



**THE ANALYSIS OF STRUCTURE OF CHD AMONG NEWBORNS OF RS(Y)
ACCORDING TO DATA IN 2002-2004 AND 2011-2013**

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ABSTRACT

Growth of registration of CD, including CHD, in recent years, and a tendency to increase in difficult CHD and the critical CHD demanding the high-tech cardiac help in the period of a neonatality and at infancy in the Russian Federation, the leading role of CHD when forming invalidization among children, formed the basis for carrying out the comparative analysis of frequency and structure of congenital heart diseases and large vessels among newborn children in RS (Y) in 2002-2004 and 2011-2013. Research was conducted on the basis of the Perinatal Center State Budgetary Institution RS (Y) RH№1 NCM among live-born newborns. CHD were registered according to the nomenclature headings Q20-Q28 (ICD10). The indicator of frequency was made on 1.000, the live born. According to research growth of frequency of CHD is observed among newborns in comparison with 2002-2004 by 4.7 times.

Keywords: the congenital heart diseases (CHD), congenital anomalies of development of the large vessels, difficult CHD, CHD frequency in RS (Y), CHD structure in RS (Y).

INTRODUCTION

In structure of children's incidence, disability and infantile mortality congenital developmental anomalies, (CD) which meet at 4,0-6,0% of newborns are of all great importance, making more than 20,0% in structure of infantile mortality [1,4]. In structure of congenital developmental anomalies the congenital heart diseases (CHD) and large vessels are high on the list (22% of all CD) and their frequency of birth rate worldwide makes 8-14 cases on 1000 newborns [2]. Frequency of occurrence of CHD among the live-born makes 0.7 to 1000 newborns. In 40% of cases of CHD is the reason of perinatal losses and in 60% of death on the first year of life [5,9]. Birth rate of children with heart diseases makes in the Russian Federation from 3.2 to 8.0 to 1000 newborns and tends to growth [6]. The researchers conducted in the USA and Great Britain, showed that at a natural current of CHD by the end of the 1st year more than 70% of children die, in North America this pathology is the cause of death of 37% of babies, and



in Western Europe – 45% [3,10]. Actuality of this problem is caused not only by their big prevalence, but a tendency to increase in proportion of heavier patients, combined CHD with a frequent failure on the first year of life [7] these data are provided without CHD among dead born and abortions.

Population of RS(Y) according to Goskomstat of Russia makes 955 580 people (2013) [8]. Distinctive feature of Yakutia from other regions of Russia - extremely low population density at the huge territory occupied by the republic. It makes — 0.3 people/sq.km (2013). It is one of the lowest among subjects of the Russian Federation. Republic of Sakha (Y) (RS(Y)) steadily is a part of the few regions of Russia in which the natural increase of the population remains. Natural reproduction of the population grew in 2012 in comparison with 2010 by 7,8% (2012 - 8,3 to 1000 population; 2011 – 8,3; 2010-7,7). (to data of Territorial body of Federal State Statistics Service (TO FSGS)). According to TO FSGS, during 2002-2004 the average value of birth rate of urban and country people on RS (Y) made 15,0 to 1.000 newborns; average value infant mortality 14,0 to 1.000. During 2010-2012 the city and country people made an average value of birth rate 17,2; in comparison with 2002-2004, it grew by 2,0 to 1.000. The average value of infantile mortality taking into account new criteria 1) made 7,7 to 1.000 been born the live; in comparison for 2002-2004, an average value of infantile mortality decreased almost by 2 times (by 1,8).

