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**FREQUENCY OF COMPLICATIONS IN CHILDREN AFTER
SURGICAL CORRECTION OF VENTRICULAR SEPTAL
DEFECT**

Abstract. *Ventricular septal defect refers to septal defects, which in children undergo significant transformation during the process of growth and development, depending on the size and location of the defect, as well as on the duration of the disease. The radical method of treatment is surgical correction, however, in the postoperative period, complications associated with anatomical damage to the conduction system of the heart located in the interventricular septum very often develop.*

Keywords: *ventricular septal defect, heart rhythm disturbances, sinus tachycardia, sinus bradycardia, incomplete right bundle branch block, surgical correction, residual shunts.*

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ЧАСТОТА ОСЛОЖНЕНИЙ У ДЕТЕЙ ПОСЛЕ ХИРУРГИЧЕСКОЙ КОРРЕКЦИИ ДЕФЕКТА МЕЖЖЕЛУДОЧКОВОЙ ПЕРЕГОРОДКИ

***Аннотация.** Дефект межжелудочковой перегородки относится к септальным порокам, которые у детей в процессе роста и развития претерпевают значительную трансформацию в зависимости от величины и локализации дефекта, а также от продолжительности заболевания. Радикальным методом лечения является хирургическая коррекция, однако в послеоперационном периоде очень часто развиваются осложнения, связанные с анатомически повреждением проводящей системы сердца, расположенной в межжелудочковой перегородке.*

***Ключевые слова:** дефект межжелудочковой перегородки, нарушения ритма сердца, синусовая тахикардия, синусовая брадикардия, неполная блокада правой ножки пучка Гиса, хирургическая коррекция, резидуальные шунты.*

Relevance. Isolated ventricular septal defect (VSD) represents the most important medical and social problem in relation to the development of a threat to the life of a child. (2,3,6).

Small defects in the interventricular septum can occur for a long time without clinical manifestations and have a tendency to spontaneous closure, with a good subsequent prognosis. In children with a large defect, conservative treatment cannot always prevent the development of complications, and only timely correction of the defect will prevent irreversible changes, both in the parts of the heart and in the pulmonary vessels. (4,5,8)

However, as the results of recent studies show, even timely correction of VSD in 15-28% of cases in the postoperative period can be accompanied by complications such as heart rhythm disturbances, in particular those associated with impulse conduction, the frequency of which in long-term follow-up increases 2,5 times. In addition, the appearance of residual shunts at the correction sites requires repeated surgical intervention (1,2,3,7).

Thus, all of the above formed the basis of our scientific research. There are still many unresolved questions, and it remains to be hoped that scientific and clinical research conducted in this direction will be able to answer most of them.

Materials and methods of research. We examined children with corrected VSD who received treatment in the cardio-rheumatology department. When selecting children, we obtained parental consent to participate in the clinical study. The study program did not include children in whom VSD was part of complex multicomponent defects, combined and was not part of genetic syndromes. The scope of our research included 45 children who received one-stage surgical correction at different age periods: the group of children with an early postoperative period included 32 children and those with late surgical

correction – 13 children. Information about the health status of children before admission to the hospital was obtained during a conversation with parents.

Clinical examination of all children was carried out according to generally accepted standards, and instrumental examination included: ECG in 12 standard leads and EchoCG with assessment of intracardiac hemodynamics.

Results. The age of children after surgical correction of VSD is represented by a wide age range from 1 year to 16 years. The most numerous groups were children from 4 to 6 years old (32%), 11-16 years old (32%) and from 1 to 3 years old (18%). When analyzing gender, there were slightly more boys (54%) than girls (46%).

According to our results, the main group consisted of children who received radical surgical correction in the period of early (29%) and preschool age (24,4%). We classified children whose defect correction occurred in the older age group (46,6%) as the most unfavorable time to receive surgical treatment.

We assessed the state of the heart rhythm, according to ECG data, and the nature of cavitory disorders of the heart chambers according to echocardiography in children in the early and late stages after surgical treatment. We included 32 children in the group of children with an early postoperative period, with a period of surgical correction of 1-3 years.

Table 1. ECG changes in children with the early postoperative period (n=32)

ECG symptoms	Abs	%
Sinus rhythm	32	100%
Sinus tachycardia	23	71,8%
Sinus bradycardia	9	28,2%
Normal position of the ELH	3	9,4%
ELH deviation to the left	11	34,4%

ELH deviation to the right	18	56,2%
Left ventricular hypertrophy:		
1) with 1st degree AV block with complete blockade of the right leg of the Giss beam	1	3,1%
2) with with incomplete blockade of the right leg of the Giss beam	7	22%
3) with 1st degree AV block	3	9,4%
Right ventricular hypertrophy:		
1 with incomplete blockade of the right leg of the Giss beam	16	50%
2) with complete blockade of the right leg of the Giss beam	2	6,2%
Hypertrophy of the right and left ventricle:		
1) with complete blockade of the right leg of the Giss beam	2	6,2%
2) with 1st degree AV block	1	3,1%

According to the results obtained, the predominance of sinus tachycardia indicates the influence of the sympathetic part of the autonomic nervous system, given that it has a direct impact on the adaptive abilities of the cardiovascular system in children in the early postoperative period. Despite the correction of the defect, ECG signs of right ventricular hypertrophy remained in 2/3 of the children. In 16% of children, complete blockade of the right Giss bundle branch was recorded due to traumatic effects in the IVS area, and the presence of AV block was associated with surgical manipulation around the atrioventricular node.

According to echocardiography, 3 children (9.4%) showed dilatation of the right side, which was apparently due to the presence of a residual shunt measuring 2-3 mm.

In the group of children with long-term results, we included 13 patients with a postoperative period of more than 5 years. The results of instrumental assessment of the state of the cardiovascular system are presented in Table 2.

Table 2. ECG changes in children with a long-term postoperative period (n=13)

ECG symptoms	Abs	%
Sinus rhythm	13	100%
Sinus tachycardia	6	46%
Sinus bradycardia	2	15,3%
Age-related heart rate	5	38,7%
Vertical position of the ELH	3	23%
ELH deviation to the right	10	77%
Right ventricular hypertrophy:		
1) with incomplete blockade of the right leg of the Giss beam	9	69,4%
2) with complete blockade of the right leg of the Giss beam	4	30,6%

We associated the predominance of automatism disorders in the form of tachycardia and bradycardia in this group of children with disorders of autonomic regulation of heart rhythm. Complications in the long term after surgical treatment are of concern, in the form of preserved hypertrophy of the right ventricle, with impaired impulse conduction in the form of incomplete and complete blockade of the right leg of the Giss bundle on the ECG and a different degree of dilation of the right ventricle in all children. A negative complication of the long-term result of surgical correction was the visualization in 2 children of a large residual shunt, 3 mm in size, requiring repeated surgical intervention.

Thus, hemodynamic disorders in children who received surgical treatment are associated with persistent disturbances in heart rhythm due to trauma to the

conduction system. An unfavorable complication of the postoperative period, regardless of the timing of surgical correction, was the appearance of residual shunts requiring additional surgical intervention.

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