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Blood Pressure and Obesity among Rural Indigenous Population of Yakutia

V.I. Fedorova, T.M. Klimova, M.E. Baltakhinova, V.G. Krivoshapkin

ABSTRACT

The frequency of hypertension and obesity in a sample of the rural indigenous population (457 people aged 20 years and older) of the Republic Sakha (Yakutia) was studied. It was found that 40% of the surveyed population had arterial hypertension. Obesity was revealed in 14% of males and 19% of females, abdominal obesity in 42 and 55%, respectively. Blood pressure level positively correlates with body mass index and the waist circumference. Information content of these indicators at identifying individuals with high risk of hypertension did not differ. The prevalence of abdominal type of obesity requires the study of its contribution to morbidity and mortality from chronic non-communicable diseases, constitutional features of a given population and the subsequent possible development of specific ethnic criteria for obesity.

Keywords: blood pressure, indigenous population, body mass index, waist circumference, obesity.

INTRODUCTION

Hypertension (HP) in the Republic of Sakha (Yakutia), as in the whole of the Russian Federation, is one of the main causes of cardiovascular diseases and their complications. According to Statistical data taken in the Republic of Sakha (Yakutia) for the period from 2000 to 2012, the prevalence of cardiovascular diseases increased from 102,7 to 256,0, including diseases associated with high blood pressure from 30,2 to 109,5 by 1000 the adult population [3]. This is due both to improved diagnosis and prevention of health, aging and the deterioration of his health.

Obesity is the major risk factor of hypertension. In the Framingham study, it was shown that the levels of systolic (SBP) and diastolic blood pressure (DBP) increased with growing body mass index, and in the follow-up period, 70% of new cases of hypertension occurred against the background of obesity [9].

In this context, the aim of the study was to examine the levels of blood pressure among indigenous rural population of Yakutia and its relationship with obesity.

MATERIALS AND METHODS

Cross-sectional epidemiological study was carried out among rural indigenous population of Yakutia (p. Berdigestjah, Gorny district). In fact 457 people aged 20 years and older (248 women and 209 men) indigenous ethnic groups of Yakutia (yakuts, evens, evenks) were examined. The average age of the population studied was $44,9 \pm 14,7$ years: women - $44,4 \pm 13,7$ years, men - $45,6 \pm 15,7$ years ($p=0,328$).

The research project approved by the local Committee for Bioethics at the Yakutsk Scientific Center complex medical problems SB RAMS (extract from the report №23 of 25/5-2010).

According to the research program double measurement of blood pressure (BP) was conducted on the right arm in a sitting position with an accuracy of 2 mm Hg. To exclude the impact of physical and emotional factors on blood pressure prior to the measurement for 5 min surveyed were in a state of rest. Taken were the average results of the two measurements of blood pressure.

Height was measured to the nearest 0,1 cm, body mass using bioimpedance analyzer «Tanita SSC 330» (Japan) - up to 0,1 kg. Waist circumference (WC) was measured in the standing position in the middle of the distance from the bottom edge of the costal arch to the iliac



crest, up to 0,1 cm; body mass index (BMI) was calculated using the formula: $BMI = \text{body weight (kg)} / \text{height (m)}^2$.

The criteria for the study:

1. Hypertension criteria were established by VNOK in 2008 [1]. The group of persons with hypertension also included people who were taking antihypertensive medications during the survey period or stop taking them within less than 2 weeks before the survey, regardless of the measured blood pressure.

2. For the criterion of overweight BMI values taken corresponding to 25,0-29,9 kg/m^2 , obesity - $\geq 30 \text{ kg/m}^2$, abdominal obesity - the IDF criteria for Asian populations (waist circumference greater than 80 inches in women and 90 cm in men).

Statistical analysis of the material was performed using the package IBM SPSS Statistics 19. A statistical test criterion was applied to verify the correct distribution of quantitative traits using the Kolmogorov-Smirnov adjusted Lilliefors and Shapiro-Wilks test in each subgroup analysis, compared to the sub-groups - the test for equality of variances. During scanning it was decided to use the comparison of independent groups nonparametric Mann-Whitney and Kruskal-Wallis tests. Comparison of groups was carried out by attributes using the four-field tables with calculation criterion χ^2 . Descriptive statistics is presented as the median (Me) and interquartile distribution (Q25-Q75). The critical level of significance (p) was assumed to be 5%.

RESULTS AND DISCUSSION

To characterize the distribution of blood pressure among 457 surveyed those who took antihypertensive medications (119 people) were excluded. In the study of population, and the median interquartile swings in blood pressure corresponded to the category "normal" and "high normal" (Table 1). SBP was significantly higher in men ($p=0,03$), diastolic blood pressure differences did not reach statistical significance ($p=0,07$). In both gender groups, SBP and DBP in older age groups were significantly higher than in the young subjects ($p < 0,001$). Women ages above of 40 the median waist circumference met criteria for abdominal obesity. There were no gender differences in the values of body mass index ($p=0,84$) in both groups from the age of 40 years, the median figure was in the category of "overweight."

In a comparative analysis with other northern populations, it was found that the average blood pressure and anthropometric indicators of the rural population of Yakutia, the data are similar to those of other indigenous northern territories (Alaska, Greenland, Canada, Sweden) [4, 5, 9, 10, 11, 13, 14, 16].

Table 1

25 (14%) of 177 and 28 women (20%) of the 142 men who were not taking antihypertensive medications had higher blood pressure ($p=0,149$). The frequency of hypertension including those receiving antihypertensive medications was ($n=119$), 39,5% (Table 2). Obese (body mass index) is set at 19% of women and 14% of men ($p=0,202$). Attention is drawn to the high frequency of abdominal obesity, even among young people.

Table 2

Previous studies have shown that waist circumference and body mass index are associated with an increased risk of cardiovascular diseases [2, 15].

To assess the strength and direction of the relationship of blood pressure with a waist circumference and body mass index rank was held by Spearman correlation analysis. Direct correlation between the studied variables was revealed (Table 3). Along with this, each of these features are also positively correlated with the age of the patients ($p < 0,001$). In order to mitigate the effect of age on the relationship studied partial correlation analysis (controlled variable - age)

was held. It was found that the correction does not change the direction of the age of communication, but the strength of association between these variables to some extent is due to the influence of age of patients.

Table 3

According to the results of the study it was found that the frequency of hypertension was significantly dependent on body weight category of persons surveyed (Fig. 1). For example, elevated levels of blood pressure were observed in 51% of men with a body mass index over 25 kg/m² and 37% of low and normal birth weight ($p=0,04$), in women the corresponding figures were 53 and 18%, respectively ($p<0,001$).

Fig. 1. Frequency of hypertension in different categories of body mass index (kg/m²)

Elevated blood pressure was observed in 53% of men with abdominal obesity and 36% - with a waist circumference of less than 90 cm ($p=0,07$) among women of hypertension was significantly more frequent among those with central type of obesity (51 and 19%, respectively, $p<0,001$).

Several studies have shown that the waist circumference is a more informative measure for the risk of hypertension and cardiovascular complications than BMI [6, 7]. To answer the question of which of these indicators can be used in this population to highlight the risk for hypertension, ROC-curves were constructed. It was classified as a variable passed the presence or absence of hypertension. As a result the analysis showed that the area under the curve was 0,62 for BMI in men and 0,71 in women for the waist – 0,65 and 0,73 respectively (Fig. 2). In addition, no statistically significant differences between the areas under the curves in both gender groups were found ($p>0,05$). Therefore, for a given sample values of waist circumference and BMI one observes the same information content in the allocation of risk for hypertension.

Fig. 2. ROC-curves for the identification of individuals with hypertension

CONCLUSIONS

The study showed a high incidence of hypertension among rural indigenous population of Yakutia. One of the factors contributing to the development of hypertension in this population is obese. Revealed prevalence of abdominal type of obesity requires the study of constitutional features of the above population, its contribution to morbidity and mortality from chronic non-communicable diseases, and the subsequent possible development of ethnic-specific criteria for obesity.

REFERENCES

1. Diagnostika i lechenie arterial'noj gipertenzii. Rekomendacii VNOK [Diagnosis and treatment of hypertension. VNOK Recommendations] J. Kardiovaskuljarnaja terapija i profilaktika [Cardiovascular therapy and prevention]. Moscow, 2008, Pril. 2, № 6, 32 p.
2. Drapkina O.M., Popova I.R. Rol' ozhirenija v razvitii arterial'noj gipertenzii i nealkogol'noj zhirovoj bolezni pečeni [The role of obesity in the development of hypertension and non-alcoholic fatty liver disease]. Consilium Medicum. Moscow, 2012, № 14(12), pp. 72–76.
3. Zabolevaemost' vzroslogo naselenija Respubliki Saha (Jakutija) v 2009-2012 gg.: Stat. Materialy – I ch. / GU JaRMIAC MZ RS(Ja) [The incidence of the adult population of the



- Republic of Sakha (Yakutia) in 2009-2012: Stat. Materials - I h / GU MH YARMIATS of Sakha (Yakutia)]. Yakutsk, 2012, 157 p.
4. Shestakova G.N. Sostojanie serdechno-sosudistoj i dyhatel'noj sistem u korennoogo naselenija – hanty severa Tjumenskoj oblasti: avtoref. dis. kand. med. nauk [The cardiovascular and respiratory systems of the indigenous population - Khanty north of the Tyumen region: Thesis dis... cand. med. science: 14.00.06 / G.N. Shestakova]. Tjumen', 2004, 26 p.
 5. Bjerregaard F. Borch-Johnsen and the Greenland Population Study. Obesity and central fat pattern among Greenland Inuit and a general population of Denmark (Inter99): Relationship to metabolic risk factors / F. Bjerregaard, T. Gyntelberg, K. Jorgensen // Intern. J. of Obes. – 2003. - № 27. - P. 1507–1515.
 6. Body compartment and subcutaneous adipose tissue distribution – risk factor patterns in obese subjects / C.D. Sjostrom, A.C. Hakangard, L. Lissner [et al.] // Obesity Res. – 1995. – № 3. – P. 9–22.
 7. Body fat distribution, blood pressure and hypertension: a prospective cohort study of men in the normative aging study / P. Cassano, M. Segal, P. Vokonas [et al.] // Ann. Epidemiol. – 1990. – Vol. 1. – P. 33–48.
 8. Caballero A.E. Endothelial dysfunction in obesity and insulin resistance: a road to diabetes and heart disease / A.E. Caballero // Obes. Res. - 2003. – № 11. – P. 1278 – 1289.
 9. CANHR Project Team. Metabolic Syndrome in Yup'ik Eskimos: The Center for Alaska Native Health Research (CANHR) Study / B.B. Boyer, G.V. Mohatt, R. Plaetke [et al.] // Obesity. – 2007. – Vol. 15, №11. - P. 2535-2540.
 10. Edin-Liljegren A. Risk factors for cardiovascular diseases among Swedish Sami — a controlled cohort study / A. Edin-Liljegren, S. Hassler, P. Sjolander // Int. J. Circumpolar Health. – 2004. - № 63. – P. 292–297.
 11. Impaired fasting glucose and metabolic syndrome in an indigenous Siberian population / J.J. Snodgrass, W.R. Leonard, L.A. Tarskaia [et al.] // Inter. J. of Circum. Health. – 2010. - Vol. 69, №1. – P. 87.
 12. International Diabetes Federation: IDF consensus worldwide definition of the metabolic syndrome [article online], 2006. URL: http://www.idf.org/webdata/docs/IDF_Meta_def_final.pdf (accessed 11 July 2012)].
 13. Obesity and central fat pattern among Greenland Inuit and a general population of Denmark (Inter99): Relationship to metabolic risk factors / M.E. Jørgensen, C. Glümer, P. Bjerregaard [et al.] // Inter. J. of Obesity. – 2003. - № 27. – P. 1507–1515.
 14. Prevalence of Obesity and Its Metabolic Correlates Among the Circumpolar Inuit in 3 Countries / T.K. Young, P. Bjerregaard, E. Dewailly [et al.]// Am. J. of Public Health. – 2007. - Vol 97, №4. - P. 691-695.
 15. Rosengren A. Body weight and weight gain during adult life in men in relation to coronary heart disease and mortality. A prospective population study / A. Rosengren, H. Wedel, L. Wilhelmsen // Eur. Heart J. – 1990. – Vol. 20, №4. – P. 269–277.
 16. The Influence of Basal Metabolic Rate on Blood Pressure Among Indigenous Siberians / J.J. Snodgrass, W.R. Leonard, M.V. Sorensen [et al.] // Am. J. Phys. Anthropol. – 2008. - Vol. 137, № 2. – P. 145-55.

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Table 1

Blood pressure levels* and anthropometric measures depending by sex and age (years)

Data	20-39 years old		40-59 years old		60 year and older		20 years and older	
	n	Me (Q25-Q75)	n	Me (Q25-Q75)	n	Me (Q25-Q75)	N	Me (Q25-Q75)
Women								
SBP, mm Hg	71	109 (100-111)	96	121 (110-133)	10	121 (120-124)	177	112 (106-126)
DBP, mm Hg	71	70 (62-75)	96	76 (68-83)	10	71 (68-81)	177	72 (66-80)
WC, cm	76	76 (69-86)	132	85 (78-94)	24	84 (79-89)	232	82 (74-91)
BMI (weight/height ²)	76	23 (20-28)	133	27 (23-30)	24	26 (24-26)	233	25 (22-29)
Men								
SBP, mm Hg	60	115 (110-123)	65	120 (108-137)	17	131 (114-144)	142	119 (110-131)
DBP, mm Hg	60	71 (66-80)	65	76 (70-87)	17	73 (70-81)	142	75 (68-81)
WC, cm	67	83 (76-92)	87	89 (81-97)	43	89 (82-97)	197	87 (80-96)
BMI (weight/height ²)	67	24 (21-27)	88	26 (23-29)	42	25 (23-28)	197	25 (22-28)

Note: * - among those not taking antihypertensive medications; SBP, DBP - systolic, diastolic blood pressure; WC - waist circumference, BMI - body mass index.

Table 2

The frequency of hypertension and obesity by sex and age

By age group	Hypertension		BMI ≥ 30 кг/м2		abdominal obesity	
	N	n (%)	N	n (%)	N	n (%)
Women						
20-39 years old	76	10 (13,2)	76	10 (13,2)	76	27 (35,5)
40-59 years old	136	59 (43,4)	133	33 (24,8)	132	83 (62,9)
60 year and older	27	18 (66,7)	24	1 (4,2)	24	17 (70,8)
20 years and older	239	87 (36,4)	233	44 (18,9)	232	127 (54,7)
Men						
20-39 years old	67	13 (19,4)	66	7 (10,6)	67	19 (28,4)
40-59 years old	89	40 (44,9)	88	16 (18,2)	88	44 (50,0)
60 year and older	43	32 (74,4)	43	5 (11,6)	42	20 (47,6)
20 years and older	199	85 (42,7)	197	28 (14,2)	197	83 (42,1)



Table 3
The coefficients of correlation between the level of blood pressure and anthropometric measurements

Variables	Men			Women		
	n	r	p	n	r	p
Paired correlation analysis						
SBP& age	198	0,444	<0,001	239	0,624	<0,001
DBP & age	198	0,237	0,001	239	0,414	<0,001
BMI & age	198	0,181	0,011	235	0,347	<0,001
WC & age	198	0,242	0,001	234	0,388	<0,001
SBP & BMI	193	0,304	<0,001	230	0,420	<0,001
SBP & WC	193	0,315	<0,001	229	0,430	<0,001
DBP & BMI	193	0,321	<0,001	230	0,399	<0,001
DBP & WC	193	0,318	<0,001	229	0,381	<0,001
Partial correlation analysis (controlled variable age)						
SBP & BMI	189	0,250	<0,001	226	0,237	<0,001
DBP & BMI	189	0,307	<0,001	226	0,254	<0,001
SBP & WC	189	0,249	<0,001	226	0,233	<0,001
DBP & WC	189	0,291	<0,001	226	0,226	0,001

Note: r-correlation coefficient; SBP, DBP - systolic, diastolic blood pressure; WC - waist circumference; BMI - body mass index.



HLA Antigens and Their Correlation with Lipid Metabolism Indices in Patients with Psoriasis

A.V. Nekipelova, G.B. Kalatushkina

Abstract

The article provides the authors' data on the correlation of HLA antigens with lipid indices in psoriasis patients in the Khabarovsk Krai. The study of psoriasis patients revealed the increased incidence of HLA- A 1 ($p < 0,001$); B13 ($p < 0,001$); B 17 ($p < 0.001$) and negative A28 ($p < 0.001$); B7 ($p < 0,01$); Cw 3 ($p < 0,01$); Cw 4 ($p < 0.01$).

The study shows the connection of total lipids, triglycerides and total cholesterol indices with the increased frequency of HLA-A 1 ($p < 0,001$); B13 ($p < 0,001$); B17 ($p < 0.001$) in psoriasis patients.

Keywords: psoriasis, genetic predisposition, HLA antigens, lipids (total lipids, triglycerides, total cholesterol).

Introduction. Psoriasis is one of the most common dermatoses. Its incidence among the population of different countries ranges from 0.1% to 2.8% [4, 11].

The problem of psoriasis is relevant in connection with the increased incidence of its especially severe forms in recent years, i.e. psoriatic arthritis, psoriatic erythroderma, psoriatic pustulosis (including children) often leading to disability and, in particularly severe cases, to lethal outcomes [7, 10].

The predisposition mechanism has not been revealed but it can be assumed that there is an associative connection of psoriasis with histocompatibility antigens of HLA system [3, 12]. It has been determined that the incidence of psoriasis in combination with HLA-B13 and HLA-B17 is most common, while in case of arthropathic psoriasis it is HLA-B 27 [3].

HLA determinants play a major role in the pathogenesis of psoriasis as it has been proved that the dominant role in the development of psoriasis is assigned to genetic factors [4]. It has been found that the frequency of histocompatibility antigens (HLA-A, B, C) in patients with psoriasis in the Khabarovsk Krai is represented by phenotypes HLA-A1, HLA-B13 and HLA-B17 ($p < 0.001$). This is consistent with published data for other regions [8, 9, 12].

The biological role of histocompatibility antigens formed a new clinical trend called «HLA and Disease," which is actively developed both by foreign and domestic researchers. The level of certain HLA antigens in humans is significantly higher in case of some diseases. This suggests a genetically determined predisposition, a "programmed risk" of susceptibility to some form of a disease. The «HLA and Disease" trend has made a practical contribution in the diagnosis of dermatological diseases.

The establishment of a correlation between diseases and the antigens of the main histocompatibility complex not only allows us to identify groups at higher risk of developing a disease, but also to identify groups of patients with a specific course or pathogenesis of the disease, to carry out differential diagnosis of the disease, to determine prognosis and to develop optimal treatment [6].

The purpose of the study is to explore the HLA antigens and their relationship to lipids in patients with psoriasis in the Khabarovsk Krai.

Materials and Methods. In a comprehensive research of different groups of patients, as part of the «HLA and Disease" studies in the Khabarovsk Krai, a group of patients with psoriasis (85 people) was studied.

The identification of histocompatibility antigens was held in the Zonal Center of Immunological Tissue Typing at KGBUZ Blood Transfusion Station of the Khabarovsk Krai Ministry of Healthcare (G.B. Kalatushkina is head of the laboratory). Peripheral blood



lymphocytes were studied by means of complement-dependent cytotoxicity test using P.Terasaki microtechnique [14]. The control group consisted of 1600 blood donors.

In order to determine the correlation between histocompatibility antigens and a disease the criterion of relative risk was calculated:

$$RR = \frac{fn(1 - fk)}{fk(1 - fn)}$$

1

Formula 1. The calculation of the criterion of relative risk of correlation between tissue compatibility antigens and a disease

Biochemical analyzes: total lipids were determined by means of sulfophosphovanillin reaction, total cholesterol by S.ILCA (1962) method and triglycerides with a set of “Bio-test” chemicals («Lachema», Czechoslovakia).

Results. It has been found that the frequency of histocompatibility HLA antigens of A, B and C loci in patients with psoriasis in the Khabarovsk Krai is represented by the phenotypes HLA-A1 , HLA-B13 and HLA-B17 ($p < .0,001$) [5]. The obtained data are presented in Table 1. As shown in Table 1, there are antigens with higher and lower frequency of occurrence.

¹ RR – relative risk

fn - fraction antigen carriers among patients

fk - antigen carrier fraction in the control group



antigens	Khabarovsk blood donors (n=1600), Antigen frequency, %	Psoriasis patients (n=85), Antigen frequency,%	Relative risk (RR)
Locus A			
A1	20.80±1.015	37.50±5.25***	2.31
A2	47.25±1.248	56.50±5.37	1.44
A3	24.00±1.068	15.30±3.90	0.59
A9	24.00±1.068	18.8±4.24	0.75
A10	15.80±0.120	16.50±4.03	1.07
A11	14.50±0.880	14.10±3.77	1.00
A19	15.80±0.910	10.60±3.34	0.66
A28	5.40±0.570	1.18±1.17***	0.12
Locus B			
B5	12.50±0.830	16.50±4.03	1.42
B7	21.50±1.030	8.24±2.98**	0.35
B8	12.00±0.810	7.06±2.78	0.60
B12	17.00±0.930	12.90±3.64	0.75
B13	11.75±0.810	48.20±5.42***	7.00
B14	5.00±0.650	4.71±2.30	1.04
B15	9.00±0.720	2.35±1.64	0.30
B16	1.00±0.810	8.24±2.98	0.70
B17	8.80±0.710	25.90±4.75***	3.65
B18	10.70±0.770	7.06±2.78	0.68
B21	3.40±0.450	4.71±2.30	1.57
B22	4.40±0.510	-	-
B27	9.80±0.740	10.60±3.34	1.12
B35	23.20±0.110	14.10±3.77	0.56
B40	12.00±0.810	12.90±3.64	1.13
B41		1.18±1.17	-
Locus C			
Cw1	4.70±0.530	5.88±2.55	1.38
Cw2	18.20±0.960	9.41±3.17	0.49
Cw3	23.40±1.060	10.60±3.34**	0.41
Cw4	12.70±8.320	2.35±1.64**	0.205
Cw5	0.86±0.230	-	-
Cw6	15.90±0.910	18.80±4.24	1.26
Cw7	-	1.18±1.17	-
Note/ Statistical validity: ***p<0.001; ** p<0.01			

The increased frequency of the HLA- A1 was $37.50 \pm 5,25$ (control group $20.80 \pm 1,015$), the frequency of HLA-B13 was 48.20 ± 5.42 (control group $11.75 \pm 0,810$), the frequency of HLA- B17 was 25.90 ± 4.75 (control group 8.80 ± 0.710) ($p < 0.001$).

The reduced frequency of occurrence was found in HLA A- 28, 1.18 ± 1.17 (control group 5.40 ± 0.570) ($p < 0.001$), HLA Cw3 10.60 ± 3.34 (control group 23.40 ± 1.060) ($p < 0.01$) and HLA Cw4 2.35 ± 1.64 (control group 12.70 ± 8.320) ($p < 0.01$).

There is substantial evidence of the fact that psoriasis is not only a multifactor disease with a high genetic component, but it also involves a variety of other disorders at the level of homeostasis.

