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## TERMS OF FUNCTIONAL CLOSING OF AN ARTERIAL CHANNEL AT NEWBORN WITH CONGENITAL HEART DISEASES IN THE REPUBLIC SAKHA (YAKUTIA)

### ABSTRACT

In the article results of closing of the functioning arterial channel at newborns with congenital heart diseases in the Republic Sakha (Yakutia) are presented. For the purpose of studying of functional closing of an arterial channel at newborns with congenital heart diseases in the Republic of Sakha (Yakutia) 162 medical records are analyzed. Standard anthropometrical parameters, gestation term, ultrasonographies are considered. A retrospective assessment of a number of anamnestic factors on the part of parents was also conducted. We did not reveal statistically reliable distinction among such indicator as age of the father, gestation term, body weight and length of a body at the birth. Also statistically not confirmed results of median values of the functioning arterial channels are received. Statistically not confirmed indicators of association of a factor of presence of congenital heart disease at mother in group of children with the functioning arterial channel were received. As a result of a research possible terms of closing of the functioning arterial channel at newborns are established.

**Keywords:** patent ductus arteriosus (PDA), congenital heart disease, functioning arterial channel, newborns.

**Introduction.** Patent ductus arteriosus (PDA) is a vessel, connecting aorta and a pulmonary artery, kept structure, normal for a foetus, after the expiration of its closing. PDA is the most widespread defects: according to clinical data, frequency is it 10-18% of all congenital heart diseases. Existence of the open arterial channel at which its functioning is followed by noticeable violations of the central and regional hemodynamics can be designated by the term of a hemodynamic the significant functional arterial channel. Probability of its long functioning of subjects is more, than less gestational age of the child, his body weight and then serious condition of the newborn. According to Razumovsky A.Y., by results of a Doppler echocardiography, at the full-term children in the first day of life the arterial channel was completely fallen down in 50% of cases, in 48 hours – 90%, and by 96 hours of the life – it was not defined. At the body weight equal of 1500 up to 2000 grams, to this age the PDA remains at 7% of children, at the body weight from 1000 to 1500 gram of 21% and less than 1200 grams, demanding intensive therapy, the channel remains open in 85% of cases. According to some information, regardless of gestational age, the medical and obstetrical center complicates 35% of long artificial ventilation of lungs at newborns.

Terms of functional closing of an arterial channel at newborns with congenital heart diseases are insufficiently studied in the Republic Sakha (Yakutia). This research was conducted for the first time.

**Research objective.** To study possible terms of PDA at newborns with congenital heart diseases in the Republic

Sakha (Yakutia) according to repeated research.

**Materials and methods.** This research was conducted on the basis of Republican hospital №1-National center of Medicine. The database was made on the basis of results of the analysis of 162 medical records. They were filled within two periods: 2001-2003 years and 2013-2015 years. Congenital heart diseases were registered according to nomenclature headings Q20-Q28 of International classification of diseases-10.

All newborn took measurement of growth and body weight, ultrasonography, echocardiography with a Doppler for the purpose of assessment of anatomical structure, function of heart and canal vascular. Functioning of an arterial channel was determined according to color Doppler by criteria of identification of an additional stream in a vascular projection – trunk of a pulmonary artery. By results of ultrasonography were allocated two groups: 1) group without additional channel in a projection of a trunk of a pulmonary artery – not functioning arterial channel; 2) group, with the revealed systolic-diastolic or systolic dumping into projections of a pulmonary artery.

The retrospective assessment of a number of the anamnestic factors was carried out from parents: age of parents at the time of the child's birth with congenital heart diseases, gestation term at the birth, the weight and length of a body. The age of parents of the newborns included in a sample was: mothers – from 17 up to 40 years, father – from 17 to 48 years.

Gestation term at the time of the birth of children with congenital heart diseases

was from 25 week to 41 weeks of pregnancy. Body weight at the birth was: minimum value – 564 gram, maximum – 4500 gram. Body length at the birth was: the minimum value – 30 gram, maximum – 58 gram.