In structure of the reasons of perinatal mortality the specific weight of congenital anomalies of development – by 1,5 times significantly increased: 2012 - 23,9% (56 cases), 2011 - 15,7% (22 cases), 2010 - 16,3% (22 cases). Leaders in structure of congenital developmental anomalies are multiple developmental anomalies (33,9%), heart diseases and the central nervous system (21,4% -each). / the Report of the minister of HS about states of health of the population of RS (Y) 2012/. The condition of disability along with demographic indicators is one of the main characteristics of public health. The main reasons for an invalidization of children in RS (Y) are the congenital developmental anomalies (CDA) of which 48,3% make anomalies of system of blood circulation (the Report of the minister of HS about states of health of the population of RS (Y) 2012). According to the existing order MH Russian Federation No. 268 of September 10, 1998 "About monitoring of congenital developmental anomalies at children" and to No. 392 order MH Russian Federation of 02.11.1999. among all heart diseases and large vessels of obligatory registration and to the account only congenital anomalies of large arteries and "a syndrome of a left-side hypoplasia of heart" are subject, thus at the moment in RS (Y) there is no uniform full monitoring of CHD in nosological forms, including among newborns though primary incidence of CD of bodies of blood circulation, is generally formed by incidence of CHD among newborns. Thus, insufficiently full data on frequency and CHD structure among



newborns in RS (Y), their essential contribution in structure of perinatal and infantile mortality; growth of registration of CHD, including CHD, in recent years, and a tendency to increase in difficult CHD and the critical CHD demanding the high-tech cardiac help in the period of a neonatality and at infancy in the Russian Federation, the leading role of CHD when forming invalidization among children, formed the basis for carrying out the comparative analysis of frequency and structure of congenital heart diseases and large vessels at newborn children in RS (Y) for 2002-2004 and 2011-2013.

Work purpose: to study and carry out the comparative analysis of structure and frequency of the congenital heart diseases (CHD) and large vessels among newborns in RS (Y) according to the Perinatal Center State Budgetary Institution in RS (Y) RH No. 1 NCM for the periods 2002-2004 and 2011-2013.

MATERIALS AND RESEARCH METHODS

Research was conducted on the basis of the Perinatal Center State Budgetary Institution in RS (Y) RH№1 NCM among live-born newborns: department of pathology of newborns (DPN), department of nursing of the prematurely born (DNPB), infectious department of newborns (IDN). On time research is conditionally divided into 2 periods: 2002-2004 – the period A and 2011-2013– period B CHD were registered according to the nomenclature headings Q20-Q28 "Congenital anomalies of system of blood circulation" of the XVII class "Congenital Anomalies [Developmental Anomalies], deformations and Chromosomal Violations" of the International statistical classification of diseases and the problems connected with health (the 10th revision) (ICD10) as primary documentation are used: stationary magazines (form No. 010u np MH USSR 04.10.1980 No. 1030); statistical cards of the inpatient (form No. 066/u-02 np MH Russian Federation 30.12.2002 No. 413). Nosological diagnoses of CHD are confirmed with data of an echocardiography of heart with a dopplerography of vessels (EHO-KG with DG), electrocardiograms (ECG), roentgenograms, computer tomograms in angio regime, angiographic researches. The indicator of frequency counted on 1.000, been born the live.

RESULTS AND DISCUSSION

The comparative analysis of structure of CHD according to the Perinatal center State Budgetary Institution RS (Y) RH№1 NCM) for 2002-2004 (the period A) and 2011-2013 (the period B) is carried out. For 2002-2004 (the period A) the analysis of 186 clinical records of newborns with "CHD" diagnoses was carried out. In total it is processed: in OPN 70, in DNPB 56, in IDN 60 stories of diseases of children. For 2011-2013 (the period B) all 899 cases of CHD, among the newborns who have been born alive are registered. In total it is processed: in OPN 433, in DNPB 266, in IDN of 200 statistical cards. In total 1.085 stationary cards were processed. The comparative analysis of frequency of CHD for 2002-2004 and 2011-2013 was



carried out. According to our data, CHD frequency among newborns made 0,19 to 1.000 live-born during 2002-2004 (the period A) and 0,9 to 1.000 live-born during 2011-2013 (the period B); т.о. growth of frequency of CHD among newborns in comparison with the period A by 4,7 times is observed. Results of research are presented in table.№1

Table 1

Comparative characteristic of the CHD nosological forms in 2002-2004 and 2011-2013