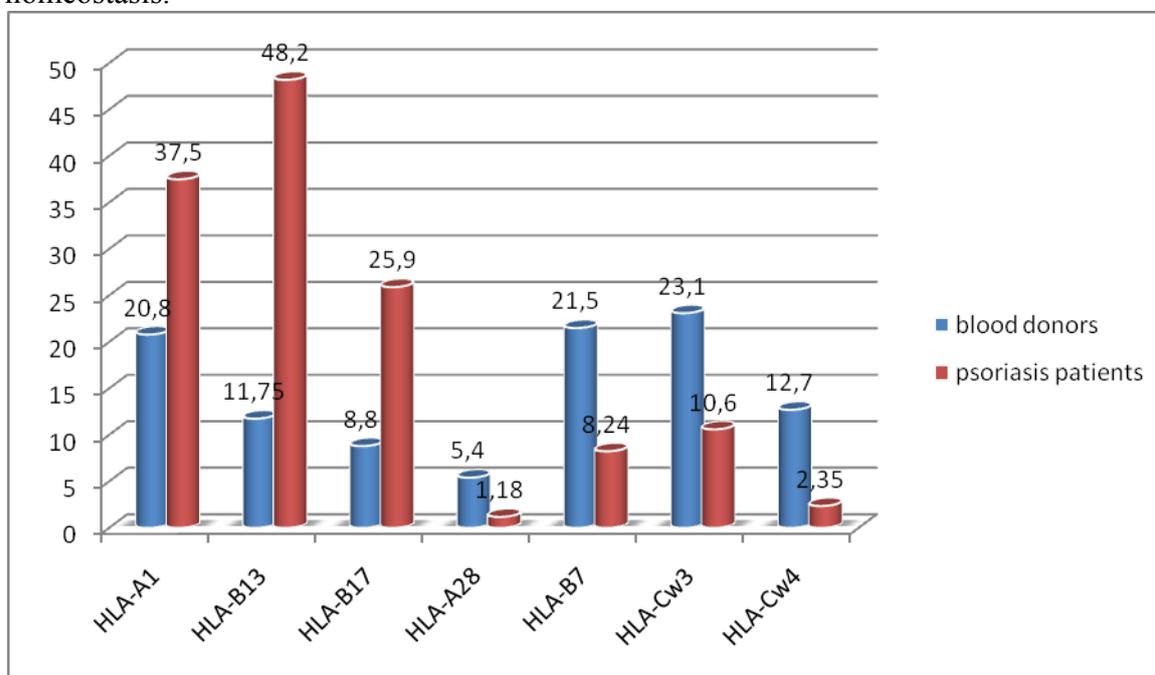


Fig.1. HLA-antigens in patients with psoriasis in the Khabarovsk Krai

Psoriasis is currently viewed as a systemic disease caused by a complex of pathogenetic mechanisms, among which great importance is attached to immunological and metabolic disorders, in particular, lipid metabolism.

Table2

Dynamics of lipid metabolism in patients with psoriasis depending on the HLA phenotype

HLA	Total lipids g /L		Triglycerides mol/L		Total cholesterol mol/L	
	n	$\bar{x} \pm 2m$	n	$\bar{x} \pm 2m$	n ₁	$\bar{x} \pm 2m$
A1	17	$6.80 \pm 0.40^{***}$	15	$1.93 \pm 0.36^{***}$	14	$4.23 \pm 0.22^{***}$
B17	12	$7.70 \pm 0.64^{***}$	12	$2.00 \pm 0.25^{***}$	12	$4.35 \pm 0.26^{***}$
B13	21	$7.09 \pm 0.49^{***}$	18	$1.66 \pm 0.26^{***}$	19	$4.55 \pm 0.16^{***}$
Здоровые	30	5.91 ± 0.18	30	1.11 ± 0.08	30	5.2 ± 0.22

p - the validity of differences between the indices before treatment and the control group of healthy individuals ($p < 0.001$, $t > 2$).

The psoriasis patients with histocompatibility antigen HLA-A1, HLA-B13 and HLA-B17 ($p < 0.001$) showed biochemical changes in terms of lipid metabolism (total lipids, triglyceride



and total cholesterol). Similar publications were not available to us. However, the study of HLA system and its correlation with indicators of lipid metabolism is of particular interest.

The total lipids in psoriasis patients with HLA-A1 antigen totaled 6.80 ± 0.40 g / L, HLA-B13 7.09 ± 0.49 g / L and HLA-B17 7.70 ± 0.64 g / L, which was significantly different from the indices in the control group of healthy individuals ($p < 0.001$). Figures of total lipids in psoriasis patients with antigen HLA-A1 were significantly higher.

Triglycerides in psoriasis patients with antigen HLA-A1 totaled 1.93 ± 0.36 mmol/L, HLA-B13 1.66 ± 0.26 mmol /L and HLA-B17 2.00 ± 0.25 mmol/L, which was significantly different from the indices in the control group ($p < 0.001$). The level of triglycerides in psoriasis patients with HLA-A1 antigen was significantly higher.

The total cholesterol in psoriasis patients with antigen HLA-A1 totaled 4.23 ± 0.22 mmol/L, HLA-B13 was 4.55 ± 0.16 mmol/L and HLA-B17 was 4.35 ± 0.26 mmol / L, which was significantly different from the indices in the control group of healthy individuals ($p < 0.001$). The figures of total cholesterol in psoriasis patients with antigen HLA A1 were significantly lower.

Conclusion:

1. The histocompatibility antigens in psoriasis patients of the Khabarovsk Krai (85 people) have been defined. The immunogenetic indicators of HLA system have been analyzed. The increased incidence of HLA- A1 ($p < 0.001$); HLA-B13 ($p < 0.001$); HLA- B17 ($p < 0.001$) and decreased HLA- A28 ($p < 0.001$) HLA - B7 ($p < 0.01$); HLA-Cw3 ($p < 0.01$); HLA-Cw4 ($p < 0.01$) have been identified.

2. The correlation between the immunogenetic determinants (HLA system) and the indices of lipid metabolism in psoriasis patients with higher frequency of HLA-A1 ($p < 0.001$); HLA-B13 ($p < 0.001$); HLA-B17 ($p < 0.001$) has been identified.

3. The indices of the total lipids in psoriasis patients with antigen HLA-A1 ($p < 0.001$); HLA-B13 ($p < 0.001$); HLA-B17 ($p < 0.001$) were significantly higher.

4. The indices of triglycerides in psoriasis patients with antigen HLA-A1 ($p < 0.001$); HLA-B13 ($p < 0.001$); HLA-B17 ($p < 0.001$) were significantly higher.

5. The indices of total cholesterol in psoriasis patients with antigen HLA-A1 ($p < 0.001$); HLA-B13 ($p < 0.001$); HLA-B17 ($p < 0.001$) were validly lower.

6. Psoriasis patients need a complex clinical, biochemical, immunological and immunogenetic examination for the diagnosis, rational treatment and prevention.



References

1. Zaretskaya Yu. M. Immunologiya i immunogenetika cheloveka (Human Immunology and Immunogenetics). - M.: Triada-Farm, 2002. – 138 p.
2. Zaretskaya Yu. M. Klinicheskaya immunogenetika (Clinical Immunogenetics). - M.: Meditsina, 1983. - p. 62.
3. Ileshina T. V. Kliniko-immunologicheskie osobennosti psoriaticheskoi eritro-dermii (Clinical and Immunological Features of Psoriatic Erythroderma): avtoref. diss. ... kand. med. nauk. - M., 1988. - 16 p.
4. Mordovtsev V. N. Izuchenie populyatsionnoi chastoty psoriaza (the Study of Population Frequency of Psoriasis) / V. N. Mordovtsev, A. S. Sergeev, P. M. Alieva // Vestn. dermatologii. - 1982. № 7. - pp. 8-13.
5. Nekipelova A. V. Kompleksnyi metod lecheniya bol'nykh psoriazom, stradayushchikh na-rusheniyami lipidnogo obmena (Comprehensive Treatment of Psoriasis Patients Suffering from Disorders of Lipid Metabolism): avtoref. diss. ... kand. med. nauk. - M., 1999. - 16 p.
6. Nikulin B. A. Otsenka i korrektsiya immunnogo statusa (Evaluation and Correction of Immune Status). – M.: GEOTAR – media, 2007. – pp. 139-140.
7. Suvorova K. N. Nekotorye osobennosti kompleksnoi terapii tyazhelykh form psoriaza (Some Features of the Complex Therapy of Severe Psoriasis) / K. N. Suvorova, I. M. Korsunskaya, A. Yu. Putintsev // Ros. zhurn. kozh. i vener. boleznei. - 2002. - № 6. - pp. 31-32.
8. Terletskii O. V. Psoriaz. Differentsial'naya diagnostika «psoriazopodobnykh» redkikh dermatozov (Differential Diagnosis of Rare Psoriasis-like Dermatoses). Terapiya : med. atlas. - SPb.: DEAN, 2007. – 512 p., il.
9. Terletskii O. V. Psoriaticheskii artrit. Nekotorye voprosy rannei diagnostiki, differentsial'noi diagnostiki i terapii (Psoriatic Arthritis. Some Issues of Early Diagnosis, Differential Diagnosis and Therapy) : avtoref. dis. ... kand. med. nauk. - SPb., 1998. - 23 p.
10. Effektivnost' i bezopasnost' lecheniya bol'nykh tyazhelymi formami psoriaza (The Efficacy and Safety of Treatment of Patients with Severe Psoriasis) / A. L. Bakulev, S. S. Kravchenya, N. A. Slesarenko, A. A. Shabogina // Vestn. dermatol. -2010. - № 2. - pp. 72-81.
11. Farber E. M. Epidemiology: Natural History and Genetics / E. M. Farber, L. Nall // Psoriasis. - New York; Basel; Hong Kong. - 1991. - P. 209-258.
12. HLA-antigens and suseptibility to psoriasis vulgaris in a non-caucasian population / Tsuji K., Nose Y., Ito M. [et. al.] // Tissue Antigens. - 1976. - V. 8. - H. 29-33.
13. HLA-antigens in Pustular Psoriasis / H. Zachariae, H. Overgaard-petersen, F. Kissmeyer-Nielsen [et. al.] // Dermatologica. - 1977. - V. 154. - H. 73-77.
14. Terasaki, P. Microdroplet Assay of Human Serum Cytotoxini / P. Terasaki, J. D. McClelland // Nature. - London, 1964 . - V. 204. - P. 998-1000 .

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Shevchenko A.A., Zhila N.G. Shevchenko A.V.

Surgical Collapse Treatment of Destructive Pulmonary Tuberculosis

ABSTRACT

The authors have developed an alternative method of extrapleural surgical collapse thoracoplasty for the treatment of destructive forms of pulmonary tuberculosis. The proposed operational technique meets all requirements of surgical collapse operations in the treatment of respiratory tuberculosis, at the same time has a high cosmetic efficacy and significantly less traumatic in contrast to previously developed traditional ways of thoracoplasty at pulmonary tuberculosis.

Keywords: tuberculosis, thoracoplasty.

INTRODUCTION

To date, tuberculosis is not eliminated in any country in the world and continues to be a complex socio-economic and medical-biological problem [1, 3, 5]. It is noted the growth of drug-resistant forms of a pulmonary tuberculosis, as well as worsening of clinical patterns of the disease. To the greatest extent this refers to the increasing number of patients with the widespread destructive tuberculosis, for which classical lung resection surgery is often unacceptable due to loss of radicalism, excessive functional risk and the inability to prevent the progression of tuberculosis [4]. Surgical collapse interventions are, in essence, reconstructive operations on the chest, associated with resection of a larger or smaller number of ribs and represent a significant injury to the human organism.

MATERIALS AND METHODS

Currently in thoracic surgery, surgery of tuberculosis in particular, as surgical collapse operations are used most often: extrapleural upper back thoracoplasty [2], which consists in removing the I, II, III ribs and resection of the posterior-lateral segments IV, V, VI, VII ribs, and 5-costal osteoplastic thoracoplasty suggested by the Novosibirsk TB Research Institute [3], consisting in resection of the posterior segments of the top four or five edges by taking them with them and commit to VI edge (when the intersection of I-II ribs in the sternum of additional parasternal access). A.F. Kravchenko developed an innovative methodology of thoracoplasty with lung fixation, after completing extrapleural pneumolysis, using a grid, a pre-fabricated type «hammock». In this case the top four ribs are deleted as well.

The disadvantage of the first type of operation is pronounced cosmetic defect consists in the deformation of the shoulders and chest, and very high traumatism. The second type of transactions creates a cosmetic defect is deepening and subclavian pits on the side of operation), which patient is a negative psychological impact, there is considerable trauma associated with transferring ribs. The third type of operations allows reduce the invasiveness of the procedure because of the removal of ribs, but manufacturing and fixation of the mesh are difficult.

In connection with the foregoing, we have developed an alternative method of operation, isolated from a cosmetic defect and corresponding to all necessary requirements for collapse surgery intervention (patent R.F № 2470604).

The proposed surgery is the following: from paravertebral access (linear incision of up to 10 cm) exposed the plate frame II-V edges intersect the spine and resection III and IV ribs from the spine to the mid-axillary line. Next, extrapleural pneumolysis dome to the root of the lung, with the imposition of seams, diminishing the amount of pleural cavity, and pleuropexion to the posterior segment of VI rib. This creates extrapleural cavity up to 300 - 400 cm³. Of complementary access at the edge of the latissimus dorsi, linear cut of up to 10 cm is allocated a certain mass, corresponding to the volume of the formed extrapleural cavity toracodorsales muscular flap on a vascular pedicle, with a node in the armpit. In the proximal part of the armpit forming a tunnel under a large circular muscle, then toracodorsales muscular flap moves through



the tunnel formed and intercostalis defect, fully covering the previously formed extrapleural cavity. For fixing the flap is imposed 1-2 leading seam in dorsal corner of the intercostal window. Extrapleural cavity is drained with rubber tube.

The proposed method of musculoskeletal surgery at destructive forms of pulmonary tuberculosis has the following advantages over the traditional methods:

1. the less pronounced operating trauma
2. complete filling of viable thoracodorsal muscular flap of any size of extrapleural cavity formed after pneumolysis, due to which we prevent recurrence of the specific process in the lung
3. none post cosmetic defect (deformation of the chest) significantly improves the quality of life and promotes optimal social adaptation of pulmonary tuberculosis patients after surgical treatment.

RESULTS AND DISCUSSION

The above presented operative method of treatment is used in the surgical thoracic Department «Antituberculosis dispensary» from February 2010. The proposed surgical technique was applied in 22 patients with destructive pulmonary tuberculosis. Postoperative complications were observed in 2 (9%) patients in the form of a small subcutaneous seroma on site of thoracodorsal flap. Complications were temporary and were liquidated by puncture and aspiration.

The results of operations were evaluated in 4 months. In 21 (95,5%) abacillation and complete closure of cavernous lesions of the lung tissue with the formation of pneumosclerosis were achieved, in one case a partial positive effect was marked: abacillation, oral disintegration decreased, but still remained, therefore the second stage was the resection of upper lobe of the right lung. In all cases there was positive cosmetic effect (symmetric chest).

REFERENCES

1. Aksenova V.A. Jepidemiologicheskaja situacija po tuberkulezu u detej v Rossii [Epidemiological situation of tuberculosis in children in Russia] Tuberkulez: Problemy diagnostiki, lechenija i profilaktiki: trudy Vseros. nauch.-prakt. konf. [Tuberculosis: Problems of diagnosis, treatment and prevention: Proceedings of the All-Russia scientific-practical conf. - St. Petersburg, 2003. - p. 81-85.
2. Bogush L.K. Hirurgicheskoe lechenie tuberkuleza legkih [Surgical treatment of pulmonary tuberculosis]. Moscow: Medicina, 1979, 296 p.
3. Borovinsky A.I. Ursov I.G. Krasnov V.A. Selektivnyj kollaps i otkrytoe lechenie kavern pri rasprostranennom fibrozno-kavernoznom tuberkuleze legkih [Selective collapse and open treatment of cavities at advanced fibro- cavernous pulmonary tuberculosis]. Novosibirsk: Polygraph, 2003. - 190 p.
4. Levin A.V. Kagalovsky G.M. Shhadjashhaja kollapsohirurgiya [Gentle collapse therapy]. Novosibirsk: SP "Nauka", 2000, 175 p.
5. Svistunova A.S. Chernehovskaya N.E. Chukanov V.I. Tuberkulez i vnutrennie bolezni [Tuberculosis and internal medicine]. Moscow: Akademija, 2005, 512 p.
6. Kravchenko A.F. RF Patent U (11) 2207055 (13), p.2.

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N.A. Koval'kova, N.I. Logvinenko, M.I. Voevoda, S.K. Malyutina
**The Effect of Smoking on the Formation of Bronchial Obstruction in the
Open Population of Novosibirsk**

Although currently smoking cigarettes recognized as the most common and important risk factor for chronic obstructive pulmonary disease, there is a view that this is not the only factor in the development of airflow obstruction (AO). Objective: to study the effect of smoking on the development of AO in the open population of the city of Novosibirsk. We used population-based cross-sectional study materials obtained in the framework of the project <HAPIEE> in 2002-2005. ("The determinants of cardiovascular disease in Eastern Europe: a cohort study"). At 73.2% (6875) from a total sample of persons aged 45-69 studied lung function: a three-fold measurement of forced expiratory volume in 1 second (FEV₁), forced vital capacity (FVC). Conducted individual calculation of indices FEV₁, FEV₁/FVC, without defining test for reversibility of AO to identify those with FEV₁/FVC < 70% and FEV₁ < 80%. Depending on the groups of smoking status: 1 - "smokers", 2 - "periodically smokers" 3 - "ex-smokers", 4 - "never smokers." With AO registered 42.5% of smokers (among men - 64.2%, among women - 14,3%); 0,8% periodically smokers (among men - 0.5%, among women - 1,2%); 15,5% ex-smokers (among men - 22.2%, among women - 6,7%); 41,2% never smokers (among men - 13.1%, among women - 77,8%). In the study of the possibility of forming AO for persons with the smoking anamnesis relative to never smokers, it was found that AO is formed 3.2 times more often in male smokers, 1.7 times more often in female smokers than non-smokers; AO is formed 2 times more often in male ex-smokers, 2.1 times more often in female ex-smokers than never smokers; chance of developing AO was not greater in periodically smokers. Analysis of indices population showed negative correlation of AO components (FEV₁, FEV₁/FVC) with the number of smoking pack years. The results showed that the presence of smoking history, intensity and duration of smoking affect the development of AO.

Key words: airflow obstruction, smoking status, smoking pack years.

Introduction. Smoking is widespread throughout the world. Russian Federation in terms of smoking prevalence among the adult population is second in the world (43.4%), second only to Greece, where the figure is 48.2%. Tobacco smoking is related to the general risk factors for chronic non-communicable diseases (including chronic respiratory diseases), which accounted for 63% of all deaths [5].

Currently, smoking cigarettes recognized as the most common and important risk factor for chronic obstructive pulmonary disease [1]. Respiratory symptoms appear earlier and impaired pulmonary function occurs more quickly in smokers [2].

However, it is believed that the factor of smoking is not only in the development of airflow obstruction (AO). There is evidence that about one third with irreversible AO had never smoked, and the majority of them women [4].

Studies on the AO, the effects of smoking on the development of AO in Novosibirsk has never been carried out.

The above makes the problem of study the effect of smoking on the development of AO in Novosibirsk.

Purpose: To study the effect of smoking on the development of AO in the open population of the city of Novosibirsk.

Materials and methods. We used population-based cross-sectional study materials obtained in the framework of the project <HAPIEE> in 2002-2005. ("The determinants of cardiovascular disease in Eastern Europe: a cohort study". Principal investigators - prof. S.K. Malyutina, Acad.



RAMS Yu.P. Nikitin). The samples were formed on the basis of the electoral lists using a table of random numbers. Sample size was determined by the protocol program. At 73.2% (6875) from a total sample of persons aged 45-69 studied lung function: a three-fold measurement of forced expiratory volume in 1 second (FEV_1), forced vital capacity (FVC).

Spirometry was performed on the device Micro Plus (MicroMedical, UK). Spirometry results were recorded and processed by a computer diagnostic program Spida 4. Carried out individual calculation of indices FEV_1 , FEV_1/FVC , without defining test for reversibility of AO to identify those with $FEV_1/FVC < 70\%$ and $FEV_1 < 80\%$. Calculation of indices (FEV_1/FEV_1 of predicted, FEV_1/FVC) was carried out using the comparative equation predicted values obtained in the course of the third national survey of U.S. (Third National Health and Nutrition Examination Survey – NHANES III) [3].

All respondents were divided into three age groups: 45-54 years, 55-64 years, 65-69 years.

Depending on smoking status were identified groups: 1 - "smokers" (regular smoking at least 1 cigarette / day), 2 - "periodically smokers" (periodically smoking at least 1 cigarette / day), 3 - "ex-smokers" (smoked in the past), 4 - "never smokers".

Number of smoking pack years (PY) was calculated using the formula: (number of cigarettes smoked per day \times number of years smoked) / 20 (1 pack has 20 cigarettes). All respondents distributed to 3 groups depending on the PY: 1 - < 10 pack years (p/y), 2 - 10-24 p/y, 3 - ≥ 25 p/y.

Factual material was processed on a personal computer program SPSS 17 c using the methods of descriptive statistics (frequencies, percentages and percentage distribution). Odds ratios (OR) were calculated by cross tables. The critical level of significance when testing statistical hypotheses assumed to be 0.05.

Results and discussion. A total of 6875 respondents aged 45-69 years were examined. Of these, 3226 were men (46.9%) (mean age $57,8 \pm 6,82$), 3649 women (53.1%) (mean age $57,6 \pm 6,96$). The response in the age group 45-54 years was 38.7% (among men - 38.1%, among women - 39.3%), in the age group 55-64 years - 40.4% (among men - 41.0%, among women - 39.8%), in the age group 65-69 years - 20.9% (among men - 20.9%, among women - 20.9%).

In view of status of smoking in the total population registered: smokers - 28.6% (among men - 49.4%, among women - 10,2%, $p < 0,0001$), periodically smokers - 1.0% (among men - 1.0%, among women - 1,1%, $p > 0,05$), ex-smokers - 13.5% (among men - 24.3%, among women - 4,0%, $p < 0,0001$), never smokers - 56.8% (among women - 84.7% among men - 25,3%, $p < 0,0001$).

AO detected in the following rates: 1 - $FEV_1 / FVC < 70\%$; 2 - $FEV_1 < 80\%$, $FEV_1 / FVC \geq 70\%$.

In the total sample of AO was detected in 19.48% of the 6875 patients (in the group of 45-54 years - at 14.80%, 55-64 years - at 20.85%, 65-69 years - at 25.49%). Among men, the AO was detected in 23.47% of cases (757 of 3226 subjects), among women (582 of 3649 subjects) - in 15.95% ($p < 0.001$).

When AO registered 42.5% of smokers (among men - 64.2%, among women - 14,3%, $p < 0,001$); 0,8% periodically smokers (among men - 0.5%, among women - 1 2%, $p > 0,05$); 15,5% ex-smokers (among men - 22.2%, among women - 6,7%, $p < 0,001$); 41,2% never smokers (among men - 13.1%, among women - 77,8%, $p < 0,001$). Smoking history was founded in men - 86.92% (of 757 men), women - in 22.16% of cases (from 582 women) among respondents with a registered AO.

We studied the prevalence of AO according to smoking status by age groups.

(Table1)

Table 1 shows that AO was detected in 30.51% of cases among regular smokers, in 12.90% - among periodically smokers, in 21.40% - among ex-smokers, in 12.12% - among never smokers the men surveyed. It is shown that the prevalence of AO higher in ex-smokers than



never smokers men in the age groups 55-64 and 65-69 years, higher in smokers than never smokers in all age groups. Frequency of AO increased with age among smokers ($p_{I-II} > 0,001$; $p_{II-III} > 0,001$; $p_{I-III} > 0,001$), of ex-smokers ($p_{I-II} > 0,001$; $p_{II-III} > 0,05$; $p_{I-III} > 0,001$), its increase was not observed among never smoking men ($p_{I-II} > 0,05$; $p_{II-III} > 0,05$; $p_{I-III} > 0,05$).

(Table 2)

Table 2 shows that AO was detected in 22.19% of cases among regular smokers, in 17.95% - among periodically smokers, in 26.71% - among ex-smokers, in 14.66% - among never smokers the women surveyed. It is shown that the prevalence of AO higher in smokers than never smokers women in all age groups, higher in smokers than the ex-smokers - in groups of 45-54 and 65-69 years. Frequency of AO increased with age among smokers ($p_{I-II} < 0,001$; $p_{II-III} > 0,05$ $p_{I-III} < 0,01$), of ex-smokers ($p_{I-II} > 0,05$; $p_{II-III} < 0,01$; $p_{I-III} < 0,001$), of female never smokers ($p_{I-II} < 0,01$; $p_{II-III} > 0,05$; $p_{I-III} < 0,001$).