When carrying out statistical processing of the database the  $\chi^2$ -criterion and Mann-Whitneys U-criterion were used.

### Results and discussion

We carried out statistical processing of cases of repeated researches on an occasion of congenital heart diseases among newborns. Among all selection of repeated researches (162 cases) it is revealed that at 62 cases of congenital heart diseases additional dumping in a trunk of a pulmonary artery at the first and repeated surveys was not revealed, closing of a channel happened at 24 children, at 76 dumping of blood through an arterial channel remained. Among cases of the PDA examined in dynamics (n=100) reduction of dumping of blood on the functioning arterial channel in dynamics occurred in 34% of cases, increase in dumping of blood on the functioning arterial channel is revealed in 34% of cases, closing of an arterial channel happened at 24% of cases, at 4% of the examined cases dynamics is not revealed. The group of nonfunctioning arterial channels made 53,1%, the group of the PDA made 46,9%. The minimum quantity of day at repeated ultrasonography was 2 days, maximum – 82 day. Results are presented in table 1.

According to the data provided in Table 1 statistically not confirmed result of median values of closing of the PDA are received. In 50% of cases of the closed arterial channels dumping of blood in not

revealed in the period from 16,5 days to 35 days, in 25% of cases of signs of functioning of a channel it was not revealed from 2 to 16,5 days and with 35 more than a day. Median values of closing of the functioning arterial channel at a repeated research were 25,5 days. Median values of reduction of dumping of blood on the PDA – 22 day, median values of increase in blood – 21 day.

Statistical processing of maternal was carried out. Results are presented in Table 2.

#### Deduction:

We did not reveal statistically reliable distinction among such indicator as age of the father, gestation term, body weight and length of a body at the birth. It is revealed that median values of age mother among the PDA was slightly more senior (26 years), than in group of nonfunctioning.

Statistically not confirmed results of median values of the PDA are received. In 50% of cases of the closed arterial channels dumping of blood is not revealed during the period from 16,5 to 35 days. Median values of closing of arterial channels at a repeated research were 25,5 days.

Statistically not confirmed indicators of association of a factor of presence of congenital heart disease at mother in group of children with the PDA were received.

**Conclusion:** By results of the carried-out statistical analysis possible terms of closing of the PDA at newborns were revealed.

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**Table 1**  
Dynamics of dumping of blood of arterial channels

Percentile	Dynamics of dumping of blood of arterial channels (days)					p=
	0 (n=62)	1(n=34)	2(n=33)	3 (n=24)	4 (n=9)	
25	15.5	17.75	14.0	16.5	15.0	0.168
50	23.0	22.0	21.0	25.5	20.0	0.168
75	30.0	29.25	24.0	35.0	30.5	0.168

Note: 0 – signs of the PDA at the first and repeated research are not revealed; 1 – reduction of dumping of blood at a repeated research (step-0,1sm); 2 – increase in dumping of blood at a repeated research (step-0,1sm); 3 – dumping of blood at a repeated research is not revealed, closing of the PDA; 4 – lack of dynamics of the amount of dumping of blood at the first and repeated research.

**Table 2**

The indicators influencing groups of arterial channels

Indicator	1)		2)		P=
	n	Me (Q1; Q3)	n	Me (Q1; Q3)	
Age of mother, years,	86	23 (23; 33,25)	75	26 (22; 31)	0.049
Age of father, years	75	29 (25; 36)	68	28,5 (25; 35,5)	0.261
Week of gestation	86	38 (36; 40)	76	39 (36; 40)	0.641
Weight (g)	86	2975,00 (2237,50; 3482,50)	76	3215,00 (2278,75; 3567,50)	0.360
Length (sm)	85	50 (46,5; 52)	75	51 (48; 53)	0.135

Note: p – the reached significance value of distinctions when comparing group with use of criterion of Kraskell-Willice.

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