Form CHD ICD 10	A (2002-2004) - 186		B (2011-2013) - 899		Comparison with A	
	number/fr equency	%	number/fr equency	%	frequenc y	%
Q21.0-21.1, Q21.8 VSD, ASD, OOW +.FAC, VSPA	137/ 0,14	73,66	779/0,78	86,65	+ by 5,6	+ to 12,99
Q25.0 OAC	8/0,008	4,30	51/0,05	5,67	+ by 6,25	+ to 1,37
Q25.1 Ao Ko	0		21/0,02	2,34		
Q22.1 VSPA	12/ 0,01	6,45	В сочетании Q21.0- 21.8			
Q22.0 APA	2/0,002	1,08	7/0,007	0,78	+ by 3,5	
Q21.3 T. Fallo	4/0,004.	2,15	10/0,01	1,11	+ by 2,5	- to 1,04
Q21.0 AVC	1/0,001	0,54	10/0,01	1,11	+ by 10 p	+by 2 p
Q26.2-26.3 TADPV, PADPV	1/5/0,006	0,54/2 ,69/3, 23	3/1/0,004	0,33/0, 11/0,44		
Q25. Stenosis of LA	4/0,004	2,15	4/0,004	0,45	0	- to 1,7
Q20.3 TMV	2/0,002	1,08	4/0,004	0,45	+ by 2p	- to 0,63
Q20.1 DOMV from RV	1/0,001	0,54	2/0,002	0, 22	+by 2p	0
Q20.4 SV	0		1/0.001	0,11		
Q22.8 Displasia of the TV Q22.5 Ebstein's disease	1/0,001	0,54	4/1/0,005	0,45/0, 11	+ by 5 p	0
Q22.6 Atresia of the TV	1/0,001	0,54	1/0,001	0,11	0	0
Q20.0 GAT	2/0,002	1,08	0			
Q23.4 Atresia of the MV	4/0,004	2,15	0			



Q24.5 Anomaly of develop. of CA	1/0,001	0,54	0			
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According to the obtained data (table1) among all revealed CHD the leading place on frequency was taken by group of the septal defects/ ventricular septal defect (VSD), atrial septal defect (ASD), the open oval window (OOW) / in combination with the functioning an arterial channel (FAC), the valvate stenosis of a pulmonary trunk (VSPA) which made 0.14 in A and 0.78 period in the period of B. In comparison with the period A group frequency of the septal defects in combination with FAC, VSPA grew with 0.14 to 0.78, i.e. by 5,6 times. Defects of large vessels / the isolated open arterial channel (OAC), Coarctation of the aorta, or aortic narrowing (abbreviated as CoA^I), the abnormal drainage of pulmonary veins (ADPV), a stenosis of a pulmonary artery (LA stenosis) / came with a frequency of 0,02 and 0,08 in the periods A and B, from them CD of large arteries – 0,008 and 0,07, CD of large arteries (PDA, CoA) unambiguously prevail in the period of B. In structure of CD of large arteries (PDA, CoA, LA stenosis) in both periods isolated PDA most often met – 8/0,008 and 51/0,05, the increase in frequency of PDA is probably connected with diagnostics improvement. CoA frequency made 0.02 (21cases), all cases are diagnosed in the period of B. The received results can be explained with improvement of beam methods of diagnostics CoA since this pathology in 100% of cases is confirmed with results of RCT with a contrast angio research. The stenosis of LA met identical frequency of 0,004. In structure of CD of large veins of ADLV met with frequency of 0,006 (total / 1 and partial / 5) in A period and 0,004 (total / 3 and partial / 1); but for the period B total ADLV (ADPV) - 3 cases that can speak about "weighting" of this CD and about improvement X-ray contrast methods of diagnostics. Frequency of a tetrad of Fallo (T. Fallo) made 0,004 (4 cases) during A and 0.01 (10 cases) for the period B; the increase in frequency of T. Fallo by 2,5 times is observed. More often the share of anomaly of Ebstein became registered– 4 cases and other congenital anomalies of the tricuspidal valve (congenital anom. TV) – 1 case that made 0,005 in comparison with the period A - 0,001; growth of frequency of this pathology by 5 times is observed. According to our data, the increase in frequency of the revealed general atrioventricular channel (G. FVC) by 10 times (0,01 period B) in comparison with the period A (0,001) is observed. Frequency of valvate CHD decreased: with 14/0,01 to 8/0,008, at the expense of isolated VSPA (12 cases in the period A, in the period B weren't registered). The atresia of the tricuspidal valve (atresia of the TV) as a part of a syndrome of a hypoplasia of the right compartments of heart came to light equally (1 case - each), it is observed increase in frequency of an atresia of the LA valve (APA) - 7/0,007 with the period A – 2/0,002. Frequency of the transposition of the main vessels (TMV) made 0,002 (the period A) and 0,004 (the period