In the study of the possibility of forming AO for persons with the anamnesis smoking relative to non-smokers, it was found that AO is formed 3.2 times more often (OR = 3,184; 95% CI 2,516-4,030) in male smokers, 1.7 times more often (OR = 1,660; 95% CI 1,276-2,161) in female smokers than non-smokers; AO is formed 2 times more often (OR = 1,975; 95% CI 1,507-2,589) in male ex-smokers, 2.1 times more often (OR = 2,122; 95% CI 1,451-3,102) in female ex-smokers than non-smokers; chance of developing AO was not greater in periodically smokers.

The results showed that the presence of smoking history, intensity and duration of smoking affect the development of AO.

In the analysis of total population indices revealed a negative correlation of AO components (FEV₁, FEV₁/FVC) with an number of PY: for FEV₁ $r_s = - 0,242$ ($p < 0,01$), for FEV₁/FVC $r_s = - 0,230$ ($p < 0,01$) in men; for FEV₁ $r_s = - 0,195$ ($p < 0,01$), for FEV₁/FVC $r_s = - 0,104$ ($p < 0,05$) in women.

PY (< 10 p/y) in the total sample (from 2895 respondents with the anamnesis smoking anamnesis) was detected in 19.2%, with AO (from 776 respondents with the smoking anamnesis) - in 13,3% ($p < 0,001$); PY (10-24 p/y) in the total sample was detected in 27.9%, with AO - in 24,1% ($p < 0,05$); PY (10-24 p/y) in the total sample was detected in 52.9 %, with AO - in 62,6% ($p < 0,001$).

(Figure 1)

Distribution of respondents with AO according to the PY (Fig. 1) had gender differences: PY (< 10 p/y) was detected among men 7.5%, among women - 44.3% ($p < 0,001$), PY (10-24 p/y) among men - 21.7%, among women - 36.9% ($p < 0,001$), PY (≥ 25 p/y) among men - 70.8%, among women - 18.9% ($p < 0,001$).

Conclusions. Thus, the effect of smoking on the formation of AO in a large industrial center of Western Siberia - Novosibirsk has been studied for the first time. The results showed that the presence of smoking history, intensity and duration of smoking affect the development of AO.

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References:

1. Global'naja strategija diagnostiki, lechenija i profilaktiki hronicheskoy obstruktivnoj bolezni legkih. Peresmotr 2011g. [Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (2011)] Per. S angl.; Pod red. A. S. Belevskiy. [Edited by Belevskiy AS.]. Moscow, 2012, 80 p.
2. Sinopal'nikov A.I. Vorob'jev A.V. Epidemiologija HOBL: sovremennoe sostojanie aktual'noj problemy [The epidemiology of COPD: current state of the actual problem] Pul'mologija [Pulmonology].2007, № 6, PP. 78-87.



3. Hankinson J.L. Spirometric Reference Values from a Sample of the General U.S. Population / J. L. Hankinson, J. R. Odencrantz, K. B. Fedan // *Am J. Respir. Crit. Care Med.* – 1999. – № 159. – P.179-187.
4. Lamprecht B. Non-reversible airway obstruction in never]smokers: results from the Austrian BOLD study / B. Lamprecht [et al.] // *Respir. Med.* – 2008. – Vol. 102, № 12. – P. 1833-1838.
5. World Health Organization. WHO Report on the Global Tobacco Epidemic 2008: The MPOWER Package. – 2008. – 329 p.

Table 1

The prevalence of AO among men with different smoking status

Age	total	never smokers		periodically smokers		ex-smokers		smokers	
		total, n	AO, n (%)	total, n	AO, n (%)	total, n	AO, n (%)	total, n	AO, n (%)
45-54 _I	1229	279	30 (10,75)	14	1 (7,14)	237	24 (10,13)	699	158 (22,60***)
55-64 _{II}	1323	341	37 (10,85)	12	2 (16,67)	329	78 (23,71***)	641	211 (32,92***)
65-69 _{III}	674	197	32 (16,24)	5	1 (20,00)	219	66 (30,14***)	253	117 (46,25***)
45-69	3226	817	99 (12,12)	31	4 (12,90)	785	168 (21,40***)	1593	486 (30,51***)

Note: *** - $p < 0,001$ when compared with never smokers from the respective age groups.

Table 2

The prevalence of AO among women with different smoking status

Age	total	never smokers		periodically smokers		ex-smokers		smokers	
		total, n	AO, n (%)	total, n	AO, n (%)	total, n	AO, n (%)	total, n	AO, n (%)
45-54 _I	1433	1079	119 (11,03)	26	3 (11,54)	86	20 (23,26***)	242	39 (16,12*)
55-64 _{II}	1454	1272	197 (15,49)	13	4 (30,77)	53	13 (24,53)	116	37 (31,90***)
65-69 _{III}	762	739	137 (18,57)	0	0 (0)	7	6 (86,71***)	16	7 (43,75*)
45-69	3649	3090	453 (14,66)	39	7 (17,95)	146	39 (26,71***)	374	83 (22,19***)

Note: * - $p < 0,05$; *** - $p < 0,001$ when compared with never smokers from the respective age groups.

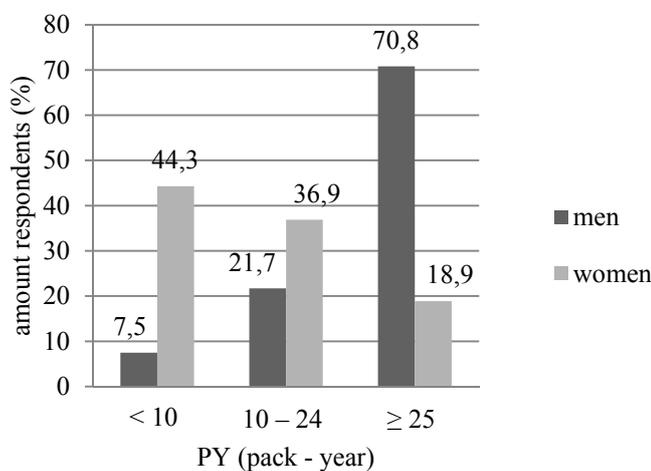




Figure.1 Distribution of respondents with AO relative the PY.

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Geomagnetic Disturbances as Factor of Cardio - Vascular Risk in the North

Neustroeva T.S., Vasilieva G. S., Sivceva A.I

ABSTRACT

We analyzed possible correlation of ischemic coronary disease (ICD) and stroke frequency with level of geomagnetic activity in Sakha (Yakutia) Republic, the Far North region of Russia. We found that during calm geomagnetic activity and in the absence of geomagnetic storms (186.3 days) the frequency of ICD and strokes was 2.9 and 3.29 lower than in days with high geomagnetic activity (geomagnetic storms), respectively. This data may be of interest to specialists of Far East, who plan preventive measures of cardiovascular events.

Keywords: ischemic coronary disease, myocardial infarction, stroke, geomagnetic disturbances in Far North.

INTRODUCTION

Currently cardiovascular diseases account for $\frac{1}{2}$ death causes in Russia, and $\frac{1}{4}$ to $\frac{1}{3}$ of references to medical institutions are caused by ischemic attacks associated with atherosclerosis of the brain and heart. In the North growth of cardio - vascular patients in hospitals is recorded at the spring and autumn periods [6]. Comparative clinical - instrumental and morphological studies among the non-indigenous contingent in the North have shown that the more expressed atherosclerosis in this group develops at the earlier age than in the indigenous population [1-3, 8, 9, 12, 15]. Herewith visit to the North from the southern and eastern regions of Russia as well as from Europe of young healthy subjects and residence in the Far North is accompanied by the development of hormonal changes with lipidemia of atherogenic type amid growth of lipid peroxidation in the organism [4] assessed as manifestations of stress reaction. In some of them during the first few years, there is increased sensitivity to weather changes. [13] However, there is little research devoted to the influence of the features of the geomagnetic factor Far North on the body of its inhabitants. In this regard it should be noted that the Republic of Sakha (Yakutia) - Russian region, where more than 40 % of the area is situated at the Polar Circle and on the territory of which more than half a century are large mining factories. The main labor extractive industries represented contingent visitors. Because analysis of the frequency of disease -related ischemic attacks due to the peculiarities of geomagnetic activity on the territory of the republic is one of the important socially significant scientific problems. The results of these works allowed to clarify during geomagnetic risk for cardio - vascular patients, thereby, help hospitals in such periods to optimize secondary prevention of adverse outcomes in such diseases. Purpose - by comparing the frequency of complaints of patients suffering from cardio - vascular pathologies with levels of geomagnetic activity on the territory of Yakutia, set periods of increased risk of cardio - vascular diseases as reasons for forming the leading cause of death in the Far North. The goal is achieved analyzing data uptake ambulance patients with CHD and cerebrovascular disease, hypertension, as well as a comparison of the data obtained with the magnetic activity of the Earth, registered on the territory of the Yakut Republic.

MATERIALS AND METHODS

We used data collected from 1990 - 2006 years by fluctuations of the geomagnetic field. It is known that geomagnetic activity (K) in biomedical research made judging by the amount of daily indicators (ΣK) denominated credit (standard unit). At calculating ΣK keeps records 29 activity parameters of the geomagnetic field. Three of them are important for biomedical purposes: horizontal direction is - H, the center - Z (measured nanoteslas or gamma), directed to the east (+) - D (measured in minutes). These parameters characterizing the amplitude intensity of terrestrial magnetism, varying in time, constantly observed observatories at different points of the earth. On the variability of these three indicators set for 8 three-hour intervals in the day, which are sensitive to the human body, are judged on the level of magnetic activity of land is determined depending on solar activity. Materials on the geomagnetic activity on the land



territory of Yakutia presented laboratory staff of terrestrial magnetism and earth currents Institute of Space Physics and Aeronomy SB RAS (Yakutsk). On the frequency of exacerbations of common cardiovascular diseases and complications of the Far North judged by motives station appeals to accident and emergency and outpatient clinics in the city of Yakutsk above mentioned period. In interpreting the data used in reports of medical institutions of the Ministry of Health of the RS (I) and analysis of the deaths in these diseases compiled by MD, Professor VP Alexeyev. Statistical data processing was carried out in programs designed Computer Centre, Russian Academy of Sciences (Krasnoyarsk) , Information Computing Centre NEFU .

RESULTS AND DISCUSSION

Analysis of the VP Alexeyev materials showed that in Yakutia in 1969 – 1983 contribution CHD cardiovascular mortality were - $46,8 \pm 0,4\%$, and cerebrovascular disease - $23,2 \pm 0,4\%$. CHD often noticed in men than in women. While men in the Polar regions more likely to suffer coronary heart disease compared with men in Central Yakutia (respectively: 341.8 against 328,6 ‰). CHD among women Arctic is 303,0 ‰ in the group older than 20 years, and in Central Yakutia -224,6 ‰. Contribution of CHD mortality in the heart of men in the Polar regions more ($64,4 \pm 2,4\%$ of cardiovascular deaths) than their figures for the country ($46,8 \pm 0,4\%$), whole. Against this background, found the question: Does the number of vascular events (heart attacks and strokes) increases, recorded during the day indicators of geomagnetic activity during magnetic storms ? It is known that a small geomagnetic storm is considered with amplitude scales at 360 ΣK be 8 - 12 points, moderate - to 600 gammas at ΣK 13-17 points , large - up to 1000 gammas at ΣK to 24 points , a very large - 1500 gam at ΣK to 32 points and a giant - over 1500 scales at ΣK equal more than 33 points. Analysis comparing the number of strokes (during the day according to the ambulance station) and levels of geomagnetic activity, registered in the periods of different levels of disturbance of the magnetic field of the earth, registered on the territory of Yakutia. Level of communication between themselves indicators ranged from $r = +0,14$ to $0.58 + 0.69$ and in different seasons during magnetic disturbances. Established fact is explained by existing cause - effect relationship between the magnetic activity of the earth and seasonal variations in solar activity, as well as cycles of solar activity, repeated in every 11. During the years that stand out Bole active sun (blue line), followed with some lag is growth periods of geomagnetic disturbances (red line) in Yakutia (Fig. 1) and afterwards the number of exacerbations of cardiovascular disease (the number of emergency calls) which are a major cause of mortality and improve load emergency aid . During 1990 and 2006, is registered 1 cycle 11 -year-old set the level of geomagnetic disturbances ($r = +0,59$). In May this relationship becomes closer ($r = +0,81$). This situation is confirmed by the fact that in the polar regions of Yakutia with severe climate in 2.33 and 1.95 CAD more frequently recorded than in Central Yakutia. These data do not contradict the results of studies carried out by various divisions of the SB RAS, show that the conditions of the Far North - extreme for the body to the new arrivals [6, 11], as well as its natives . While the risk of acute vascular pathology (judging by the number of calls about the deteriorating health in hypertension , coronary heart disease and brain) in Yakutia increased after chromospheric flares during the sharp rise in geomagnetic activity .

Negative role of geomagnetic disturbances on the higher nervous system proved experiments installed deterioration formation of conditioned reflexes in animals during magnetic storms. The people in the result of this decrease in the amount of influence, as well as outstanding quality of mental tasks and increase the number of errors in solving complex problems [7, 10]. During magnetic disturbances in the Far North in those days on the part of individual VI Hasnuln recorded growth of anxiety and other manifestations of psycho-emotional stress, negatively impacting performance of work requiring mental stress. The author explained that the development of stress, caused by the growth of geomagnetic activity [13, 14]. Data set can explain the increased incidence of stroke (according to the ambulance station) directly depending on the level of geomagnetic disturbance ($r = +0.6$ to $+ 0.69$). Confirms the



role of voltage rise during geomagnetic disturbances in the Far North, contributing quickening cerebrovascular disease exacerbations, under certain circumstances, causing strokes. Growth years of solar activity and solar magnetic storms with high amplitude, repeated every 11 years (Fig. 1), accompanied by an increase in Yakutia number of calls from patients with cardiovascular disease. Intra- ups geomagnetic activity in Yakutia accompanied by differences in atmospheric pressure, not only in the cold season, but in the transitional seasons, as well as on hot summer days. During such periods, observed increase in the number of calls from patients referred to pathology, and also increases the number of heart attacks and strokes.

While among indigenous people of Yakutia in periods of large and very large giant magnetic storms, number of adverse outcomes (myocardial respectively with 0 - 0.5 2 - 5 and 6 per day in Yakutsk) increases (respectively 4 and more times). At the visitor contingent amount quickening heart attacks and strokes observed from December to January, with the re- growth in the month of May. Significantly increases the number of such patients not only during periods of very large and large storms in the winter (respectively: 3-3.3 per day and 1.3 - 2.0 per day on average). In the transitional seasons, not only during very large, large, but moderate and even small number of such magnetic storms becomes smaller (1.3-1.6 per day, but in general from 5 to 6 times more), but well above, any late geomagnetic indices.

References:

1. Alekseev V.P. Osobennosti morfogeneza severnogo ateroskleroza [Features northern atherosclerosis morphogenesis] Aktual'nye voprosy zdorov'ja naselenija Respubliki Saha (Jakutija): sbornik trudov nauchnyh rabotnikov i praktikujushhih vrachej RS (Ja) [Actual problems of health of the Republic of Sakha (Yakutia): Proceedings of researchers and practitioners of Sakha (Yakutia)]. Yakutsk, 1994. No.2, pp.55- 58.
2. Argunov V.A. Dinamika i tendencii razvitija ateroskleroticheskogo processa po rezul'tatam trehjetapnyh patologoanatomicheskikh issledovanij [Dynamics and tendencies of development of the atherosclerotic process by three-stage results of postmortem studies] Serdechno - sosudistaja patologija v Arkticheskom regione Rossii: fundamental'nye i prikladnye aspekty: materialy dokladov Mezhhregional'noj nauchno – prakticheskoj konferencii (Jakutsk, 2008) [Cardio - vascular pathology in the Arctic region of Russia: fundamental and applied aspects : proceedings of the Inter-regional scientific - practical conference (Yakutsk, 2008)]. Yakutsk, 2008. Pp. 60-61.
3. Vinnichuk S.A. Argunov V.A Rasprostranennost' ateroskleroza sonnyh arterij u korenogo i nekorenogo naselenija g. Jakutsk [The prevalence of carotid atherosclerosis in the indigenous and non-indigenous population of Yakutsk] Jakutskij medicinskij zhurnal [Yakut Medical Journal].Yakutsk, 2007. № 1 (17), pp. 29-32.
4. Gichev Y.P. Hasnulin V.I. Neustroeva T.S. Osobennosti izmenenija lipidnogo obmena i pereokislenija lipidov u zdorovyh ljudej v processe migracii v Zapoljar'e [Features of change of lipid metabolism and lipid peroxidation in healthy people in the migration process in the Arctic region] Struktura, biosintez i prevrashhenie lipidov v organizme zhivotnyh i cheloveka: tezis dokl. 2-go Vsesojuz. Simpoziuma [Structure, biosynthesis and conversion of lipids in animals and humans: Proc. 2nd All-Union. Symposium].Moscow, 1975, pp. 35-36.
5. Danishevskii G.M. Patologija cheloveka i profilaktika zabolevanij na Severe [Human pathology and disease prevention in the North]. Moscow, 1968, 412p.
6. Deryapa N.R. Matjuhin V.A. Solomatin A.P. Itogi i perspektivy razvitija issledovanij po medicinskoj klimatologii v probleme adaptacii [Results and prospects of studies on medical climatology Adapting] Voprosy bioklimatologii i medicinskoj geografii:sbornik nauchnyh trudov SF AMN SSSR [Otv. red. chlen-korr. AMN SSS N. R. Derjapa [Questions Bioclimatology and medical geography: collection of scientific papers SF AMS USSR. Edited by Corresponding Member AMS CAS Deryapa N.R.]. Novosibirsk, SF Academy of Medical Sciences of the USSR, 1977, pp. 3-8.



7. Belisheva N.K., Popov A.N., Petuhova N.V. Kachestvennaja i kolichestvennaja ocenka vozdeystvija variacij geomagnitnogo polja na funkcional'noe sostojanie mozga cheloveka [Qualitative and quantitative assessment of the impact of geomagnetic field variations on the functional state of the human brain]. *Biophysics*. 1995, Iss. 5 (40), pp.1005 - 1012.
8. Maharova N.V. Voevoda M.I., Ljutova F.F. Kliniko-jelektrokardiograficheskie izmenenija u korennyh i prishlyh zhitelej Jakutii s koronarnym aterosklerozom [Clinico-electrocardiographic changes in the indigenous and immigrant residents of Yakutia with coronary atherosclerosis] *Jakutskij medicinskij zhurnal [Yakut Medical Journal]*. 2009. Issue 1 (25) , pp. 38-41.
9. Maharova N.V. Voevoda M.I., Ljutova F.F. Vysokaja chastota arterial'noj gipertenzii i porazhenie organov mishenej u korennyh zhitelej Jakutii s verificirovannym aterosklerozom koronarnyh arterij – vozmozhnaja svjaz' s insulinorezistentnost'ju [High frequency of hypertension and target organ damage in the indigenous population of Yakutia with verified coronary atherosclerosis - a possible association with insulin resistance] *Jakutskij medicinskij zhurnal [Yakut Medical Journal]*. 2011. - № 1 (33), pp. 104-107.
10. Mizun Y.G. Magnitnye buri i zdorov'e [Magnetic storms and health]. Moscow: Scientific and Practical Center "Ecology and Health ", 1994, 176 p.
11. Kaznacheev V.P. Kulikov V. Ju. Panin L.E. Nekotorye osobennosti adaptacii cheloveka v vysokih shirotah [Some features of human adaptation to high latitudes] *Fiziologija cheloveka [Human Physiology]*. – 1975, № 5 (5), pp. 286-292.
12. Alekseev V.P. Osobennosti razvitija ateroskleroza i IBS, ih morfogenez u korenogo i prishlogo naselenija Severa (jepidemiologicheskie i patologoanatomicheskoe issledovanie: avtoref. dis. dok. med. nauk / [Features of the development of atherosclerosis and coronary heart disease , their morphogenesis in native and alien North (epidemiological and autopsy : MD Author. Dis.] Moscow, 1990, 50 p .
13. Hasnulin V.I., Vil'gel'm V.D., Skosyreva G.A. [i dr.] Sovremennyj vzgljad na narodnuju medicinu Severa: otv. red. L.D. Sidorova [Modern view of the traditional medicine of the North: Ed. LD Sidorova]. Novosibirsk: Siberian Branch of RAMS, 1999, 281 p.
14. Hasnulin V.I. Vvedenie v poljarnuju medicinu [Introduction to polar medicine]. Novosibirsk: ed. SB RAMS, 1998, 337 p.
15. Argunov V.A., Basharin K.G., Trufanov A.S. [i soavt.] Cerebrovaskuljarnye zabojevanija i ateroskleroz obshhej i vnutrennej sonnoj arterij [Cerebrovascular disease and atherosclerosis of common and internal carotid arteries] *Serdechno - sosudistaja patologija v Arkticheskom regione Rossii: fundamental'nye i prikladnye aspekty: materialy mezhregional'noj nauchno – prakticheskoj konferencii [Cardio - vascular pathology in the Arctic region of Russia: Fundamental and Applied Aspects: Proceedings of the inter-regional scientific - practical conference]*. Yakutsk, 2008, pp. 61-63.

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The Morphological Markers of Moonphasal Changes in Rats' Organs

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Summary

In the model experiment on rats in order to verify the lunasensor theory of brain aging by methods of light microscopy in the hypothalamus, responsible for the aging mechanisms, biorhythms, homeostasis and reproduction, the pineal gland, as well as in the organs related to them on the system-level, the morphological markers of moonphasal changes are studied for the first time. Concluded possible enhancement of the hypothalamic-pituitary-gonadal axis, glycogenolysis, water and electrolyte metabolism and cardiac activity on the full moon, and of the pacemakers biological rhythms - suprachiasmatic nuclei of the hypothalamus and pineal gland, the tone of the parasympathetic division of the autonomic nervous system, insulin secretion and insulin-like protein on the new moon.

Keywords: rats, hypothalamus, endocrine glands, kidneys, testes, medulla, heart, glands of the digestive system, the lunar cycle.

Introduction

According to the lunasensor theory of brain aging [9, 10], under the influence of the gravitational field of the Moon the moonphasal relocation of psammoma bodies is possible in the pineal gland, which influences the secretion of the pineal hormone and activity of hypothalamic neuroendocrine cells responsible for the aging mechanisms, biorhythms, homeostasis, and reproduction.

The suprachiasmatic nuclei (SCN) of the hypothalamus are body's biological clocks. They affect the production of GnRH by small-cell nuclei of hypothalamus, the activity of gonadotropin-releasing endocrine (GnRE) of pituitary and interstitial endocrine (IE) of the testes; project the influence in paraventricular nuclei (PVN) of the hypothalamus, affect the water reabsorption in kidneys, through the "pre-autonomous" neurons they project the influence in rear nuclei of the vagus nerve (RVN) of medulla, also in heart and pancreas, which changes the functional state of cardiac pacemaker cells, the A- and B- islet cells, and glycogen content in the cells of various tissues. Pineal hormones also affect GnRE of pituitary, glomerular zone cortical cells of the adrenal cortex, sodium reabsorption in the kidneys, that is controlled by the dense patches (DP) epithelial cells of juxtaglomerular complex. Convoluted seminiferous tubules of the testes and epithelial granular sections (GD) of striated ducts of submandibular salivary glands [4-6] are sensitive to IE testosterone.

Changes in physiological parameters of animals and humans, the ultrastructure of the HRC of rats at different moon phases are presented in a number of studies [8, 12]. The Search of morphological markers of moonphasal changes in organs, responsible for the aging mechanisms, biorhythms, homeostasis and reproduction, was never conducted before at the light-optical level. Given that previously in rats' neurosecretory nuclei of hypothalamus, pineal gland and the salivary glands light-dependent morphological changes were noted [1-3, 7, 8, 11], the role of the light factor must be excluded. For the maximum possible reduction of the diurnal and seasonal biorhythms role [8] it was important to carry out the capture of material in the same time and contain animals in a given mode of illumination environment. To exclude differences related to sex and age [12], - young adult males were used.

