 1.92 - 6.87), threat of termination of pregnancy (OR 2.54, CI 1.1 - 5.88).

Analysis of the early neonatal period of children with congenital heart defects showed that cardiopulmonary resuscitation in the delivery room was provided to 33 newborns (51.6%). The Apgar score in 54 children (84.3%) was ≥ 6 points, in the remaining 10 children the average Apgar score was 4-5 points, which is due to the limited adaptive capabilities of children with congenital heart defects. Diagnostics and instrumental confirmation of congenital heart disease in newborns using transthoracic echocardiographic studies were carried out during the first days after birth.

Next, we analyzed the clinical manifestations of congenital heart defects in children in the early neonatal period - Fig. 3.

Figure 3. Clinical signs of congenital heart defects in children in the early neonatal period (%)



The results obtained prove the polymorphism of the clinical manifestations of congenital heart defects, which are caused by the anatomy of the defect, the nature of hemodynamic changes and the presence of comorbid pathology.

When analyzing the electrocardiographic study carried out in the first days of the life of children, the following changes were revealed: cardiac arrhythmias in the form of sinus tachycardia were observed in 32.8% of newborns, grade I atrioventricular block was recorded in 12.5% of children; impaired conduction in the form of incomplete blockade of the right bundle branch block in 79.6% of children; direct and indirect signs of right ventricular hypertrophy - in 67.2%; left ventricular hypertrophy - in 6.3%; myocardial hypertrophy of the right atrium - 3.2% of children.

CONCLUSIONS

1. For the period 2019-2020. The most common heart defect in children in the Khorezm region of the Republic of Uzbekistan is a ventricular septal defect. The highest frequency of congenital malformations was registered in the Khozarasp (21.9%) and Yangiarik (18.8%) districts of the Khorezm region.

2. Complicated obstetric history of mothers of children born with congenital heart defects (spontaneous miscarriages in 25% of mothers, fetoplacental insufficiency in 54.6% of the threat of termination of pregnancy in 56.2%), as well as acute viral diseases in the first trimester of pregnancy in 59.3% of mothers and laboratory confirmed carriage of high titers of Ig G to TORCH infections such as herpes, toxoplasmosis and cytomegalovirus in 48.4% of mothers probably influenced the formation of congenital heart defects in children. At the same time, according to the results of logistic regression analysis, the most significant risk factors for the formation of anatomical disorders of the structures of the heart in the prenatal period were: ARVI in the first trimester of pregnancy (OR 4.37; CI 1.35-14.11), high titer of Ig G to TORCH- infections (OR 3.63; CI 1.92 - 6.87), threatened abortion (OR 2.54, CI 1.1 - 5.88).

3. The main clinical signs of congenital heart defects in children were: systolic murmur -100%, increased I tone - 84.4%, signs of heart failure 31.2% and acrocyanosis - 29.6%.

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