B). Frequency of a double outlet of the main vessels from the right ventricle (DOMV from RV) 0,001 (the period A) and 0,002 (the period B). In the period A the syndrome of a hypoplasia of the left compartments of heart with an atresia of the mitral valve (atresia of the MV) met the frequency of 0,004 (4 cases), in the period In this CHD wasn't observed. As in the period A 1 case (frequency 0,001) anomalies of development of coronary arteries (anomaly of develop. of CA): coronary-pulmonary fistula. In total difficult and combined CHD were registered with a frequency of 0,03 (32 cases) in A and 0,04 period (42 cases) in the period B.

The comparative analysis of structure of CHD was carried out in periods 2002-2004 and 2011-2013. According to the presented data table.№1 in CHD structure traditionally leading place was taken by a group share of the septal defects (VSD, ASD, VSD+ASD, open company), in combination with FAC, VSPA which made 73,66% (137/frequency 0,14) in the period A and 86,65% (779/frequency 0,78) in the period B. In comparison with the period A the share of the septal defects in combination with FAC in structure of revealed CHD grew from 73,66% to 86.65% (for 12,99%). Defects of large vessels (isolated PDA, CoA, LA, ADLV stenosis) made only 9,68% (18) and 8,90% (80) of all revealed cases of CHD. In CD group of large vessels CD of large arteries in the period In – 95% (76 cases unambiguously prevail: PDA, CoA and LA stenosis); whereas in the period A it made 66,66% (12 cases: PDA, LA stenosis). In structure of CD of large arteries in the period A first place was won by isolated PDA – 8 of 12 cases (66,66%), CoA didn't happen, LA stenosis - 4 cases from 12 (33,34%). In the period B as isolated PDA – 51 of 76 cases (67,10%) most often met, on the second place met CoA – 21 cases from 76 (27,63%), on the third place LA stenosis - 4 cases from 76 (5,26%). Received results: CoA identification which occupied one of leading places in structure of CD of large arteries in the period B, can be explained with considerable improvement of quality of diagnostics, including active use of beam, X-ray contrast methods of research in recent years. CHD of large veins (all cases-ADLV): in ADLV structure in the period A unambiguously partial ADLV of 83,33% (5 of 6 cases) whereas in the period B the increase in a share of total ADLV – 75% (3 of 4 cases) was observed, and a share partial prevailed made 25% that can speak about "weighting" of this CD, and as improvement of X-ray contrast methods of diagnostics. T. Fallo's share made 2,15% (4) during A (186) and 1,11% (10) during B (10) from all revealed CHD (899). Some reduction of a share of T. Fallo, for 1,04% is observed. In structure of all CHD in recent years, but increase in its frequency (0,004 and 0,01). The share of anomaly of Ebstein and other congenital anomalies of TV made 0,54% (1 case) in the period A and 0,56% (5) in the period B. Share of groups of valvate CHD (VSPA, APA): in the period A made 7,53%-14 cases (VSPA-12, a LA valve atresia - 2); in the period B made 0,78%-7 cases, all cases were made by an atresia of the LA valve isolated by VSPA didn't come to light. Reduction of a share of valvate