The purpose of this research – to look for markers in rats of alleged moonphasal morphological changes in organs responsible for the aging mechanisms, biorhythms, homeostasis, and reproduction.

Material and methods

The study was performed in accordance with the "Rules of the work using experimental animals" (1977) on 5-month-old male Wistar rats weighing 180-200 g (n = 20), which were kept in a vivarium in the light-dark mode 12-12 h (starting at 8:00 till 20:00, 200 lux illumination animals). The organs were elicited after the decapitation of rats at 11h daily in May and June in the various phases of the moon after a 24-hour food deprivation, fixed in 10% neutral formalin, dehydrated and embedded in paraffin. The sections were stained with hematoxylin and eosin, Mallory's method. Chromatophilic substance in nerve cells was detected by the method of Nissl. Drugs were examined in the «PrimoStar» microscope with «AxioVision 4.8.2» Software («CarlZeiss», Germany) and digital camera G- 10 ("Canon", Japan).

Results and Discussion

In the SCN during the lunar cycle morphological changes occur mainly in the ventral subcore. Neurons of the nucleus of a given population, the nucleoli become larger on the new moon, tortuosity shell nuclei - more pronounced and clumps margination of condensed chromatin - less significant compared with other lunar cycle phases, which confirms the sensitivity of the circadian pacemaker to moonphasal changes (Fig. 1).

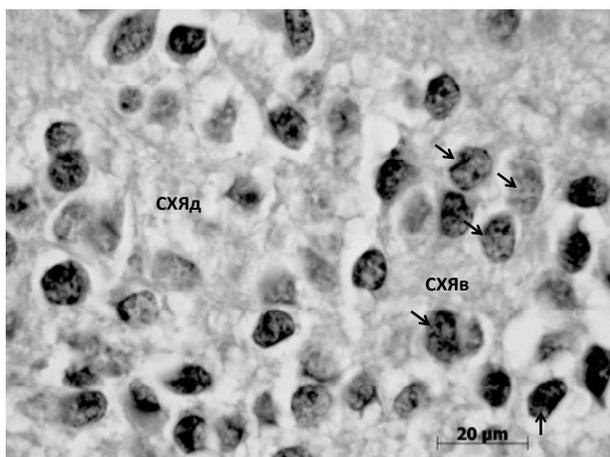
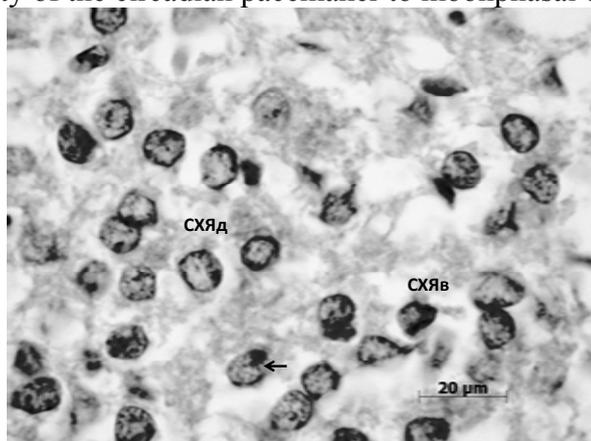


Fig. 1. Suprachiasmatic nucleus on the full moon (a) and the new moon (b): SCN_v – ventral subcore, SCN_s - spinal subcore, arrows indicate intussusception of nuclear envelope. Hematoxylin and eosin stain. Obj.100, ocular lens10.

It is possible that a special genetic program is produced in pacemakers with around-month period, which launches on the new moon on the back of revitalization of the pineal gland. On the other hand, in the ventral SCN subcore the cells are found in a state of recovery on the

new moon more often than on other lunar cycle phases. They have large nucleoli, and dark colored perikaryonic with evenly distributed clumps of chromatophilic substance. Apparently, pacemakers, along with around-month cycle of functional activity, show a more pronounced reduction ability in the daytime and on the new moon.

The presence of large HRC with light-colored perikaryonic, large nucleus and nucleoli, moderately or low condensed chromatin, deep and narrow intussusception of nuclear envelope ("cariosoma") in the organ on this lunar cycle phase indicates the activation of the pineal gland on the new moon. In opposed phase similar cells are less characteristic to the pineal gland. The light HRC on the full moon often have a small spherical or ovoid nucleus with central nucleolus, moderately condensed chromatin and shallow shell invaginations, and also its protrusion into the HRC with a small pear-shaped nucleus (Fig. 2).

GnRE of the anterior adenohypophysis show signs of increased functional activity, on the contrary, on the full moon. In this phase they acquire larger sizes, the macula, that pushes the core to the periphery, increases, the cytoplasm contains endocrine granules (Fig. 3).

Obviously, that the production of luteinizing hormone activates in GnRE on the full moon against the background of the pineal gland HRC activity inhibition, since on a similar phase IE also acquire larger sizes in the testes. Their nuclei and nucleoli markedly increase comparing with the new moon phase, the number of clumps of condensed chromatin in the nucleus reduces, light vacuoles in the oxyphilous stained cytoplasm increase.

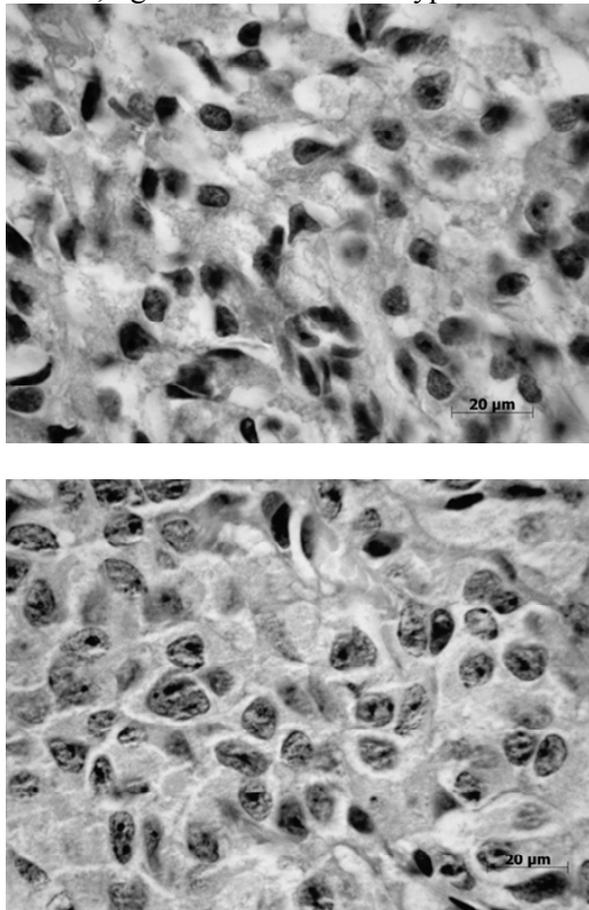


Fig.2. The pineal gland on the full moon (a) and on the new moon (b). Hematoxylin and eosin stain. Obj.100 oc.lens 10.

Respectively, the thickness of the spermatogenic epithelium of the convoluted seminiferous tubules in areas with the same spermatogenesis phases appearance is the most

pronounced on the full moon compared with other lunar cycle phases, and GD epithelial secretory activity in submandibular salivary glands as well. GD lumen diameter expands, nuclei in epithelial cells are shifted to the central part of the cytoplasm, the size and number of endocrine granules reduce. Apparently on the new moon against the background of GnRE pituitary activity oppression and IE testis in GD, on the contrary, depositing of endocrine granules in the epithelial cells cytoplasm is observed (Fig. 4).

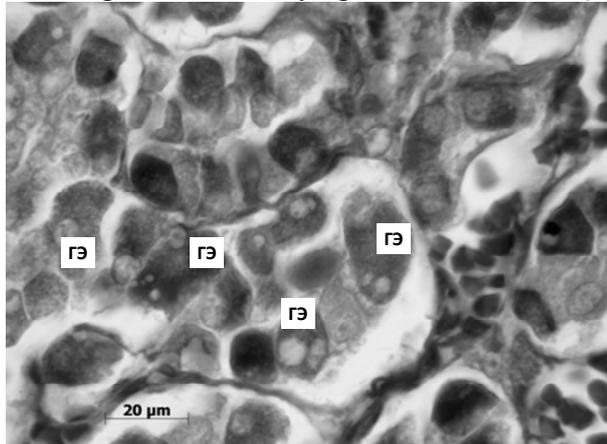
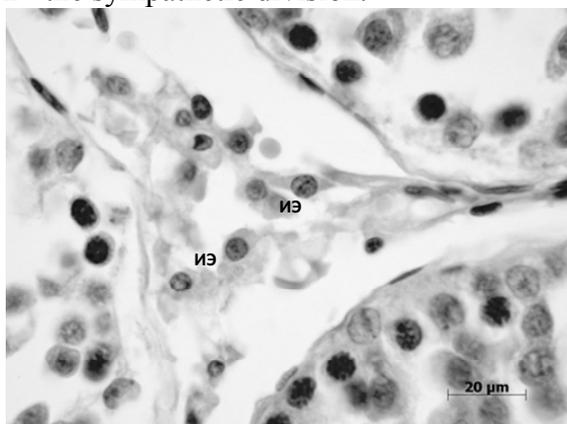


Fig. 3. Prehypophysis on the full moon: GnRE - gonadotropic endocrinocytes. Mallory's stain. Obj. 100. oc.lens 10.

Hypothalamic neuroendocrine cells of the small cell PVN ("pre-autonomous"), autonomous preganglionic neurons RNVN of medulla and postganglionic neurons in the heart show morphological signs of functional activity in the waning moon phase and on the new moon. Nucleus neurons are larger, in perikaryonic parts of the nerve cells focal (mainly central) chromolysis is marked. In the waxing moon phase and on the full moon, on the contrary, their nuclei are smaller, nucleoli are large, hyperchromatic neurons without wrinkling of the nucleus are found more often. Perhaps that not only during the day and seasons of the year, but also the lunar cycle the functional state of the sympathetic and parasympathetic divisions of the autonomic nervous system changes with a shift in the waning moon phase and on the new moon in the direction of enhancing the parasympathetic division, in the waxing moon phase and on the full moon - the sympathetic division.



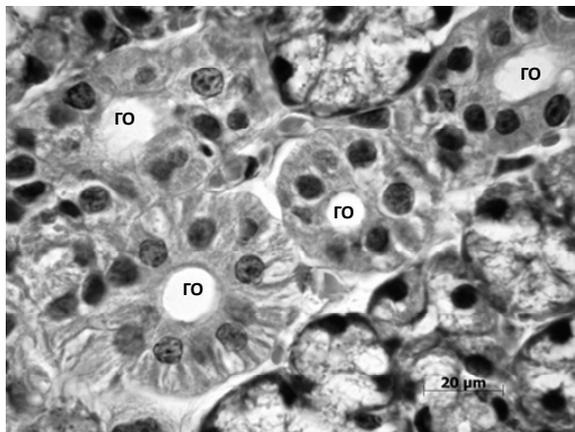
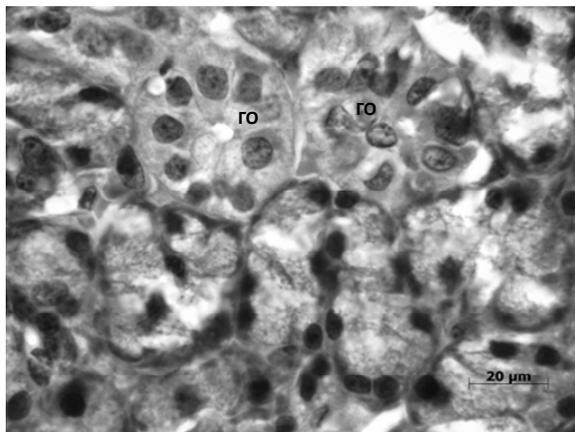
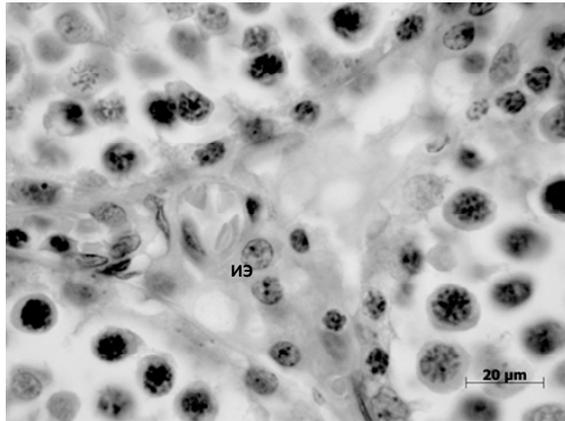


Fig. 4. Testes and submandibular glands: a, b - new moon; c, d - full Moon. IE - interstitial endocrinocytes, GD - granular sections. Hematoxylin and eosin stain. Obj. 100 oc.lens10.

B-cells of pancreatic islets have larger nuclei and unevenly dispersed endocrine granules in the cytoplasm on the new moon, and smaller nuclei with more condensed chromatin on the full moon. A- cells, which are located on the periphery of the islets, on the contrary, are larger on the full moon. The size of their nuclei on the new moon is smaller than on the full moon (Fig. 5).

On the new moon the secretion activation of not only insulin-like protein in granular striated ducts sections of submandibular salivary glands is possible, but also the secretion activation of insulin by pancreas islets B-cells, which favors the absorption of glucose by cells of different tissues, glycogen synthesis and deposition in the " parasympathetic " phase of reduced reproductive activity of rats. On the full moon, apparently, not only sympathetic-adrenal system and reproductive activity of the animals becomes more active, but also the secretion of pancreas islets A-cells of glucagon into blood, and the glycogen decomposition.

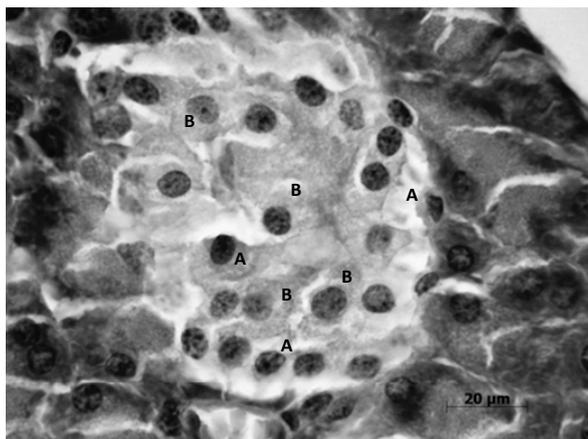
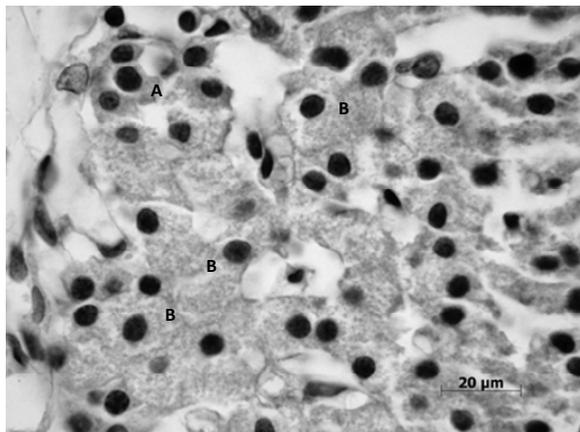


Fig.5. Pancreas Islet on the full moon (a) and on the new moon (b). A and B - A-and B-cells. Hematoxylin and eosin stain. Obj.100 oc.lens10.

Pacemakers cells of the sinoatrial node in the heart on the new moon, in comparison with the full moon, have smaller nuclei with more condensed chromatin and winding nuclear envelope, which indicates their functional activity oppression, and, obviously, heart rhythm changes over the lunar cycle. It is probable that on the new moon not only the heart rhythm slows down, but also the blood pressure decreases. Thus, epithelial cells of DP juxtaglomerular kidney complex on the new moon and in the waxing moon phase are less dense (wider), have larger nuclei with less condensed chromatin. It is possible that during this period of lunar cycle against the background of increasing level in blood plasma of adrenoglomerulotropic hormone and aldosterone of sodium reabsorption in kidneys, the inhibitory activity of DP epithelial cells towards the juxtaglomerulocytes, that secretes renin, becomes more active (Fig. 6) .

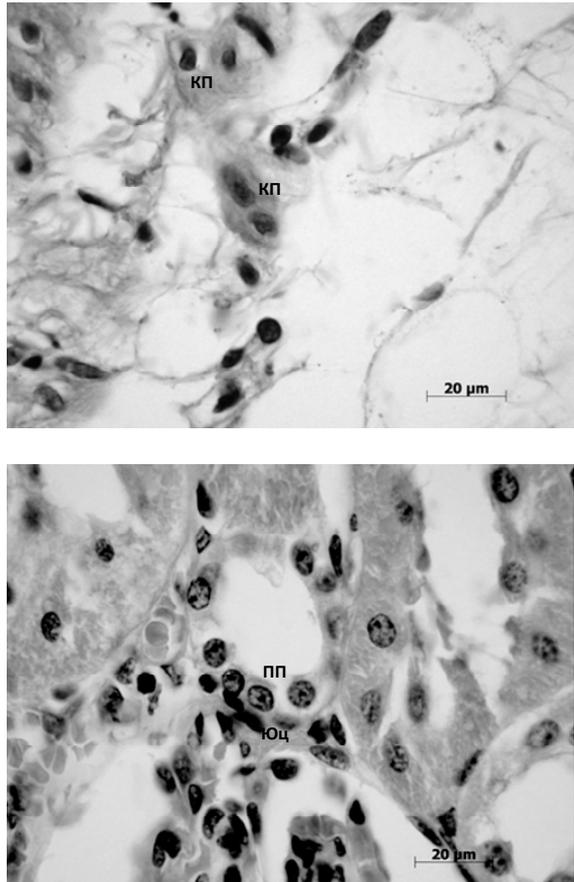


Fig. 6. Atrionector on the new moon (a) and renal cortex on the full moon: PC - cardiac pacemakers cells, DP – dense patch, Jx - juxtaglomerulocyte. Hematoxylin and eosin stain. Obj.100 oc.lens10.

Conclusion

Thus, during the experiment on rats in different lunar cycle phases, organs responsible for the aging mechanisms, biorhythms, homeostasis, and reproduction are analysed for the first time. By the criteria of structural analysis the alleged morphological markers of moonphasal changes are highlighted and possible cell and tissue mechanisms of functional changes in the body. Morphological signs of increasing secretion in the pituitary lutropin, testosterone and spermatogenesis in the testes, glucagon in the pancreas, heart pacemaker cells appear on the full moon. On the new moon morphological signs of functional activity of suprachiasmatic and paraventricular nuclei of the hypothalamus, the pineal gland, the parasympathetic section of the autonomic nervous system, the insulocytes of pancreatic islets, granular epithelial sections of submandibular glands producing insulin protein, dense patch of juxtaglomerular kidney complex, the cardiac pacemaker cells activity oppression and renin secretion by juxtaglomerular myocytes in kidneys. Moonphasal changes, verified on the light-optical level, confirm the fundamentals of the lunasensor theory of brain aging and require more detailed study by methods of quantitative light and electron microscopy.



References

1. Gerasimov A.V. Funkcionalnaja morfologija neyronov suprahiazmaticheskikh jader gipotalamusa krysa posle kombinirovannogo vozdejstvija rentgenovskogo izlucheniya i sveta [Functional morphology of neurons in suprachiasmatic nuclei of the hypothalamus of rats after the X-rays and light combined effect] Radiacionnaja biologija. Radiojekonomika [Radiation biology. Radioecology]. 2003, V. 43, № 4. PP.389-395.
2. Gerasimov A.V., Logvinov S.V., Kostyuchenko V.P. Morfologicheskie izmeneniya v epifize u krysa pri dlitel'nom osveshenii jarkim svetom [Morphological changes in the pineal gland of rats after prolonged illumination with bright light] Bjul. eksperim. biol. i med. [Bulletin of experimental biology and medicine]. 2010, V.150, № 7. PP.97-99.
3. Logvinov S.V., Gerasimov A.V., Kostyuchenko V.P. Ultrastruktura pinealocitov u krysa pri vozdejstvii sveta i radiacii [Ultrastructure of pinealocytes in rats when exposed to light and radiation] Morfologija [Morphology]. 2004. V.125, № 1. PP.71-75.
4. Logvinov S.V., Gerasimov A.V. Cirkadiannaja sistema i adaptacija. Morfofunkcional'nye i radiobiologicheskie aspekty. [Circadian system and adaptation. Morphofunctional and radiobiological aspects] - Tomsk: Print Manufactory, 2007. - P.200.
5. Khmel'nitsky O.K., Stupina A.S. Funkcional'naja morfologija endokrinnoj sistemy pri atero-skleroze i starenii [Functional morphology of the endocrine system in atherosclerosis and aging] L.: Medicina, 1989. P.248.
6. Buijs R., la Fleur S., Wortel J. et al. The suprachiasmatic nucleus balances sympathetic and parasympathetic output to peripheral organs through separate preautonomic neurons // Comp. Neurol. - 2003. - Vol. 464, № 1. - P. 36-48.
7. Logvinov S. V., Gerasimov A.V., Kostyuchenko V. P. Plasticity of secretory neurons in the supraoptic and paraventricular nuclei of the hypothalamus when exposed to light // Neuroscience and Behavioral Physiology. - 2006. - Vol. 36, № 5. - P. 463-466.
8. Martinez-Soriano F., Ruiz-Torner A., Armananzas E., Valverde-Navarro AA Influence of light / dark, seasonal and lunar cycles on serum melatonin levels and synaptic bodies number of the pineal gland of the rat // Histol. Histopathol. - 2002. - Vol. 17. - P. 213-222.
9. Olovnikov A. Lunasensor, infradian rhythms, telomeres, and the chromomere program of aging // Annals N. - Y. Acad. Sci. - 2005. - Vol. 1057. - P. 112-132.
10. Olovnikov A.M. Hypothesis: Lifespan is regulated by chromomere DNA of the hypothalamus // J. Alzheimer's Disease. - 2007. - Vol.11. - P.241-252.
11. Pizarro M., Pastor F., Lopez G., Munez B. Ultrastructural study of the distribution of calcium in the pineal gland of the rat subjected to manipulation of the photoperiod // Histochemistry. - 1989. - Vol. 92, № 2. - P.161-169.



12. Zimecki M. The lunar cycle: effects on human and animal behavior and physiology // Postepy Hig. Med. Dosw. - 2006 . - Vol. 60 . - P. 1-7 .

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Prediction of Infectious-Toxic Shock And Disseminated Intravascular Coagulation in Patients With Pneumonia in the Disease Onset

I. M. BORISOV, T. G. SHAPOVALOVA

SUMMARY

Objective: Development of diagnostic algorithms for prediction of infectious-toxic shock and disseminated intravascular coagulation (DIC) patients with pneumonia at the onset of the disease.

Materials and methods. Examination and treatment of patients with pneumonia was conducted in pulmonary department of the military hospital in the period from 1998 to 2008 in the study included 2000 patients with pneumonia, men, military, military service by conscription, aged 18 to 22 years ($19, 2 \pm 0,19$).

In order to evaluate the effectiveness of forecasting algorithms of infectious-toxic shock and DIC with pneumonia, a comparative analysis of the two groups of patients. In the comparison group ($n = 782$) forecasting of infectious-toxic shock and DIC was conducted based on the individual views and personal experiences of doctors, without the use of forecasting algorithms in the period from 1998 to 2003, and in the study group ($n = 1218$) – between 2003 to 2008 - on the basis of diagnostic algorithms forecasting of infectious-toxic shock and DIC pneumonia developed by us.

Results. It is shown that the proposed diagnostic algorithms for the prediction of the infectious-toxic shock and DIC help practitioners, including at the stage of primary health care in the early stages of development to suspect the possibility of a patient with pneumonia potentially fatal complications, which allows to adjust medical and diagnostic tactics, more accurately resolve transportation issues the patient to determine the indications for hospitalization, including in the emergency department and intensive care.

Keywords: pneumonia, toxic shock, DIC, predicting complications of pneumonia, algorithms.

Introduction. Despite the continuous improvement of diagnostic methods and the availability of highly antibiotics, pneumonia, as before, is a leader in the structure of morbidity and mortality from infectious diseases in developed countries [1, 8]. Mortality for pneumonia in adults up to 50 years without comorbidity is 2 - 3%, and among patients requiring hospitalization in intensive care units, reaches up to 22% [1, 7]. Remains a high incidence of pneumonia in the Armed Forces of the Russian Federation among soldiers performing military service [3, 5]. Risk factors for poor outcome of pneumonia, including in the military, is the development of complications such as toxic shock and disseminated intravascular coagulation (DIC). Due to this fact remains urgent task is the development of diagnostic algorithms for forecasting, which would allow a doctor at an earlier date to reveal indirect signs indicating the possibility of the above complications of pneumonia.

The purpose of the work. Development of diagnostic algorithms for the prediction of infectious-toxic shock and disseminated intravascular coagulation in patients with pneumonia at the onset of the disease

Materials and methods. Examination and treatment of patients with pneumonia was conducted in pulmonologic-Soviet department of the military hospital in the period from 1998 to 2008. Were enrolled 2,000 patients with pneumonia, men, soldiers performing military service at the age of 18 to 22 years ($19, 2 \pm 0,19$).

In order to evaluate the efficiency of algorithms for forecasting the development of



infectious-toxic shock and disseminated intravascular coagulation with pneumonia, a comparative analysis of the two groups of patients. In the comparison group (n = 782) to predict the development of infectious-toxic shock and disseminated intravascular coagulation was carried out according to individual views and personal experiences of doctors, without the use of algorithms to predict the period from 1998 to 2003, and in the study group (n = 1218) - in the period from 2003 to 2008 - on the basis of diagnostic algorithms for predicting the development of infectious-toxic shock and disseminated intravascular coagulation in pneumonia, developed by us.

In the course of the study were used, and general clinical and instrumental diagnostic methods in accordance to the guidelines of the Main Military Medical Directorate of the Ministry of Defense of Russia in 2003, as well as the standard for the diagnosis and treatment of patients with non-specific lung diseases, approved by the Ministry of Health of the Russian 9. 10. 1998 № 300 [2, 6].

In patients who were treated in the department of anesthesiology and intensive care unit (193 people). Additionally monitored some of the functions of the body, including blood pressure, central venous pressure, urine output. Determined by blood gas, electrolytes (potassium, sodium, serum), the use of protein composition, blood coagulation and renal excretory function.

Patients received etiopathogenic and symptomatic therapy According to current standards of treatment of disease. According to the testimony appointed as mucolytics, fever and cold preparations, as well as complex physical therapy and physiotherapy.

Statistical processing of the results of the study were performed using software package Microsoft Office Excel 2007 and Statistica 6.0 (StatSoft, Inc. 2001). For the processing of the data used assessment of the credibility of intergroup differences with the Student t-test for independent samples. Between-group differences were considered significant at $p < 0, 05$.

Calculation of the diagnostic value of forecasting algorithms performed using the following formulas: diagnostic sensitivity (DF) = $a / (a + c)$, in %, diagnostic specificity (DS) = $d / (d + b)$, in% diagnostic accuracy (DA) = $(a + d) / (a + d + c + b)$, in%, diagnostic efficiency (DE) = $(DF + DS) / 2$, and wherein a- the number of true positive results of the study, b - number of false positive results, b - the number of false negatives, d - the number of true negative results [4].

Results and discussion. The principle of constructing an algorithm to predict the development of infectious and toxic shock [ID for rationalization proposal number 4454 "Irkutsk State Medical University" 10. 04. 2009] was as follows. On admission to the hospital the patient was evaluated the clinical picture of the disease, including the identification of clinical markers of verification of infectious-toxic shock. Further analysis was conducted signs indirectly indicate the possibility of this complication and its degree. In the proposed algorithm took into account the following well-known to medical practitioners clinical signs of pneumonia character's debut, the state of consciousness of the patient, the presence or absence of shortness of breath, skin color, blood pressure. An analysis of the above symptoms are gradually determined the likelihood of infectious-toxic shock (Figure 1).

Another complication is inevitable or very often associated infectious-toxic shock, the patient's life-threatening pneumonia, contributing to the accession of other complications of the disease and increasing the duration of treatment, including the favorable outcome is DIC. This is a complex disorder of hemostasis that develops as a result of an imbalance between the factors of the cellular elements of blood, plasma and vessel wall. Systemic activation of the coagulation system with multiple promotes the formation of blood flow in micro-and makrogustkov and blood clots, blockage of the microcirculation in the "target organs" with the development of their failure, leading to activation, intensive consumption and depletion of coagulation factors physiologic anticoagulants (antithrombin III, protein C) and components of fibrinolytic system



(plasminogen and its activators).

In order to predict the possibility of DIC in pneumonia we have developed a diagnostic algorithm [ID for rationalization proposal number 4458 "Irkutsk State Medical University", 10.04.2009], according to which the patient on admission to the hospital evaluated the clinical picture of the disease and identified clinical signs, indicating a high probability of this complication in the short term. Later identified and analyzed markers, indicating the possibility of the occurrence of DIC and its degree. The algorithm took into account the following signs: respiratory rate, color of skin, hemodynamic parameters, the presence and extent of acute respiratory failure, the presence of infectious-toxic shock and anti-shock performance measures.

Depending on the presence or absence of any of the features listed above, the extent of their manifestations determined not only by the risk of disseminated intravascular coagulation, but also predicted the degree of severity (Figure 2).

Diagnostic algorithm for predicting the development of DIC is used to determine the risk of its occurrence in a patient with pneumonia, and depending on the degree of treatment to correct violations, avoiding thus the adverse effects and improve treatment outcome.

The introduction to the work of the receiver, infectious and pulmonary department of the hospital developed algorithms for predicting the development of infectious-toxic shock and disseminated intravascular coagulation in patients with pneumonia has significantly reduced the number of these complications of the disease. As a result, toxic shock was diagnosed in 8 patients, 8% of patients in the comparison group and 3, 7% of the study group ($p < 0, 05$). DIC was diagnosed only in the comparison group (2, 8%), while among the patients of the group this complication have been identified through the effective prediction of shock and taken preventive measures (Table 1).

The effectiveness prediction algorithm infectious toxic shock of 97, 7 % sensitivity at 95, 6%, specificity of 99, 7 % and accuracy 99 5%. The effectiveness of the algorithm prediction of DIC was 100%.

Conclusion. The proposed diagnostic algorithms to help the practitioner, including at the stage of primary health care in the early stages suspect the possibility of a patient with pneumonia potentially fatal complications. It will help to correct the medical and diagnostic tactics, more accurately solve transportation issues the patient, to determine the indications for hospitalization, including the intensive care unit and intensive care, and thus improve the results of treatment of pneumonia.



References

1. Community-acquired pneumonia in adults: Practical guidelines for the diagnosis, treatment and prevention / A.G. Chuchalin, A.I. Sinopalnikov, L.S. Stratchounski [et al.] - M.: «Publishing house" M-News ", 2006. – 76 p.
2. Diagnosis, treatment and prevention of community-acquired pneumonia in the Defense Ministry servicemen / Ed. Rakov A.L., Melnichenko P.I., Sinopalnikov A.I., Mosyagin V.D. – M.: PM-News, 2003. – 82 p.
3. Kazantsev V.A. Pneumonia: A Guide for Physicians / V.A. Kazantsev, B.B. Udaltsov. - St. Petersburg.: SpetsLit, 2002. – 118 p.
4. Rebrova O.Y. Statistical analysis of medical data. Application software package «Statistica» / O.Y. Rebrova. - M: Media Industry, 2006. – 312 p.
5. Sinopalnikov A.I. Analysis of the state pulmonology care in the Armed Forces and the ways of its improvement / A.I. Sinopalnikov, A.A. Zaitsev // Military Medical Journal. - 2008. - V. 329. - № 8. - P. 31 - 40.
6. Standards (protocols) diagnosis and treatment of patients with non-specific lung disease: the order of the Ministry of Health of the Russian 9. 10. 1998 number 300 / (Library Journal "The quality of care» № 1/99). - M.: Grant, 1999. – 40 p.
7. Chuchalin A.G. Pneumonia / A.G. Chuchalin, A.I. Sinopalnikov, L.S. Stratchounski. - M.: MIA, 2006. - 461 p.

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Health and Social Aspects of the Life Quality of Children with Chronic Gastroduodenal Pathology in Yakutsk

ABSTRACT

This work reviews aspects and the research tools and the quality of life of children with chronic gastroduodenal pathology.

Quality of life is one of the new criteria for evaluating the effectiveness of medical care that have been widely used in countries with high levels of medicine. The quality of life is considered as an integral characteristic, which should be guided in evaluating the effectiveness of rehabilitation of sick and disabled people. The accumulated experience of studying the quality of life shows that this method is very promising for all branches of medicine. The study of quality of life in medicine allowed to return at a new stage in the evolution of the most important principle of clinical practice "does not treat the disease, but the patient".

To study the quality of life in children with chronic gastroduodenal pathology it can be used special questionnaires: GSRS, QLDUP, QOLRAD, IBS-QOL, IBDQ; and also - general questionnaire - CHQ-Child Health Questionnaire, PedsQL - general version. The quality of life of children with chronic gastroduodenal pathology may vary depending on age, sex, stage of disease, the presence or absence of complications, the degree of social well-being of the family and psychological factors. Assessment of the quality of life of children with chronic gastroduodenal pathology has significant potential for application not only in clinical trials and clinical practice, but also in the field of public health and health care.

Keywords: quality of life, gastroduodenal pathology, medical and social aspects.

INTRODUCTION

Today, much attention has been paid to the quality of human life in our country. The concept of quality of life assessment in medicine is declared as a priority. The President of the Russian Federation Vladimir Putin declared that "improving the quality of life of Russian citizens should be a priority for the long term." It is an important new scientific and practical direction of interdisciplinary research in pediatrics. The concept of quality of life research in Russia is primarily based on the main components of the definition of health. The World Health Organization (WHO) provides an effective model for integrated assessment of the human condition with the versatile and deep understanding of the impact of the disease on its physical, psychological, emotional and social functioning. Quality of life is seen as a multidimensional, complex structure, including the perception of the individual's physical and psychological condition, their level of independence, their relationships with others, and personal beliefs and their relationship to the significant characteristics of its environment. WHO has established the basic criteria of quality of life and physical (power, energy, fatigue, pain, discomfort, sleep, rest), and psychological (positive feelings, thinking, learning, concentration, self-esteem, appearance, emotions), the level of independence (everyday activity, performance, dependence on drugs and treatment), social life (personal relationships, social value of the subject, sexual activity), the environment (way of life, well-being, safety, accessibility and quality of health and social care, security, environment, training opportunities, the availability of information); spirituality (religion, personal beliefs).

Over the past 5 years, the overall incidence of children of all ages in Russia increased annually by 6.5%. The health of children of teenage age is alarming, 70% of them have chronic pathology, socially constructed and socially significant diseases. The pathology of the digestive system is one of the priority diseases of the internal organs and, as indicated in the literature,



does not tend to decrease. According to Baranova A.A. (2010), in recent decades, the prevalence of digestive diseases among teenagers of 15 to 17 years increased by 1.8 times, amounting to an average of 300 - 400 ‰.

In the literature there are the works of assessing the quality of children's life with celiac disease, bronchial asthma and frequently ill children of our republic with the help of international questionnaires, but the study of quality of life of children with chronic gastroduodenal pathology wasn't conducted. The knowledge of this index will allow a comprehensive approach to assessing the health of the child, his satisfaction with various aspects of their lives, the degree of adaptation, effectiveness of treatment and rehabilitation measures, and also it will serve as a prognostic factor. However, in order to obtain reliable data on the parameters of quality of life, methodology must be observed. Significant contribution to the development of methodology contributed experts of Multinational Research Center of the Quality of Life in St. Petersburg.

At the end of the twentieth century, the term of "health related quality of life, HRQL" appeared. It allows to define precisely the medical aspects of this concept from the variety of aspects of human life. Health related quality of life describes how the physical, emotional and social well-being of the patient is influenced by the disease or its treatment. The most comprehensive definition that reflects the essence of the concept was given by experts of Multinational Research Center of the Quality of Life in St. Petersburg: health related quality of life is an integral characteristic of the physical, psychological, emotional and social functioning of healthy or sick person, based on his subjective perception.

A significant contribution to the development and introduction of a methodology for assessing the quality of life of children have Feeny D. (Canada), Landgrave J. (USA), Varni J. (USA), Bullinger M. (Germany), Kind P. (UK). There are more than three thousand foreign publications, devoted to the study of the quality of life. This method is currently used in various fields of pediatrics in the USA, Canada, UK, France, Germany, Italy, Japan, as part of programs coordinated by the International Society for the Study of quality of life.

The basis of the study of the quality of life for both children and adults is based on three main features: multi-component, variability in time and part of the respondent (the child or parents) in the assessment.

Multicomponent feature. The quality of a child's life reflects the following aspects of his life: physical (physical activity, mobility, experience, independence in everyday life, physical role), psychological (emotional background, psychological problems, cognitive ability), social (relationships with peers, parents, social role, self-esteem). The components of quality of life in children differ from those of adults, reflecting thus the physiological, psychological, intellectual, social, and other age-related features. Studies have shown that the basic meaning for the child has the following aspects of life: games, the level of welfare of the family, friends, self-esteem, lack or presence of pain, sickness, and hunger. Changing the name of these factors entails, as a rule, changes in the level of quality of life. Schooling for children is an important indicator of social and physical activity. As for adults, the same indexes are professional activities, work, behavior in society.

The variability in time. Quality of life time varies depending on his state of health due to various external and internal factors. On the basis of data on the quality of life implementation of long-term monitoring and conducting therapy correction are possible.

Participation in the *assessment of life quality* is carried out by both the child and his parents. An interesting fact is a presence of disagreement between children and parents in assessing the quality of life of children, the so-called proxy-problem, and cross-informant variance is a phenomenon described in detail in the literature. The question of who should evaluate the quality of a child's life is still open. Children are able to adequately represent his personal opinion in regard to their own health after 5 years. Therefore, up to 5 years child's quality of life is assessed by parents and after 5 years old both parents and the children take part



in assessment. The subjective perception of a person plays an important role, because such an assessment is very sensitive and informative. The level of quality of life of the patient, along with the traditional medical opinion can create a complete and objective picture of the disease. Depending on the patient's pathology it can be solved various problems during treatment. The quality of life of the patient can be either a major or additional aim.

Assessment of the quality of life in medicine should be conducted differentially, taking into account the so-called theory of motivation by Maslow A.H., 1970. According to this theory there are vital human needs of different levels, from basic physiological (breathing, eating, relief from pain, sleep) to the needs of high-level (self-esteem, self-actualization). In this case, the more serious the illness, the greater the basic human physiological needs, while the needs of high-level affected a little.

Among the research tools of quality of life, questionnaires filled out by patients are commonly accepted and distributed. Single, universal tool for measuring the quality of life does not exist. At present there are about 400 questionnaires, each researcher selects the most appropriate, based on the goals and objectives of their work. It is important to consider the psychometric properties of the questionnaire, with the help of which they study of quality of life. They are:

- reliability - the ability to give consistent and accurate measurements;
- validity - the ability to reliably measure precisely the characteristic that it laid;
- sensitivity - the ability to produce significant changes in quality of life scores in accordance with changes in the respondent.

Quality of life is one of the new criteria for evaluating the effectiveness of medical care that have been widely used in countries with high levels of medicine. The quality of life is considered as an integral characteristic, which should be guided in evaluating the effectiveness of rehabilitation of sick and disabled people. The accumulated experience of studying the quality of life shows that this method is very promising for all branches of medicine. The study of quality of life in medicine allowed to return at a new stage in the evolution of the most important principle of clinical practice "does not treat the disease, but the patient."

To assess the quality of life of children it was developed a series of questionnaires. Currently, the most commonly used, which have high psychometric qualities and meet the international standards for quality of life assessment tools are the following: Pediatric quality of life questionnaire-PedsQL, Varni JW, 1998. Shild health questionnaire-CHO, Landgraf J.E. et al., 1999. German generic quality of life instrument for children-KINDL, Bullinger M. et al., 1998. In addition, there are other common questionnaires for quality of life of children TACQOL, CHIP-AE, CHIP-CE, QUALIN, FSIIR etc. As noted above, there are specific questionnaires designed for a nosological form. They are narrow, but more sensitive to minimal changes in clinical state of health of children of these groups. From the presented survey questionnaires we can see that a single, universal tool for measuring, both general and specific quality of life of children does not exist, each researcher selects the most appropriate, based on the goals and objectives of their work.

Fields of application the method of assessing the quality of life of children is quite broad. These include: - population studies and monitoring of children's health in identifying risk groups; - evaluation of the combined effect of the disease on the child's life; - monitoring the patient's condition and prognosis of the disease definition; - evaluation of the effectiveness of new drugs, treatment, rehabilitation and prevention programs; - standardization of treatment methods; - evaluation of the effectiveness of programs and reforms in health care; - health economics.

From the position of social health it is particularly important that the study of quality of life is universal and highly informative tool for determining the effectiveness of the health care system, providing complete an objective assessment on the level of the main consumer-patient. It



is possible to assess patient satisfaction, as a recipient of health care services, quality of care from the perspective of both social and physical and mental functioning of the patient.

To study the quality of life in children with chronic gastroduodenal pathology it can be used special questionnaires: GSRs, QLDUP, QOLRAD, IBS-QOL, IBDQ; and also - general questionnaire-CHQ-Child Health Questionnaire, PedsQL-general version. The quality of life of children with chronic gastroduodenal pathology may vary depending on age, sex, stage of disease, the presence or absence of complications, the degree of social well-being of the family and psychological factors. Assessment of the quality of life of children with chronic gastroduodenal pathology has significant potential for application not only in clinical trials and clinical practice, but also in the field of public health and health care.

The study of quality of life is a simple, reliable and effective tool to assess the patient's condition before treatment, during treatment, a period of rehabilitation. Quality of life allows the monitoring of the disease and improves treatment outcomes. A well-designed methodology helps to ensure a reliable data on the parameters of quality of life of the patient. The results of studies of quality of life, received international and domestic experts, demonstrate great potential of the method in research and clinical practice.

Own experience of the research quality of life of children and teenagers with chronic gastroduodenal pathology with the help of the international PedsQL questionnaire showed that it is possible to identify the factors that influence its component parts and to examine the causes of handicaps and disabilities. The advantage of PedsQL questionnaire are speed filling – only 5 minutes and the accuracy of measuring the components of quality of life, reliability and comparability of the data. It is important that this option is possible to trace the dynamics of the assessment carried out rehabilitation.

This method opens up new possibilities for improving health and social care for children with chronic gastroduodenal pathology. Together with the standard clinical examination techniques it enables a comprehensive assessment of Child Health. It allows carrying out corrective actions on the part of health and social services. This method is recommended for pediatricians and gastroenterologists who deal with this category of patients. In addition, the international general questionnaire PedsQL-module can be used to evaluate the quality of life of healthy children and patients with various other conditions.

References

1. Alifanova L.A. Realizatsia sistemnogo podhoda k zdorovjesberegeniu I garmonicnomu razvitiu shkolnikov [The implementation of the system approach to healthcare and harmonious development of students] *Pediatria [Pediatrics]* 2007, V.86, № 2, pp. 106-110.
2. Albitsky V.Y. Vozmoznosti ispolzovania kriteriev kachestva gizni dla ocenki sostoyania detey [The possibility of using quality of life measures to assess the health of children] *Rossiysky pediatricheski gurnal [Russian Journal of Pediatrics]* 2007, № 5, pp.54-56.
3. Baranov A.A. Izuchenie kachestva gizni detei – vazneishaya zadacha v pediatrii [Study of the quality of life of children is the most important task of current Pediatrics] *Rossiysky pediatricheski gurnal [Russian Journal of Pediatrics]* 2005, № 5, pp. 30-34.
4. Baranov A.A. Sovremennye podhodi v izichenii zaboлеваemosti detskogo naselenia Rossii [The modern approach to the study of child morbidity in Russia] *Rossiysky pediatricheski gurnal [Russian Journal of Pediatrics]* 2008, № 5, pp. 4-7.
5. Livzan M.A. Kachestvo gizni bolnih hronicheskimi gastritom posle eradikatsii Hp: tezis doklada 9 rossiyskoy gastroenterologicheskoy nedeli [Quality of life of patients with chronic gastritis after eradication Hp: Proceedings of the 9th Russian Gastroenterological



- Week] Rossiyskiy yurnal Gastroenterologii, Hepatologii, Coloproctologii [Russian Journal of Gastroenterology, Hepatology, Coloproctology] 2003, № 5, App. № 21, pp. 34.
6. Novik A.A. Ionova T.I. Issledovanie kachestva zizni v medicine [The study of quality of life in medicine] Moskow: GEOTAR-MED, 2004, P. 304.
 7. Varni J. W. Pediatric health-related quality of life measurement technology : a guide for health care decision makers / J. W. Varni, M. Seid, P. S. Kurtin // J. of Clinical outcomes Measurement. - 1999. -Vol. 6. - № 41 - P. 33-40.
 8. Varni J. W. The PedsQL 4.0 measurement model for the pediatric Quality of life inventory version 4.0 / J. W. Varni, M. Seid, P. S. Kurtin // Qual. Life News Letter. - 1997.-Vol. 3.-P. 4-10.
 9. Varni J. W. The PedsQL 4.0 reliability and validity of the pediatric quality of life inventory version 4.0 genetic core scales in healthy and patient populations / J. W. Varni, M. Seid, P. S, Kurtin // Medical Care. - 2001. - Vol. 39. - № 8. - P. 800-812.

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Structure of short paroxysmal disorders of consciousness in the Civil Aviation specialists and the approaches to medical-flight examination

G.N. Biriyaeva

Abstract

The article presents the clinical observations of short episodes of losses of consciousness among the Civil aviation specialists, which make a threat to the flights safety. From 2000 to 2011 192 episodes were recorded. In 29.17 % of cases epileptic seizures were diagnosed, in 70.83 % - transient disorders of consciousness of non-epileptic origin. Results of a comprehensive survey showed features of clinical manifestations among the various categories of aviation professionals. At the deciding a question on the professional serviceableness at the medical-flight examination an individual and a balanced approach is necessary that takes into account gender, age, etiology, previous medical examination, etc.

Keywords: aviation specialists, seizures, short-time paroxysmal disorder of consciousness, safety, expert decision.

Introduction

Many diseases of neurology system, as well as the episodes of short-term loss of consciousness (seizures, faint, stroke, any acute cerebrovascular diseases, etc), in aviation personnel represent a threat for safety of flights.

The determination of characteristic episodes of loss of consciousness – epileptic seizure or not, faint or seizure and risk of recurring are very actual for the correct adaptation of the expert decision in each concrete case in Central Flight Medical Expertise Commission [2, 3, 7, 14, 16].

The symptom common to seizures and faints is loss of consciousness which, by definition, is of rapid onset and brief duration. There is not one classification of loss of consciousness disorder, because there are many various genesis mechanisms in each case [1, 9, 20].

By definition the word “faint” means a loss of consciousness due to a temporary failure of the cerebral circulation of a postural or reflex causation, not the result of heart diseases. This definition word excludes from our consideration attacks caused by heart block or other cardiac disorders and also those due hypoglycemia. The word “convulsive seizure” may be used to indicate that the loss of consciousness is accompanied by convulsions, or in a largest sense to include attacks or seizure of any kind that is epileptic. The first symptom is local discharge from epileptic centre of nerve tissue in brain. There for, seizure semiology is usually combined with EEG (not one EEG) and other neuroimaging data to localize the seizure focus [4-6, 8-17].