CHD by 7%, twice, in the period B, at the expense of VSPA was observed. 0,54% fell to the share of G. AVC (1) in the period A and 1,11% (10) of all cases of CHD in the period B, e.i. the increase in a share of AVK in structure of all CHD twice in the last years (and increase in frequency by 10 times) was observed. The share of TMV made 1,08% (2) in the period A and 0,45% (4) in the period of B. Difficult defects made 12,37% (23 cases) of CHD total in the period A and 4,67% (46) of all quantity of revealed CHD in the period of B According to our data in structure of difficult defects in nosological forms the increase in a share of such CHD was observed as T. Fallo (for 4,55%), APA (for 6,52%), T.ADPV (for 2,17%) in the period of 2011-2013, in comparison with 2002-2004. The share of G.AVC in structure of difficult defects increased by 5 times (!), a share of anomaly of Ebstein twice in the period of 2011-2013, in comparison with 2002-2004. TMV share (8,7%) and DOMV from RV (4,35%) remained without changes. Reduction of a share of a stenosis of LA in structure of difficult CHD-for 8,69% in recent years, in comparison with 2002-2004 was observed. Other defects (the SV, the Atresia of the TV (syndrome of a hypoplasia of the right compartments), the Atresia of the MV (syndrome of a hypoplasia of the left compartments) were registered 1 time in 3 years. The lethality in the period A made 3,22% (6 cases) of total number of cases of CHD and was generally formed due to difficult defects of 66,67% (4 cases) from all cases of a lethality (6). The lethality in the period made 1,22% (11 cases), from total of children with CHD (899) and was formed due to difficult defects (5), obstructive damages of an aorta (4), a combination of the septal defects with Edwards's syndrome (2).

CONCLUSIONS

According to our data, CHD frequency among newborns made 0.19 (186) to 1.000 live-born during A and 0,9 (899) on 1.000 live-born for the period B; i.e. growth of frequency of CHD among newborns in comparison with the period A by 4,7 times is observed. In CHD structure the leading place was taken by a group of the septal defects (VSD, ASD, VSD+ASD, OOW), in combination with FAC, VSPA which made 73,66% (137/frequency 0,14) in the period A and 86,65% (779/frequency 0,78) in the period B. In comparison with the period A the share of the septal defects in combination with FAC in structure of revealed CHD grew from 73,66% to 86.65% (for 12,99%), and on frequency with 0,14 to 0,78, i.e. by 5,6 times.

Defects of large vessels: isolated PDA, CoA, ADLV, a stenosis of LA came with a frequency of 0,02 (9,68% of all CHD) and 0,08 (8,90% of all CHD) in the periods A and B, from them CD of large arteries – 0,008 and 0,07, CD of large arteries (PDA, CoA) unambiguously prevail in the period of B. Difficult and combined CHD were registered with a frequency of 0,02 (23 cases) in A and 0,05 period (46 cases) in B period and made 12,37% in the period A and



4,67% in the period B from all quantity of revealed CHD. In structure of difficult defects in nosological forms, in comparison with the period A, the increase in a share and frequency of such CHD as it is APA (for 6,52%, frequencies in 3,5 t), by T. Fallo (for 4,55%, frequencies in 2.5 t), T. ADPV (for 2,17%, frequencies in 3 t), G.AVC (shares by 5 times, frequencies by 10 times), Ebstein's anomalies (shares twice, frequencies in 4 t). TMV share: 8,7% and DOMV from RV: 4,35% remained without changes for both periods, frequency increased twice in comparison with A. Reduction of a share of a stenosis of LA in structure of difficult CHD - by 8,69% was observed, frequency remained without changes in recent years, in comparison with the period A other defects (the SV, atresia of the TV, atresia of the MV) were registered 1 time in 3 years. Lethality reduction from 3.22% of the period A to 1,22% of the period (for 2%) was observed.



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