It is very difficult problem of differential diagnosis in clinical practice to determine characteristic episodes of loss of consciousness. The value of etiology, clinic of paroxysmal loss of consciousness definition of prognostic results are very actual for the correct adaptation of the expert decision in each concrete case [1, 3, 12].

Many researches devoted to epidemiology, clinical picture, differential diagnostics episodes of loss of consciousness which continue to be actual to the present are conducted. The results published in works of different authors, don't differ uniformity that dictates need of further works on studying of different aspects of a problem.

This research deals with determining the structure of paroxysmal short-term loss of consciousness disorders among aviation personnel of civil aviation.



Materials and methods

The studying the cases of paroxysmal loss of consciousness disorders among aviation personnel of Civil aviation from long time are presented. Aviation personnel included: entrants, cadets, stewards; licensed aviation personnel: aircraft commanders, pilots, aeronavigators, flight engineers, flight mechanics; from other - air traffic controllers. In all cases of paroxysmal loss of consciousness patients have clinical observation in neurological department in Civil aviation Hospital and expert decision in each concrete case in Central Flight Medical Expertise Commission [10, 14, 16]. In some cases it took years and repeated complex instrumental examinations for clarifying courses of disease. Instrumental examinations included: EEG, neuroimaging (CT, MRI), psychology tests, etc. [13, 16].

Results and discussions

During the period from 2000 to 2011 192 episodes of loss of consciousness among aviation experts were observed. After a careful assessment of the preclinical period, the description of an attack and the subsequent obligatory stationary inspection of registered persons in examination and rehabilitation office all episodes of short-term loss of consciousness were divided on: epileptic attacks – 56 (29,17%) and cases of short-term loss of consciousness of not epileptic character - 136 (70,83%).

Among employees and students of CA with short-term frustration of consciousness 150 (78,25%) men and 42 (21,87%) women were observed. Average age of patients at the time of a debut of an attack of loss of consciousness made $34,8 \pm 5,45$. All women with short-term frustration of consciousness were from among stewards, cadets and entrants. Distribution on official categories among an aircrew and students was the following: the aircrew (the aircraft commander, pilots, navigators, flight engineers, flight mechanics) was included in the 1st group - 48,96% of cases, dispatchers of the Department of Internal Affairs in the 2nd - 18,23%, to the 3rd group, we designate, stewards, entrants and cadets - 32,81% are carried.

From an aircrew with paroxysms of frustration of consciousness of 53,33% (40 people) pilots, 20% (15 people) the aircraft commander; 14,66% (11 people) flight mechanics, 6% (8 persons) navigators and 3% (4 people) flight engineers.

If to speak about type of paroxysmal frustration of consciousness at aviation experts of CA, they were distributed as follows (tab. 1). In total number of epileptic attacks the share of an aircrew made 57,14%, on the second place – dispatchers of the Department of Internal Affairs – 23,21%, a share of the other contingent – 19,64%. Among frustration of consciousness of other genesis the aircrew share (45,59%) took also the 1st place, the 2nd place at other – 38,23% and on the 3rd place of the dispatcher of the Department of Internal Affairs - 16,18%.

Table

Structure of paroxysmal loss of consciousness disorders among Civil aviation specialists,
abs. number (%)

Consciousness disorders	Category of the CA specialist			
	Aircrew	Air traffic controllers	Other	Total
All paroxysms	94 (48,96)	35(18,23)	63 (32,81)	192 (100)
Epileptic seizures	32 (57,14)	13 (23,21)	11(19,643)	56 (100)
Short-time paroxysmal disorder of consciousness of non-epileptic origin	62 (45,59)	22 (16,18)	52 (38,23)	136 (100)

In this study, for the first time surveillance of paroxysmal episodes of consciousness disorders in the Civil aviation specialists for a long of time was conducted. The carried-out monitoring showed that at structure of short-term losses of consciousness there were epileptic attacks and frustration of consciousness of other genesis.

According to the International antiepileptic league, epilepsy takes the third place on prevalence in the general population of the population, making 0,8-1,2%. Prevalence of faints in the same population makes 3% among man's and 3,5% among a female [10,11]. In our research among aviation experts less than 1/3 made epileptic attacks, more than 2/3 episodes of losses of consciousness of other genesis. It significantly doesn't differ on ES ratio to paroxysmal frustration of consciousness of other genesis from given in data.

Requirements of the Flight Medical Expertise (FME) which is carried out among aviation experts, dictate discharge of the persons who have transferred a single epileptic attack from professional activity. Return to a profession and diagnosis specification, determination of character of ES (symptomatic epileptic, provoked single) is possible only after the long period (not less than 2 years) discharges. Lack of recurrence of an attack, in the absence of the found tool changes in dynamics, allows to assume, the provoked character of an epileptic attack, instead of formation of an epileptic illness.

As it was already spoken, owing to specifics of a profession in our research of women there were only 21,87% (42 people) and all of them belonged to the other contingent (stewards, cadets, entrants).

Prevalence of the paroxysmal frustration of consciousness of non epileptic genesis (1,9:1), in group of other structure is probably connected with a variety of reasons. In this group of 6,6% (42 people) women, the age structure of this group is much younger, than in other structures (from 16 to 39 years) as entrants and cadets here entered. It is known that at young age immaturity of vegetative functions is most presented. FME in these cases uses temporary discharges for up to 3 months and carrying out treatment-and-prophylactic actions [3,6,11] more often.

Prevalence of ES over paroxysmal frustration of consciousness in group of dispatchers of the Department of Internal Affairs makes 1,4: 1. In group of an aircrew these ratios make 1,2: 1. The age structure of the observed contingent in these groups is more senior, than in group other, i.e. it is possible to assume a maturity of vegetative structures. The category of the working personnel already passed preliminary elimination in these groups at a study stage. Control supervision over this professional structure rather strict that forces professionals to watch the



reasons of functional violations and the reasons which can provoke faints. It is much more difficult to prevent EP. As appears from our previous publications the organic reasons of short-term frustration of consciousness (a consequence of craniocerebral injury, cerebrovascular disease, intoxication and etc.) here prevail. FME in these cases demands more frequent acceptances about discharge from professional activity [2,3,19,20].

Conclusion

Short-term paroxysmal frustration of consciousness represents an important medical and social problem. Faints can be the first and, on a certain time point, the only manifestation of various pathology. The range of the diseases leading to short-term paroxysmal frustration of consciousness is very wide. The forecast varies from widespread, having favorable a current to heavy states menacing to life.

Short paroxysmal disorders of consciousness pose a threat to safety, both to the life of passengers, and from an economic position, in case of intermediate landing, the cause of which is an acute illness of one of the crew members. As a result of the conducted research among aviation specialists groups of short-term paroxysmal frustration of consciousness of epileptic and non epileptic genesis are distinguished. Epileptic attacks made 29,17%, paroxysmal frustration of consciousness of other genesis made 70,83%. These ratios don't differ from those in the general population of the population. Taking into account the specified structure of attacks the FME principles are made assuming the maximum preservation of safety conditions of flights. After the transferred attack of epileptic genesis discharge from professional activity follows. After paroxysmal frustration of consciousness of other genesis probably short-term discharge is necessary for the purpose of specification of genesis of an attack and carrying out medical and rehabilitation actions. Carrying out an expert assessment of professional suitability right after the first registered episode and, often, lack of possibility of selection of medical actions and the preparations, dictated by requirements of preservation of safety of flights, is feature of diagnostics at aviation experts.

After carrying out inspection and physical examination of FMEC, Central Flight Medical Expertise Commission 40,8% of staff are detached (completely or with an individual assessment) from professional activity, 45,2% (62 ps) are left in a profession. From the students 42% (8) were recognized unusable to training.

At the analysis of short-term paroxysmal frustration of consciousness structure among various categories of aviation experts different ratios of ES to paroxysms of other genesis are revealed. Among an aircrew this ratio is 1,2:1, among dispatchers of the Department of Internal Affairs – 1,4:1, among the other - 1: 1,9 . It is connected with the variety of reasons, including sex, age, an etiology, the previous medical supervision, etc. and, demands further studying.

References

1. Barsukov A.V. Syncope in clinical practice / A.V. Barsukov, M.V. Didenko, S.N. Janiszewski, I.V. Shkodkin; Ed. S.V. Shustov. - St. Pbg: «ELBI-SPb ", 2009. - 336 p.
2. Biryukbaeva G.N. Paroxysmal disorders of consciousness in aviation specialists / G.N. Biryukbaeva //Aerospace and Environmental Medicine, 2012. - V.46, № 2. - P.64 -67.
3. Biryukbaeva G.N. Paroxysmal disorders of consciousness. Clinic, diagnostics, medical- flight expertise in civil aviation personnel: Textbook / G.N. Biryukbaeva, NA. Skripkina. – M., 2013. – 60 p.
4. Zenkov L.R. Clinical epileptology /L.R. Zenkov. – M., 2002. – 416 p.
5. Karlov V.A. Epilepsy as clinical and neurophysiological problem /V.A. Karlov // S.S. Korsakov Journal of Neurology and Psychiatry. - 2000. - V. 100. - p. 7-15.
6. Karlov V.A. Catamnesis of epilepsy patients discharged from the neurological department of the emergency hospital / V.A. Karlov, Listratova T.A. // S.S. Korsakov Journal of Neurology and Psychiatry. – 2008. – V. 2. Epilepsy. Suppl. - p. 10-12.



7. Clinical and functional criteria for the differential diagnosis of epileptic and non-epileptic paroxysmal disorders / A.K. Petrov, A.S. Zharylgapova, J.E. Akchurina [et al.] // <http://svs.kz>. 2011
8. Korovin A.M. Paroxysmal disorders of consciousness / A.M. Korovin. – L., 1973. - 104 p.
9. Guidelines for the diagnosis and expert evaluation of paroxysmal disorders of consciousness in aircrew of civil aviation / Ed. B.L. Gelman. Compiled by B.H. Semenov, S.G. Svinnikov, L.I. Kuznetsova. – M., 1978. – 31 p.
10. Methods of medical examination of aviation personnel of Civil Aviation: Handbook for medical- flight expert commissions / ed. by V.V. Kniga. - M: Air transport, 2004. - 304 p.
11. Neurology: national guide / ed. E.I. Gusev, A.N. Konovalov, V.I. Skvortsova, A.B. Hecht. - M.: GEOTAR - Media, 2009. - 1040 p. (Series “National guide”).
12. Some features of the clinic and etiology of paroxysmal disorders of consciousness in the individual flight professions / G.N. Biryukbaeva, Bogomolova M.A., A.G. Bystrova [et al.] // Proceedings of the 6th International Scientific Practical Congress.- M., 2008. – 94 p.
13. Paroxysmal disorders of consciousness. Urgent issues of diagnosis, first aid and military medical examination: guidelines / Ed. Y.V. Sabanin. – Balashikha, 2006. – 54 p.
14. Manual on Civil Aviation Medicine / Ed. MD, prof. NA. Razsolov. – M.: Publishing house "Ekon -Inform", 2006. - 592 p.
15. Sologubova T.S. Modern capabilities of differential diagnosis of neurogene syncope and seizures: the PhD thesis abstract. – M., 2004. - 25 p.
16. Federal Aviation Regulations. Medical examination of the flight, dispatching staff, cabin crew, cadets and candidates, entering the Civil Aviation aviations (FAP MOGA- 2002). – M., 2002. – 118 p.
17. Epileptic seizures in stroke patients: risk factors and mechanisms of development / I.A. Kaymovsky, A.B. Hecht, A.V. Lebedeva [et al.] // S.S. Korsakov Journal of neurology and psychiatry, 2008. – V. 2. Epilepsy. Ann. - p. 29-32.

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State of the Primary Disability of the Adult Population in the Republic Sakha (Yakutia)

ABSTRACT

The analysis of the main indicators of the primary disability of the adult population in the Republic Sakha (Yakutia) in the period from 2009 to 2012 was done. The primary disability of the working population in the same period, including a comparative perspective by districts (uluses) was separately analyzed.

Level of primary disability of the adult population declines in recent years, but slightly increases in comparison with 2011. The level of primary disability of working age population continues to decrease from 51.9 in 2009 to 45.5 per 10 thousand of working-age population in 2012.

Keywords: primary disability level of the adult population, the level of the primary disability of the working population, disability groups, the structure of the primary disability of the adult population according to the classes and subclasses of major diseases.

INTRODUCTION

At the present stage the most unfavorable feature of the Russian demographic situation is health worsening and growth of the working population disability [3]. Population disability is essential informative indicator of public health, the accumulating impact of social, economic, industrial, environmental and genetic factors, the level of medical care and, ultimately, reflective quality of life support systems [1]. By Y.P Lisitsyn definition (2009), "disability is a prolonged or permanent disability due to significant violations of bodily functions, caused by chronic illness or injury". [2]

MATERIALS AND METHODS

We analyzed the primary disability of the adult population of the Republic of Sakha (Yakutia) for 2009-2012. Number of disabled submitted pursuant to the Regional office of the Pension Fund of the Russian Federation on the RS (I).

RESULTS AND DISCUSSION

The total number of disabled people in Yakutia on 01.01.2013 is 56,953 people (01.01.2009 - 50,722), representing 5.9% (in 2009 - 5.3%) of the total population. Of them children - 6161 (6255), representing 10.8% (11.7%) of the total number of persons with disabilities.

Level of primary disability of the adult population declines in recent years, but slightly increased in comparison with 2011 (Table 1). Continues to decrease the level of primary disability of working age population from 51.9 in 2009 to 45.5 per 10 thousand working-age population in 2012

According to the level of the primary disability of the adult population in our country in 2012 occupies 42nd place ranking (in 2011 - 57). The level of primary disability in the Russian Federation in 2012 is 69.0 per 10 thousand of the population concerned (in 2011 - 72.6).

By region, the highest levels of the Republic of primary disability recorded in 2012 in these areas (encampments) as Srednekolymskiy, Ust-Yanskiy, Momskiy, Allaikhovskiy where the level of the primary disability of the adult population was above 10 100.0 thousand of the adult population (Table 2). At the same time located in Ust-Yanskiy, Momskiy areas marked the largest increase in this indicator since 2009 in Srednekolymskiy area for 4 years of observation, despite a slight decline in the primary disability, a high level of primary disability of the adult population.



Level of primary disability of the adult population below 60.0 per 10 thousand of the adult population in 2012, such as encampments Anabarskiy, Zhiganskiy, Gorniy, Mirninskiy. In the Anabarskiy, Mirninskiy areas for all 4 years there is a low level of primary disability of the adult population.

In Zhiganskiy area the largest decline in this indicator since 2009 - by 46.1% (from 94.5 in 2009 to 50.9 in 2012) was marked. Also a reduction of more than in 20% occurred in Amginskiy, Ust-Aldanskiy, Abyiskiy areas.

According to the level of the primary disability of the working population occupy leading positions Allaykhovskiy, Srednekolymskiy, Ust-Janskiy areas (Table 3). In the Allaykhovskiy, Ust-Yanskiy areas there is a significant increase compared with the figure in 2009 - 33.0 and 28.7%, respectively.

In some areas, the dynamics of the level of the primary disability of the working population is significantly reduced - by 61.4% Zhiganskiy, Nerungrinskiy - 43.1%, Amginskiy - 43.4%, Tattinskiy - 42.9%, Bulunskiy - 42.3%.

In the structure of the primary disability of the adult population in 2012 is still dominated by people with disabilities the third group (Table 4). The share of persons with disabilities in Group II is reduced in comparison with 2009, 2010 years, and group III increased.

In 2012 there was the following structure of primary disability of the adult population according to the classes and subclasses of the main diseases:

Ranking first place is occupied by circulatory system diseases - 19.1 per 10 thousand of the adult population. Compared to 2009, this figure dropped to 13.6%. In comparison with 2011 (18.9), there is a slight growth of 1.1%. At the same time dominated first recognized as disabled persons of retirement age (specific weight in 2012 was 56%). Among the first recognized disabled persons of retirement age the proportion of "heavy" disability groups (I and II) and is dominated by 69% of those of working age, the figure is 52%

Second rank place is still occupied malignancies - 11.6, while attention is drawn to their growth over the past three years. In this group of diseases is also dominated by people of retirement age. In both age groups dominated the heavier group disability. Weight of relatively equal and is among the elderly 79% working - 80%.

3rd place ranking - diseases of the musculoskeletal system (MMR) - 9.6 - here also witnessed steady growth in recent years. Among those who first recognized disabilities caused by diseases of the CCM is dominated by people of working age. The share for the first time recognized as disabled group III predominates in both age groups - among the elderly 79%, 61.8% working.

4th place ranking - the effects of trauma, poisoning and certain other consequences of external causes -5.8. In comparison with 2009, there has been reduction in the primary disability for this class of diseases by 14.7% (from 6.8 in 2009 to 5.8 in 2012). For this group of diseases is significantly dominated by people of working age, their share in 2012 is 75%. Group III disability citizens of working age is set for the first time in 49.7% of cases. In the elderly the severity of disability groups established for the first time, about the same, ranging from 31% (the first group) to 36% (third group).

5th place ranking in 2012 were diseases of the ear and mastoid - 4.8 per 10 thousand of the population concerned. The increase is 23% in comparison with 2009, 2011, But below the level of 2010 in most cases (66%) for the first time disability due to diseases of the ear and mastoid process established persons of retirement age. In the majority of cases (99.6%) Group III disability is established as persons of retirement age and those of working age.



CONCLUSION

Thus, the level of the primary disability of the adult population declines in recent years, but slightly increases in comparison with 2011; the level of primary disability of workforce continues to reduce. In the structure of the primary disability of the adult population in 2012 the third group of people with disabilities is still dominated. By region, the highest levels of the Republic of primary disability were recorded in 2012 in these areas (encampments) as Srednekolymskiy, located in Ust-Yanskiy, Momskiy, Allaikhovskiy. According to the level of the primary disability of the working population leading positions Allaykhovskiy, Srednekolymskiy, Ust-Yanskiy areas occupy. First place in the rank structure of diseases that cause primary disability stably cardiovascular diseases, malignant neoplasms, diseases of the musculoskeletal system occupy.

References

1. Grishina L.P. Talalayeva N.D., Amirov E.K. Analiz invalidnosti v Rossijskoj Federacii za 1970-1999 gg. i ee prognoz do 2015 g. [The disability analysis in the Russian Federation 1970-1999 and its forecast prior to 2015] Med.-soc. jekspertiza i reabilitacija [Medical - social examination and rehabilitation]. Moscow, 2001, No. 2, pp. 27-31.
2. Lisitsyn Yu.P. Obshhestvennoe zdorov'e i zdavoohranenie [Public health and health care]: Textbook. Moscow: GEOTAR-media, 2009, 512 p.
3. Shchepin O.P., Korotkikh R.V., Shchepin V.O., Medik V.A. Zdorov'e naselenija – osnova razvitija zdavoohranenija [Health of the population – a basis of development of health care]. Moscow: Nacional'nyj NII obshhestvennogo zdorov'ja RAMN, 2009, 376 p.

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Table 1

Dynamics of primary disability level for 2009-2012

Rate of primary disability (10 thousand ACC.)	2009	2010	2011	2012	Increase% to 2009	Increase% to 2011
The total population	65.0	64.8	60.4	61.6	-5.2	2.0
The adult population	76.2	75.6	69.1	71.2	-6.6	3.0
of which:						
The working-age population	51.9	51.0	46.3	45.5	-12.3	-1.7
The population of pensionable age	200.9	194.5	180	192.8	-4.0	7.1

Table 2

**Primary disability level of the adult population by districts of the Republic of Sakha
(Yakutia) (10 thousand of population)**

№	Districts of the Republic Sakha (Yakutia)	2009	2010	2011	2012	Increase to the level of 2009
	The of Sakha (Yakutia)	76.2	75.6	69.1	71.2	-6.6
1	Abyjskiy	110.1	91.2	97.9	72.9	-33.8
2	Aldanskiy	85.8	72.6	59.5	67.6	-21.2
3	Allaikhovskiy	108.6	124.4	87.6	103.5	-4.7
4	Amginskiy	97.3	67.5	74.3	66.7	-31.5
5	Anabarskiy	52.6	45.9	58.5	54.0	2.7
6	Bulunskiy	61.2	69.1	53.3	41.8	-31.7
7	Verhnevilujskiy	57.7	71.9	65.4	74.9	29.9
8	Verkhoyanskiy	79.4	60.9	40.6	61.1	-23.0
9	Vilyuyskiy	77.6	84.3	91.8	79.2	2.1
10	Verhnekolymskiy	57.7	71.5	88.0	60.2	4.4
11	Yakutsk	75.0	77.3	69.6	77.1	2.8
12	Gorniy	55.9	70.2	54.0	49.8	-10.9
13	Zhiganskiy	94.5	41.2	58.4	50.9	-46.1
14	Kobâjskiy	65.1	81.3	94.5	69.8	7.3
15	Lenskiy	85.0	99.2	99.2	81.8	-3.7
16	Mirninsky	45.9	47.8	45.0	45.6	-0.6
17	Megino-Kangalasskiy	89.1	88.9	81.2	88.3	-0.9
18	Momskiy	61.6	87.0	69.6	106.9	73.6
19	Namskiy	57.1	62.5	65.8	61.7	8.1
20	Neryungrinskiy	87.6	78.4	59.3	64.4	-26.5
21	Nizhnekolymskiy	73.7	96.0	104.0	80.8	9.6
22	Nyurbinskiy	75.7	75.8	72.1	73.5	-2.9
23	Ojmâkonskiy	95.4	79.3	79.3	81.5	-14.6
24	Olekminskiy	80.9	100.0	85.9	85.1	5.2
25	Olenekskij	61.8	49.3	60.7	74.2	20.0
26	Srednekolymskiy	116.6	104.2	115.2	109.7	-5.9
27	Suntarskiy	87.4	62.4	71.9	64.2	-26.5
28	Tattinskiy	96.6	76.1	90.0	72.2	-25.3
29	Tomponskiy	72.1	72.3	77.0	61.5	-14.7
30	Ust-Aldanskiy	101.9	89.2	69.9	68.2	-33.0
31	Ust-Mayskiy	76.7	58.3	61.0	71.7	-6.5
32	Ust-Yanskiy	56.0	89.1	84.5	109.7	95.8
33	Hangalasskiy	75.7	76.8	62.6	68.3	-9.7
34	Čurapčinskiy	77.8	72.0	65.2	61.1	-21.5
35	Even-Bytantajskiy	105.5	119.7	72.8	82.2	-22.1



Table 3

Primary disability level adult working-age population

№	Districts of the Republic of Sakha (Yakutia)	2009	2010	2011	2012	Increase to the level of 2009.
	Republic of Sakha (Yakutia)	51.9	51.0	46.3	45.5	-12.3
1	Abyjskiy	76.5	63.2	81.3	51.7	-32.4
2	Aldanskiy	55.4	49.2	38.4	50.1	-9.6
3	Allaikhovskiy	65.7	84.4	72.3	87.4	33.0
4	Amginskiy	68.0	48.8	52.3	38.5	-43.4
5	Anabarskiy	49.7	31.2	41.6	46.3	-6.8
6	Bulunskiy	48.2	53.9	44.9	27.8	-42.3
7	Verhnevilûjskiy	46.2	56.0	47.4	52.7	14.1
8	Verkhoyanskiy	74.4	48.5	38.2	49.1	-34.0
9	Vilyuyskiy	56.1	60.2	62.9	61.4	9.4
10	Verhnekolymskiy	39.4	46.2	78.2	45.3	15.0
11	Yakutsk	45.1	45.7	42.8	43.4	-3.8
12	Gorniy	47.3	45.6	30.9	41.3	-12.7
13	Zhiganskiy	85.6	26.7	49.0	33.0	-61.4
14	Kobâjskiy	42.7	51.8	47.8	47.6	11.5
15	Lenskiy	52.3	61.4	61.4	57.4	9.8
16	Mirninskiy	35.0	35.0	35.8	33.0	-5.7
17	Megino-Kangalasskiy	62.3	58.3	58.9	57.3	-8.0
18	Momskiy	48.0	35.7	22.3	51.7	7.7
19	Namskiy	33.1	49.5	43.2	44.1	33.2
20	Neryungrinskiy	69.4	63.9	41.9	39.5	-43.1
21	Nizhnekolymskiy	61.2	86.1	86.1	63.6	3.9
22	Nyurbinskiy	57.0	55.0	58.0	55.5	-2.6
23	Ojmâkonskiy	63.4	67.8	58.0	63.4	0.0
24	Olekminskiy	58.0	62.7	57.2	46.9	-19.1
25	Olenekskiy	48.8	43.2	57.6	44.6	-8.6
26	Srednekolymskiy	90.8	67.2	91.8	70.2	-22.7
27	Suntarskiy	51.6	49.7	44.0	44.4	-14.0
28	Tattinskiy	63.4	51.5	59.9	36.2	-42.9
29	Tomponskiy	50.0	56.1	47.0	48.5	-3.0
30	Ust-Aldanskiy	77.7	59.7	50.1	47.3	-39.1
31	Ust-Mayskiy	49.6	44.6	26.4	53.3	7.5
32	Ust-Yanskiy	54.0	78.5	59.3	69.5	28.7
33	Hangalasskiy	47.1	52.2	47.4	44.2	-6.2
34	Čurapčinskiy	57.0	46.6	42.0	43.0	-24.6
35	Even-Bytantajskiy	67.1	67.0	33.5	68.3	1.8



Table 4

**The disabled people
recognized for the first time, taking into account the degree of disability**

Years	Recognized by	I group		II group		III group	
		m	%	m	%	m	%
2009	5314	687	12.9	2424	45.6	2203	41.5
2010	5280	945	17.9	1826	34.6	2509	47.5
2011	4831	911	18.9	1590	32.9	2330	48.2
2012	5020	935	18.6	1571	31.3	2514	50.1



The Role of Medical Education Institutions in the Improvement of Human Resources Management of the Health Care System

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Abstract

The questions of adequate medical training, using new forms of organization and technology training, establishment of modern management services that ensure the efficient management of staff performance were discussed.

The urgency to improve human resources management by the problem of finding effective mechanisms to optimize the staffing of the health system in areas with low population density, including the training, retraining and further vocational training of medical personnel.

International and domestic experience shows that among the structural changes in health care, the purpose of which is to increase the efficiency of the system, the greatest success achieved in the field of action of the organization work with the staff, their training and retraining. According to the WHO, the cost of training and the use of human resources constitute 60 to 80% of the public expenditure on health care.

The country's transition to a system of market relations, the study and implementation of international experience in higher and vocational education change the concept of human resource management, methodology, and practical implementation of management tasks in order to improve the efficiency of health care organizations. The rational use of the limited capabilities of human resources, the introduction of new technologies in higher and secondary vocational education, social orientation in personnel work, increasing the motivation of health personnel in the distal areas contribute to its higher efficiency. The crisis of the state of health of the population and the increased demand for medical services do not only occur against the background of increasing scarcity of financial and material resources, but also inevitably accompanied by a lack of qualified personnel.

Under these circumstances, the medical staff is seen as a valuable resource of health, able to carry out skilled, accessible, cost-effective health care to the population. Quality performance of health care is possible only when adequate training in the use of new forms of organization and technology training, establishment of modern management services that ensure the efficient management of staff performance.

Conducted by the Government and the Ministry of Health reform changes in health care gave concrete results, expressed in the creation of a multi-level system of vocational training, improvement of material and technical base. At the same time, the effective use of health care personnel remains an urgent need for practical health care. The current situation in the health care system implies a profound change in educational policy. As Russian President Vladimir Putin rightly said: "Current conditions determine not only the new challenges of modernization of the health system, but also new requirements for the preparation of highly qualified professionals with world trends". The development of health and medical science is caused by the successful promotion of medical education and its degree of saturation of the achievements of biomedical research. The progress of biomedical science stimulates the development of medical education and its symbiosis with science, forms the curriculum, determining their quality, hence the efficiency.

Keywords: medical education, medical schools, health care.

Currently, there are over 16,000 higher medical schools that operate on a national level, and their activity is stimulated by leading international organizations: the World Health Organization, the World Federation for Medical Education, UNESCO, the Council of Europe,



the International Institute of Medical Education, the Association of Schools of Public health in the European region, the European Association for medical Education and others. At present, almost all developed countries of the world are carried out reforms in the system of medical education. Along with Russia, the new laws on education come into effect from 2013 in several European countries, radical amendments to the existing law on education adopted in the U.S. this year. Combining international and national efforts contributes to the development of medical education in the world and ensures the progress of this important field of human activity.

Virtually all countries, and our country, to recognize that the problem of the education of health professionals are systemic in nature, and share common positions: the inconsistency of knowledge and skills of health care needs and quality of care, it is a narrow technical focus in the absence of a broader understanding of the context, it is prevailing focus on inpatient care at the expense of primary health care, is a quantitative and qualitative imbalances in the professional labor market is the lack of a balanced system of continuing professional development, and, finally, the weakness of the leadership and training of managers needed to improve the efficiency of the health system. The industry remains a significant shortage of personnel, continuing brain drain from public health facilities, increasing pressure on doctors because of inefficient forms of work organization, job dissatisfaction, social tensions staff.

Optimizing health can only be realized only through building material and technical resources of the health system; they must be targeted application and results-oriented. It should be noted that in the changed circumstances in the nationwide Russians health problem cannot be solved solely within the classical medicine and constant parameters of higher and secondary medical education. The changed conditions of life of the country constitute changes in the principles, targets, methods of health care system, and hence the process of training for work in it.

In this regard, the World Federation for Medical Education established the Commission, which included 20 professional and academic leaders from around the community to develop a common vision and strategy for medical education and public health. The Commission has made appropriate conclusion on the results of 2012, "Today, we understand the need for third-generation reforms, which must be integrated to improve the efficiency of the health system by adapting the basic professional skills to the specific conditions for the use of the global potential of knowledge and experience". This conclusion is entirely reflects our mission at this stage, which involves increasing the capitalization of human resources and the competitiveness of the vocational education system, the formation of a system of continuous education.

The experience gained in the field of medical education at the international level is extensive and characterized by a multiplicity of national schools, their characteristics and traditions. Curricula considered the presence of the priority groups of diseases specific to different regions of the world, the principles of primary and secondary prevention, etc. Global vector of development of medical education and our strategic objective is to improve the system of vocational education. Today, we are lagging behind the development of vocational education in the countries of the European average of 10 years. The current system of additional vocational training does not meet the present level of health care, both in form and in content. In this regard, we will as soon as possible to establish a system of continuing professional medical education.

Despite the existence of national differences, the general laws of development of medical education prevail. In all countries, differentiated three stages or phases of the process at the level of undergraduate education (1st stage), is strictly regulated by the theoretical and clinical training. Specialization (2nd stage) is implemented in accordance with the needs of health care. The ongoing demographic shifts in the direction of increasing life expectancy, especially in developed countries dictate the need for more training in the field of geriatrics, cardiology, oncology, psychiatry, ophthalmology, etc. Continuing Professional Education (third stage) is



based on the achievements of the Life Sciences science and applications of advanced medical technologies.

In recent years, many countries and at the international level gave special importance to the development and implementation of standards within each phase of continuing education. In particular, the World Federation for Medical Education has developed international standards for the various stages of medical education, which were discussed and adopted by the World Conference on Medical Education in March 2003 in Copenhagen. In this regard, there is a need to develop evidence-based modern control system by medical personnel of medical institutions based on actual conditions and possibilities of state and municipal public health, considered one with the personnel management system of national health care.

Purposeful activity on the formation of the educational continuum in a medical institute of the North- Eastern Federal University named after M.K. Ammosov (NEFU) is carried out from the opening of the Faculty of postgraduate training of doctors in 1997. Currently, medical school came to qualitative changes in the activity from the perspective of the development of innovative approaches, which allows for optimal and sustainable form of educational space. Promotion of continuing professional education is a top priority for medical school until 2020, which is reflected in the program of development of the university. Solving problems of post-graduate training is carried out at the university through the implementation of strategic management, the deep integration of education, research and innovation, medical and international activities, development and implementation of mechanisms that increase the competitiveness of the real NEFU in medical training not only for the North -East of Russia, but also for the whole Far East region. The main task of medical school NEFU was and still is a quality career-oriented training of specialists in the priority areas of medicine and health care on the basis of a single production process, promotion and application of new skills. Today the medical school NEFU builds relationships with consumers of educational services on a new paradigm, "from the formation of knowledge and skills - to master the competencies". The principle of the Bologna Convention "Lifelong Education" is realized through vocational education programs in the clinical internship, the program of training and retraining (of 72 programs) , in graduate school (in 8 specialties) . With the 2013/14 school year for interns and residents, as well as for students of cycles of training and retraining programs developed and implemented simulation courses. To improve the quality of medical education are essential components of self-control institution, and evaluation of the examination. Current 2013 marked a successful completion of the International University of professional accreditation specialty "General Medicine" and successful state accreditation Rosobrnadzor specialties internship, residency and postgraduate studies.

As for the shortage of human resources industry, it is appropriate to note that a set of contingent on 1 course depends not only on the university, its policies, and the impact of competition. First of all, the interested party must be an employer, through the Ministry of Health, Chief Physician of the medical organization. Process of medical training in developed countries is focused on appropriate health care needs, and here it is used a well-known method of planning training, which helps to optimize the development of the health system.

The impetus for learning throughout life should be the criterion for the selection of students entering medical schools and students at all stages of medical education. Therefore, special attention should be paid to the work and career guidance to students and graduates of secondary schools. Medical school puts a lot of effort for this work. But, as the analysis of this part, this activity would be more effective if it was connected to the medical community on the ground. We propose to include in the annual work plan of health facilities meeting with students and graduates of secondary schools, and educational outreach, publications and presentations in the media leading experts in career-oriented focus, with the popularization of specialty. It's no secret that the applicants often find it difficult to explain the committee why they have opted for



a particular specialization. The organization and carrying out together with the District Board of Education case competitions and workshops, preparation for republican competition "Step into the Future" would serve as an impetus for students in choosing a career. In the end, get on the end of their final training specialist - a native of the same district, is much more real than to attract young professionals - a native of another district. In this respect, a lot of work carried out by the Ministry of Health in cooperation with the Government of Republic of Sakha (Yakutia). For the third year are allocated to State order additional seats at the expense of the national budget. It would seem that we will be able to significantly reduce the shortage of personnel on the ground in a very difficult period of 2016-2020 years. But here, we met unexpected difficulties. The fact that children from areas with good results exam held on the general competition, and those who have the least points - under the state order. It turns out that the government order provides graduates of places known to be weak, and after the period of study - potentially weak specialists. What quality of professionals in the field can say in this situation of affairs? Analysis of the performance of students admitted under the state order showed that about 10% of them have been expelled for poor academic performance. The decision to exit from this situation, we see a clear division of target sites in themselves Regional Health and Education in the competition, where the best of the best will be given guaranteed places the obligation on mining locations specified period intern. This should have a positive impact attention and support, including financial, health care institutions themselves, which is regulated by the new Federal Law "On Education". The Institute of Medicine has spoken with the initiative to open the university preparatory courses health professionals, according to objective difficulties in the development of high school graduates from the Arctic area of the school curriculum in chemistry and biology. We believe this solution to the problem is very promising.

Continuing professional education (CPE) means the period of education or training of doctors, beginning after the completion of undergraduate and postgraduate medical education, continuing throughout the professional life of a doctor. However, CPE - it is far more serious activity throughout the period of continuous medical education. Therefore, CPE is a professional; it is necessary for every physician education and, at the same time serves as a prerequisite for improving the quality of health care. CPE mainly involves more self and practice-based self- active, unlike learning control side. In addition to the problem of increasing the level of individual professional education, aims CPE are also the preservation and development of competencies (knowledge, skills and abilities) of each physician needed to work with the ever-changing demands of patients. The objectives also include the development of the health system responsive to new scientific discoveries in medicine and faced with increasing demands of licensed entities and the public.

For the conduct of good practice throughout his professional life, physicians must comply with the current level through continuous training in any direction or continuing education. To ensure high-quality patient health care or maintenance service CPE should be aimed at strengthening the role of the doctor and the increase of its competence (both clinical skills and theoretical knowledge). Fundamental innovations alter the medical concepts and methods, and representatives of the medical profession must be adequate through CPE to absorb these innovations. By analogy with this, health workers have to constantly deal with new ethical requirements and factors of social and economic development, which requires every doctor taking on new roles. It is becoming increasingly significant role of CPE in the quality assurance and quality development of the health system.

Motivation to CPE for the individual doctor due to three main factors:

- Professional desire to ensure optimal care for each patient;
- A commitment to take into account the requirements of employers and society;
- The need to maintain a sense of satisfaction derived from work.



However, it is well known that only a highly competent professional can meet the needs of the population for health care at the appropriate level of quality, thereby protecting the legitimate rights and human dignity. In conclusion, it should be noted that the general patterns and trends in medical education in the world, despite some negative elements of its development, create prerequisites for the formation of medical professionalism of the twenty-first century, so essential to social and economic development of modern society.

References

1. Koncepcia rasvitiya sistemi zdavoohranenia vs Rossiiskoi Federacii do 2020 [The concept of development of the health system in the Russian Federation until 2020]: itogovij doklad [Final report].
2. Ukaz Prezidenta RF "O merah po realizacii gosudarstvennoi politiki v oblasti obrazovania i nauki" ot 7 maja 2012g. №599 [Presidential Decree «On measures for implementation of the state policy in the field of education and science» May 7, 2012, № 599].
3. Federalniy gosudarstvenniy obrazovatelniy standart po napravleniu podgotovki (specialnosti) 060101 Lechebnoe delo visshogo professionalnogo obrazovania, utverzhdenniy prikazom Ministerstva obrazovania i nauki Rossiiskoy Federacii ot 8 noyabrya 2010g. №1118 [Federal State Educational Standard for training (specialty) 060101 Medicine of higher education approved by the Ministry of Education and Science of the Russian Federation, November 8, 2010, №1118].
4. Federalniy gosudarstvenniy obrazovatelniy standart po napravleniu podgotovki (specialnosti) 060103 Pediatria visshogo professionalnogo obrazovania, utverzhdenniy prikazom Ministerstva obrazovania i nauki Rossiiskoy Federacii ot 8 noyabrya 2010g. №1122 [Federal State Educational Standard for training (specialty) 060103 Pediatrics of higher education, approved by the Ministry of Education and Science of the Russian Federation, November 8, 2010, № 1122].
5. Federalniy gosudarstvenniy obrazovatelniy standart po napravleniu podgotovki (specialnosti) 060201 Stomatologia visshogo professionalnogo obrazovania, utverzhdenniy prikazom Ministerstva obrazovania i nauki Rossiiskoy Federacii ot 14 yanvary 2011g. №16 [Federal State Educational Standard on direction 060201 "Dentistry" of higher education approved by the Ministry of Education and Science of the Russian Federation dated January 14, 2011, № 16].
6. Postanovlenie Pravitelstva RF ot 31 dekabrya 2010g. № 1220 «O finansovom obespechenii za chet budzhetnih assignovaniy federalnogo budzheta sozdania obuchauzhih simulationnih centrov v federalnih gosudarstvennih uchrezhdeniyah» [Government ordinance dated December 31, 2010, № 1220 "On the funding from the budgetary allocations from the federal budget of organization of simulation training centers in the federal public institutions»].
7. Kluev A.K. Strukturi rasvitiya VUZa: nauchno-obrazovatelnie centry [Structure of development of the university: research and education centers] // Universitetskoe upravlenie: praktika i analiz [University Management: Practice and Analysis]. 2009, №5, pp. 64-70.
8. Navodnov V.G. K voprosu o sozdanii vnutyrvuzovskoy sistemy monitoringa kachestva obrazovaniya [Towards the creation intrahigh education monitoring of education quality] // Sovremennye problemy professionalnogo tekhnicheskogo obrazovaniya: materially mezd.nauch.-metod.konf. [Modern problems of vocational and technical education: Materials of interreg. scient. met. conf.]. Yoschkar – Ola, 2011, pp. 81-82.

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Regional Model of Surgical Care Organization for the Newborn of Sakha Republic (Yakutia)

Abstract

In order to improve the quality of care for neonates with surgical diseases we examined the primary causes of newborn deaths in the period from 1992 to 2011 according to the children's surgical department of Yakutsk data. In 77% of cases the causes of adverse outcomes in neonates with surgical pathology were conditionally preventable. We identified the main organizational direction, which led to a reduction in mortality of infants with surgical pathology in 3, 5 times during the 2 study period. Basic medical and organizational moments of regional model improving medical care for newborns with surgical pathology are antenatal diagnosis of malformations and prenatal consultation by pediatric surgery, competent and timely transportation of the newborns from regions, centralization assist in the level 3 hospital, introduction of modern diagnostic and treatment algorithms, methods of minimally invasive surgery.

Keywords: the newborns, surgical care, congenital malformations.

Introduction

One of the main priorities in the system of health service modernization in the Russian Federation is a surgical care to the newborns. Surgical Neonatology, especially over the last decade, has reached great heights, but the results of surgical treatment of newborns have different values, depending on the region [1, 2]. Our regional peculiarities are connected with a vast territory and low population density which influence a medical care of the newborns. Most Central Republican Hospitals are of the 1st level. They haven't possibility to take care of the newborns after operation to give a qualitative antenatal diagnosis of congenital malformations. To perfect the quality of medical care for newborns with a surgical pathology in the conditions of our region it's necessary to set up a system that includes organizing and medical aspects of perinatal and pediatric services, central republican health service helping the newborns.

The surgical department of the Pediatric Center of Republican Hospital №1 of the National Center of Medicine from 1992 till 2011 received 452 the newborns. 82% of surgical pathology of the newborns have congenital malformations, 7%- neoplasm, 6,8%-peritonitis (necrotizing enterocolitis, spontaneous stomach perforation), 42%-different pathologies (ovary cyst, incarcerated hernia, etc.). Frequency of congenital malformations has tendency to going up. In the course of researching it has gone up more than 2 times- from 14 in 1995 till 29 in 2011 per 1000 children. The frequency of congenital malformations went up 2.5 times in the industrial regions, the same is observed in the Arctic region and on the other side of the Lena river. (Table 1). Congenital malformations in the structure of infantile death are in the second place, but since 1995 it has gone up to 24%, though perinatal causes have gone down. In the structure of congenital malformations inborn heart disease is in the first place, different anomalies are in the second place, defects of the central nervous system and breathing organs are in the third place. Half of mortal cases take place during the first week of the newborn's life.

Results and discussions

In our Republic screening antenatal diagnosis of congenital malformations has been carried out since 2002. Its effect is 45%, 75% has been revealed till 22 weeks of gestation. Antenatal diagnosis of nosology is given in Table 2. Verification percent is higher in the tumors, gastroschisis, lung defects, congenital diaphragmatic hernia and omphalocele. 45% of pregnancy



has been terminated because of great number of defects and concomitant chromosomal pathology, in other cases it was a family wish in the case of isolated anomalies. But since 2008 a prenatal consultation together with a children's surgeon has been put into practice on the base of medical-genetic consultation. As a result prenatal pregnancy prolongation is going up; antenatal transfer is 45% during the last 5 years. According to the annual record of the Central Republic Hospital percent of screening pregnancy is 80-92%.

During the first researching period (1992-2001) results of the newborn treatment with a surgical pathology were unsatisfactory. Setting up an intensive care department of the newborns on the base of Prenatal Center in 1998 became the positive moment to improve the results of surgical treatment of the newborns during the second period (2002-2011). Since 2000 organizing, tactical and medical algorithms have been changed in the main groups of the surgical pathology of the newborns. In the course of researching period a mortal case has come down 3.5 times. Data in diagram 1 reflect that the mortality in the case of esophageal atresia came down from 93% to 19%, congenital diaphragmatic hernia from 43% to 10%, gastroschisis from 66% to 44%, omphalocele from 50% to 10%, high intestinal obstruction from 53% to 35%, low intestinal obstruction from 60% to 17%, anorectal defect from 29% to 4.8%, necrotizing enterocolitis from 66% to 28%, spontaneous stomach perforation from 80% to 25%.

Analysis of the causes of the newborn mortality with the surgical pathology determined that 77% might be avoided or be controlled. Mortality of only 8,6% of the first period can be referred to uncontrollable cases. In other cases the mortality causes are late diagnosis, non adequate preoperative preparations, wrong medical tactics, iatrogenic causes and septic complications. The iatrogenic causes are errors of operative equipment (4 in the 1st period), wounding of organs and tumors in childbirth (4 out of 5 in the 1st period), complications of infusing therapy (3 out of 6 in the 1st period), 1,2% is referred to transportation errors. Thus, the causes that should be eliminated were singled out.

In 2005 the reanimation consulting center of the newborns was set up in the Republic. Taking into account that regional hospitals are not able to have highly qualified specialists and modern equipments because of the low population density the new organized center plays a great role. Nowadays there are tele-medical communication posts in all central republic hospitals. The number and results of distant monitoring are given in Table 3. The main pathology of mortality as it's given in monitoring is a syndrome of respiratory disorders in the background of immaturity (56%), asphyxia, intrauterine infection, congenital heart malformations (30%), congenital malformations (6%).

Thus, the tactics of centralized surgical aid for the newborns has been justified in the conditions of our Republic. A timely antenatal diagnosis of congenital malformations plays a great role, but still there is a percent of the newborns needing a special evacuation, in most cases these newborns are with heavy prenatal congenital malformations. The main means of transport is an ambulance plane because of the vast territory. Algorithm of transport safety has been worked out. The mortality of the group with congenital malformations in the 2nd period came down 5 times; it's 8% (Table 4). During the transportation mortality was not observed. The following conclusions can be drawn:

- it's impossible to have a favorable result without timely evacuation of the newborn with a surgical pathology;
- competently carried out transportation doesn't worsen a postoperative period of the newborn.

In the hospital conditions of the 3d level new medical algorithms of highly-technological methods of surgical treatment should be introduced. In the course of 5 years small invasive endosurgical intervention in the case of congenital diaphragmatic hernia, congenital pyloric stenosis, lung defects, high anorectal atresia, coloesophagoplasty, endorectal bringing down of colon in Hirschsprung's disease, methods of levatorosphincteroplasty and others are introduced. Besides introduction of new technologies, perfection of surgical methods, acceptance of new



diagnostic and medical algorithms to aid the newborns with a surgical pathology it's necessary to set up the whole system including the relationship between Perinatal and Pediatric services.

Thus, in our region a modern model of surgical aid to the newborns with anomalies supposes qualitative antenatal diagnosis of defects, consultation of children's surgeon before childbirth who'll determine tactics of pregnancy conducting for every child specifically. But there are some complicated defects to be diagnosed antenatally i.e. 42% of the newborns have to be transported to the hospital of the 3d level [3]. Specialized surgical aid is carried out in big Pediatric hospitals having enough reserves of diagnosing and operating possibilities. Pre - operative preparations and early post-operative period should be carried out in specialized neonatal intensive care department.

CONCLUSIONS:

1. 40.4% of defects are in the competence of a children's surgeon and can be corrected at the infantile age.
2. Elimination of controllable causes of the newborn mortality with surgical pathologies, introduction of new algorithms and standard of treatment brought down the mortality 3.5 times.
3. The leading point of the regional model in the aid to the newborns is centralized medical aid as a result of the distant monitoring and competently carried out transportation of the newborns.
4. Specialized surgical aid is possible only in the hospital of the 3d level that unites Perinatal and Pediatric centers providing with successive treatment of the newborns.

References

1. Mokrushina J.G. Meditsinskaya pomosch novorozhdennyim s hirurgicheskimi zabolovaniyami [Medical care from newborns with surgical diseases]. avtoreferat diss. d.m.n. [MD thesis], g. Moskva, 2013, 52 p.
2. Sovershenstvovanie ranney hirurgicheskoy pomoschi detyam s vrozhdennyimi porokami razvitiya. Baybarina E.N., Degtyarev D.N., Kucherov Yu.I., Zhirkova Yu.V. i dr. [Improvement early surgical care from children with congenital malformations]. Rossiyskiy vestnik perinatologii i pediatrii [Russian herald of Perinatology and Pediatrics]. 2011, №2, p.12-19.
3. Transportirovka novorozhdennyih s porokami razvitiya pri razlichnyih modelyah organizatsii meditsinskoy pomoschi. Hamathanova E.M., Kucherov Yu.I., Frolova O.G., Morozov D.A. [Transportation of newborns with malformations with different models of care]. Akusherstvo i ginekologiya [Obstetrics and Gynecology]. 2010, №6, p.109-113.

Table 1. Frequency of malformations on the 1000 child population by groups of districts

groups	1995	2000	2003	2006	2007	2008	2009	2010	2011
Arctic	2,5	3,6	6,5	9,9	8,7	1,4	0,2	9,2	5,3
Viluiyskiy	4,6	8,6	9,6	1,3	2,3	8,6	1,5	7,9	9,0
Leninskiy	3,4	1,1	7,1	2,7	3,8	0,9	4,2	8,5	6,7
Industrial	0,7	2,5	9,4	4,9	5,8	3,9	3,9	6,7	6,9
Central	1,3	1,7	2,4	4,6	6,6	8,4	1,2	0,4	1,2
Yakutia	4,0	4,9	2,0	4,8	6,6	4,6	6,5	8,3	9,0

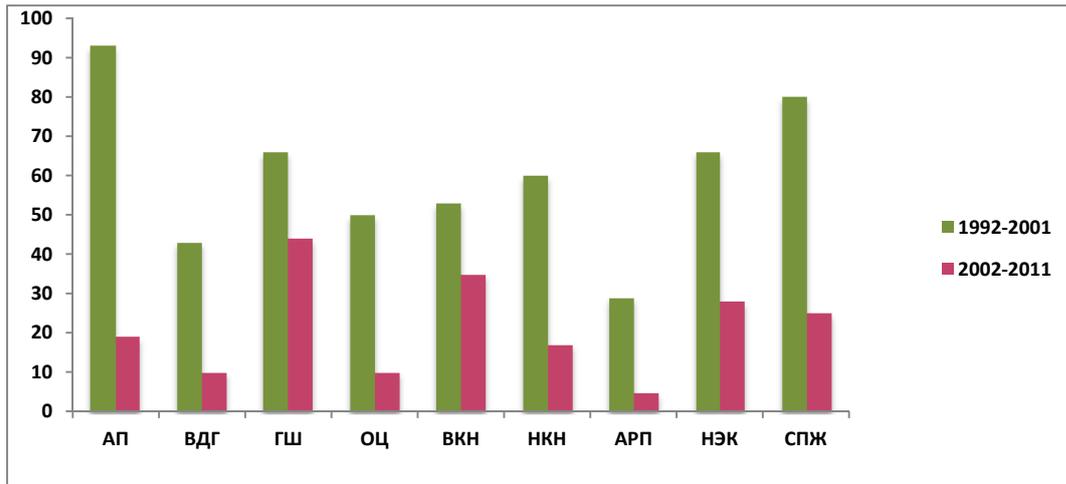


Fig 1. Reduction of mortality by major disease groups and malformations in infants during the study period.

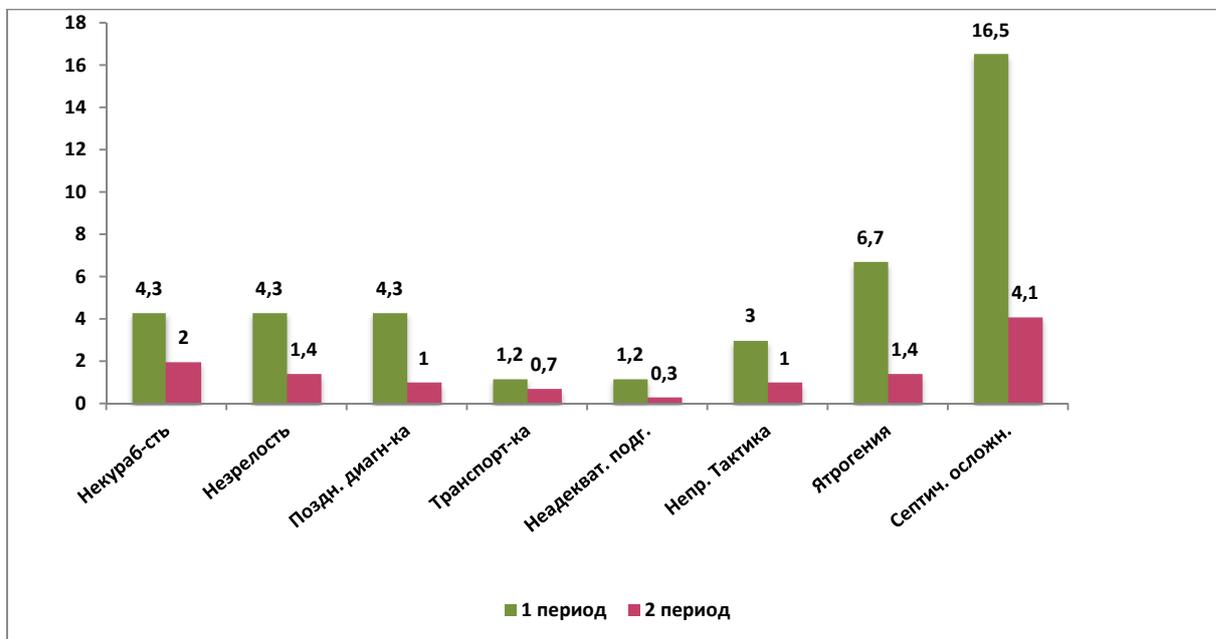


Fig. 2. Comparative structure causes deaths by period.



Table 2. Antenatal diagnostics from II period (2002 by 2011)

malformations	Total	Antenatal diagnostics	Interrupted from identified	Born
gastroschisis	39	35 (90%)	21 (60%)	18
Congenital diafragmatic hernia	28	19 (68%)	8 (42%)	20
omfalocele	18	11 (61%)	8 (73%)	10
Esophageal atresia	32	6 (19%)	5 (83%)	27
Intestinal obstruction	51	14 (27%)	5 (36%)	46
Anorectal atresia	48	6 (12%)	5 (83%)	43
Lungs malformations	10	8 (80%)	6 (75%)	4
Tumors	4	4 (100%)	2 (50%)	2
Total:	230	103 (45%)	60 (26%)	170

Table 3. Transportations newborns with congenital malformations and mortality in groups

I period		II period	
Without transportation	transportation	Without transportations	transportations
55	47 (46%)	97	71 (42%)
32 mortality	20 mortality	23 mortality	6 mortality
58%	42%	23,7%	8%

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MACRONUTRIENT COMPOSITION OF BREAST MILK AND FEEDING HABITS OF LACTATING WOMEN OF DIFFERENT ETHNIC GROUPS IN THE RUSSIAN NORTH

Savvina M.S., Chasnyk V.G., Burtseva T.E.

Abstract

The study is based on results of energy value and macronutrient composition of breast milk research and its relationship to diet of lactating women of different ethnic groups living in the Republic Sakha (Yakutia). We revealed that the energy value and the macronutrient composition of breast milk to a large extent were determined by ethnicity and region of residence of women.



Keywords: breast milk, energy value, macronutrient composition, ethnicity.

Introduction: A food of the child belongs to the most important factors of formation of its health and providing an optimum level of physical and intellectual development, quality and life expectancy improvement. Breast feeding is an ideal food of babies. Breast milk contains almost full set of the substances necessary for a food of the child.

The optimum composition of breast milk forms features of a fatty, carbohydrate, mineral and power exchange. It provides optimum conditions for physical and intellectual development of the child.

Research objective: To determine the power value and macronutrient composition of breast milk and their communication with a diet of feeding women of the different ethnic groups, living in the north of Russia.

Materials and methods: Research groups “mother – child” were picked up in a random way for satisfaction of criteria of inclusion which were: age of mother 18-45, breastfeeding, known ethnic origin, any number of previous pregnancies, filling of the card of the menu for 3 days, absence of diseases in day of inspection, signing of the informed consent.

According to the filled cards the average macronutrient contents in a daily diet and its power value was calculated.

Results: At the first stage of work the assessment of dynamics of the contents macronutrients in milk of mothers depending on lactation duration was made, age of the mothers, lengths of a body and weight of a body of the child at the birth, taking into account the place of residence and ethnic group.

Macronutrients concentration in milk depended on duration of the period of a lactation in all ethnic groups a little.

For the purpose of identification of communication of an ethnic group of the woman with the macronutrients contents in breast milk with the living place (village, city-village, Arkhangelsk region – YNAA – Yakutia), with body height and weight of mother, with characteristics of the social status, the course of pregnancy, age of the woman, existence of a professional harmfulness and addictions, number of pregnancy and for feedings. 8 most informative were defined for classification of parameters.

The received results testify, about that the content of proteins and fats in breast milk of women of all regions is slightly higher and carbohydrates below average values. The analysis of the obtained data leads to a conclusion that the quantity macronutrients in breast milk is caused by an ethnic group and the region of residence.

For the purpose of an assessment of a role of differences of a diet of feeding mother in formation of macronutrient composition of breast milk the energy value and the content of proteins, fats and carbohydrates in a food allowance of women of different ethnic groups are investigated.

The amount of proteins in a ration of the Russian women living in village, is significantly higher, than at native women. The same pattern is taped for the women living in Yakutsk: proteins in a diet of native woman were less, than in a diet of the Russian woman.

Proteins, fats and carbohydrates in a diet of native woman living in Yakutsk was significantly less, than at the woman living in village. Amount of carbohydrates in a diet of woman of both groups was above references.

Conclusion: The macronutrients contents in breast milk are defined by an ethnic group and the region of residence of the woman. Milk of native woman contains more fats; it has less than proteins and carbohydrates in comparison with milk of the Russian and Yakut woman. The content of proteins and fats in breast milk of woman all ethnic groups living in studied groups is slightly higher, in carbohydrates – below averages on population of values.



References

1. Kozlov A.I. Vershubskaya G.G. Medicinskaya antropologiya korennoho naselenia Severa Rossii [Medical anthropology of indigenous people of the North Russia]. Moscow: Izd-vo MNEPU, 1999, 10 p.
2. Muhina J.G. Chubarova A.I. Geraskina V.P. Sovremennie aspekti problemi laktaznoy nedostatochnosti u detey rannego vozrasta [The modern aspects of a lactase failure problem at children of early age] Voprosi detskoy dietologii [Problems of child dietology]. 2003, №1 (1), pp. 50-56.
3. Ntrebenko O.K. Pitanie I rost grudnogo rebenka: otdalennye posledstvia i svyaz s zabolevaniyami [Food and growth of the baby: remote consequences and communication with diseases] Pediatriya [Pediatr.]. 2009, № 88 (5), pp. 72-76.
4. Fateeva E.M. Kon I.Y. Otdalennoe vliyanie grudnogo vskarmlivaniya na zdorovie i kachestvo jizni cheloveka [Remote influence of breastfeeding on health and quality of human life] Voprosi detskoy dietologii [Vopr.det.dietol.]. 2005, 3(4), pp. 34-37.
5. Fateeva E.M. Popovich M.V. Biologicheskie, socialnie i ekonomicheskie prioritety grudnogo vskarmlivaniya [Biological, social and economic priorities of breastfeeding] Materiali V kongressa pediatrov Rossii [Materials of the V Congr. pediatr. of Russia]. Moscow, 1999, 495 p.
6. Guemonde M. Breast milk: a source of bifidobacteria for infant gut development and maturation? / M. Guemonde, K. Laitinen, S. Salminen // Neonatology. - 2007. - № 92. - P. 64-66.
7. Heinig M.J. Host defense benefits of breastfeeding for the infant. Effect of breastfeeding duration and exclusivity / M.J. Heinig // Pediatr. Clin. North Am. - 2001. - Vol. 48(1). - P. 105-23.
8. Hollox E. Lactase haplotype diversity in the Old World / E. Hollox, M. Poulter, M. Zvarik [et al.] // American Journal of Human Genetics. - 2001. Vol. 68. - P. 160-172.
9. Villalpando S.F. Lactation performance of rural Mesoamerindians / S.F., Villalpando, N.F Butter., W.W. Wong [et al.] // Eur. J. Clin. Nutr. - 1992. - Vol. 46(5). - P. 48-337.
10. Newcomb P. Breast feeding practices in relation to endometrial cancer risk / P. Newcomb, A. Trentham-Dietz // USA, Cancer Causes Control, 2000. - Vol. 11 (7). P. 7.

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Violation of the Cardiovascular System and Water Balance in Pregnant Women with Gestosis

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ABSTRACT

Understanding of the degree of dysfunction of organs and systems in pregnancy, associated with gestosis is extremely important for anesthesiologist, because it affects the tactics of the patient, the choice of anesthesia and therapy program. The article reviews the literature on the problem of hemodynamics and water balance in pregnant women with gestosis, anesthetic management of this category of patients.

Keywords: anesthesiology, pregnancy, gestosis, hemodynamics, water balance, spinal anesthesia, monitoring, operation, caesarean section.

Pregnancy is accompanied by changes in the function of many organs and systems of an organism of the woman. This is due to the growth and development of the fetus, increased body mass of women, the emergence of a new placental circulation and many other changes that occur in a woman's body [6,37,49]. Significant changes are characteristic for the cardiovascular system and water balance of an organism of the pregnant woman.

Normally, pregnancy is accompanied by a significant increase in circulating blood volume (CBV), the total volume of water (TVW) of an organism and increase of operation of all system of blood circulation [42,56]. If with physiological pregnancy and childbirth these changes remained within acceptable, with the development of gestosis shifts may reach critical values, clinically manifesting preeclampsia, eclampsia and pulmonary edema. Therefore, objective information about the state of the cardiovascular system and water balance, the degree of their violations is extremely important and relevant for professionals involved in obstetric clinics.

One of the main criteria of successful pregnancy and delivery is stable hemodynamics [6,48]. Hence, pregnancy, requiring that the system of blood circulation increased requirements, should also include mechanisms to ensure these new conditions. The system of blood circulation pregnant there are various compensatory changes, destination which is to ensure the normal development of the fetus and future safe delivery [20,21].

The minute volume of circulatory system (VSC) was increased by 8 weeks of gestation on 1 l/min, It is 22% from its level prior to the pregnancy and 57% of the total increase of the VSC reaches its maximum at 24 weeks pregnant [9,12,44].

As a result of Korotkova M.E. research it was found that in physiological pregnancy values stroke volume circulation (VSVS) range from 82,4± of 20.8 ml within 10-12 weeks to 96.6±16,1 ml at term of 38 weeks. The VSV in the same period varies from 5.8 about 1.6 l/min up to 7.35±1.25 l/min [22].

On 8-10 weeks of gestation, cardiac output increases by 30-40%, mainly due to the increase of stroke volume and to a lesser extent, by increased heart rate [2]. The peak load on the circulatory system accounted for 28-29-th week of pregnancy. The cardiac output increases and blood pressure remains the same and/or declining. Total peripheral vascular resistance (TPVR) decreases, and to the 14-24th weeks of pregnancy is reduced to 979-987 dyn cm sec⁻⁵.

In the work Stepanyan A.V. [et al.] it was established that the reorganization of the system of blood circulation to the end of the term of pregnancy is to increase the VSV on average by 21% and the work of the heart by 35%, increasing TVO 11% and extracellular fluid (Extracell) at 19, against the background of reduced TPVR on 24% [44].



This stress on the heart does not go unnoticed and causes its morphological changes. So, according to the U.S. studies have found that during pregnancy occurs thickening posterior walls of the left ventricular myocardium and slightly increasing its mass index [31, 39].

Of course, the severity of the changes of hemodynamics during pregnancy depends on the presence of concomitant pathology of the cardiovascular system. So, increase in blood pressure with concomitant arterial hypertension caused by increase of cardiac output at the average rate of 15% (women without obesity 20% and obesity by 9%) and the work of the heart by 31%, compared to healthy women, on the background of practically constant TPVR digits.

According to the WHO, from 20 to 33% [24, 27, 28, 35] cases of maternal mortality are connected with arterial hypertension (AH). Frequency of hypertensive states in pregnant women ranges from 17% to 24% [40], and in specialized hospitals of high risk, it reaches 28-30% [21,25,36,38]. In different regions of Russia it is from 7 to 29% [27].

One of the most frequent complications of pregnancy and complex sections midwifery practice is preeclampsia, which is marked with disorders of the cardiovascular system and water balance [42]. Preeclampsia occupies one of leading positions in the structure of maternal mortality causes [23,29,30,49,55]. In the general population of pregnant women the frequency of adverse options for the development of gestosis - preeclampsia and eclampsia is respectively 5-10%, and 0.05%, there is no tendency to reduction [46,47,50,51]. In Russia the rate of maternal mortality, associated with preeclampsia and eclampsia, reaches 20% and ranks second place after bleeding [42].

Beginning of development of gestational hypertension is characterized by an initial decrease in MV average on 42% and the work of the heart on 32% and increase in TPVR by 101%, with invariable liquid volumes. The main distinctive feature of the pathogenesis of gestational hypertension in pregnant women with obesity is to increase the TVB by 22% and increased Extracell 27%, in contrast to pregnant women with gestational hypertension without obesity [44].

K. Melchiorre and G. R. Sutherland when conducting echocardiographic study of pregnant women with preeclampsia have revealed that the majority of women tend to have diastolic dysfunction of the heart, which is a sign of progression of the disease [5].

For the most precise specifications of the pregnant hemodynamics A.P. Zilber and E.M. Shifman distinguish three variants: hyperkinetic type is characterized by cardiac index (CI), more than 4.2 l/min/m² and TPVR less than 2500 cm⁻⁵ x s⁻¹; eukinetic type - CI 2,5-4,2 l/min/m² and TPVR within 1500-2000 cm⁻⁵ x s⁻¹; hypokinetic type - reduction SI to 2.0 l/min/m² or less, and the TPVR rising up to 5000 dyn cm⁻⁵ x s⁻¹ [49].

Even at normal pregnancy due to a mismatch of BCC and capacity of the vascular bed volemic disorders occur [11]. During pregnancy, there are significant changes in the quantitative composition and qualitative of intracellular fluid and inner cellular fluid. Average fluid growth during pregnancy is 6 to 9 l, 4 – 6 liters from which fall on the extracellular sector.

VCB progressively increases, ranging from 6-8 weeks of pregnancy, and reaches a maximum of approximately 30 weeks [22]. The components of VCB grow unevenly: the volume of the circulating plasma was increased by 40-50%, while the volume of formed elements of blood only 20-30%. Therefore hematocrit reduced (to 32-34%) and hemoglobin concentration that allows to consider pregnancy as one of the types oligocitiemia [52,11].

Analysis of all the changes of the water balance suggests that pregnancy contributes to increase the filtration of a fluid in the interstitium and increases vessel out fluid. The most dangerous consequence of all violations is interstitial pulmonary hyperhydration, which could lead to the development of pulmonary edema [6,8,16,32].

Swelling is one of the triad of symptoms of preeclampsia, are only the outward manifestation of violation of the liquid distribution between extracellular and intracellular sectors. In severe forms of pre-eclampsia, dyshydria and tissue hypoxia are saved and in the



postpartum period [1,33,48]. Found that in puerperas in eclampsia coma there is a pronounced hyperhydration, with isotonic character [32,34]. The total volume of liquid Grozny deterioration in average 31,26% above the normal value that is associated with increased Extracell on 173,6% in comparison with the norm. These impacts are hyperhydration in interstitial sector, the volume of which exceeded the norm on 97,4%. VCV is reduced, and a deficiency due to a decrease in plasma volume. These values are much below those that take place during normal pregnancy [16,32,34].

However, stable hemodynamics does not guarantee that the perfusion of organs and tissues will be maintained at the proper level. At infringement of water balance of the body tries to compensate the lack of perfusion through redistribution of blood flow to vital organs. When this occurs, the activation of the sympathetic part of vegetative nervous system and the renin-angiotensin system, which leads to the development of a vicious circle, which helps to keep hypoperfusion [6,10,34]. The emergence of alternative, non invasive methods of assessment of Central hemodynamics and water balance, allowed to expand their clinical application.

T. Sodolski and A. Kutarski in their work showed that application of the method of integral reography pregnant for monitoring of Central hemodynamics completely exclude the possibility of complications, which occur when using invasive methods [13]. Basic methods that allow for a quick update extent and nature of the shifts of the cardio-vascular system disorders water balance are the methods based on the principles of reographyaimpedansometri [8].

Delivery requires the organism of a pregnant maximum voltage of all organs and systems, because it is the most traumatic moment during the whole period of gestation. Operation Caesarian section for the mother and the foetus is the most complicated and stressful variant of delivery, as anesthesia, surgery, drug exposure may lead to undesirable consequences. In this serious situation dependence obstetric outcome of the quality and effectiveness of anesthesiological protection of the mother and the fetus is not in doubt [2,17,18,19,26].

Of course, in a state of eclampsia and other life-threatening conditions such as obstetric hemorrhages, development hypocoagulation, septic complications absolute indication is the use of General anesthesia, usually combined endotracheal narcosis is the method of choice at the listed above clinical situations. However, when applying this method of anesthesia it is necessary to consider the metabolism of drugs (hypnotics, anesthetics, narcotic analgesics and muscle), and their effect on the organism of the woman and the fetus, as well as the impact on hemodynamics.

Most of these groups of drugs used during anaesthesia have direct or indirect impact on the system hemodynamics. So, widely used hypnoticand barbiturat - sodium thiopental causes a reduction in blood pressure, cardiac output, TPVR by depressive action on the cardiovascular center and subcortical structures. However, according to E.K. Aylamazian, thiopental sodium at a dose of 4-5 mg/kg is the drug of choice in stopping eclamptic cramps [3].

Only in anesthesiology drug that increases blood pressure, and cardiac output by stimulation of the cardio-vascular centre and activate the limbic structures – ketamine can be used in any hypotonic conditions in obstetrics and expressed cardio-vascular insufficiency.

In spite of research, denying the depressive effects of fentanyl on the fetus, it is still an open question about the use of narcotic analgesics till the moment of extraction of fetus [4,22, 57].

Central analgesic - Remifentanil provides the best cardiovascular stability in tracheal intubations. The systematic study of Remifentanil with as a component of general anesthesia for cesarean section it is shown that the induction dose of 0.5 mg/kg followed infusion in the range of 0.2 mg/kg/min with propofol effectively modulate stress response and provides hemodynamic stability in women in labour [50]. Depression of newborn respiration was only in a few cases and was resolved within two minutes using mask ventilation. Advantages of Remifentanil in comparison with other opioids in clinical practice are primarily in ultra short elimination and its



depending on the individual patient's needs. The half-life of the drug (the time needed to reduce the concentration of the drug in the blood to 50%) following termination of infusion is 3 minutes.

The study of A.A. Shmatova revealed that inhalation low flow anesthesia based on sevoran in comparison with the total intravenous anesthesia with artificial ventilation of the lungs during a cesarean section provides stable parameters of blood circulation in pregnant women [52].

E.N. Sivkov [43] works on optimization of anesthesia with operative delivery revealed that hemodynamic changes in the process of operations depend on the methodology of anesthetic management. In low-inhalation anesthesia sevoran place has a moderate decrease by 12.7 - 20, 5% from baseline) blood pressure with a maximum of 5 minutes after removing the fetus and the stabilization of the number of heart contractions. However, the amount of the average CD couldn't fall less than 70. On the contrary, total intravenous anesthesia is accompanied by the increase of blood pressure (8.5 - 8.7 % of the initial level), heart rate (12.8 15.2 per cent from baseline) and consumption myocardial oxygen (21.4 % of the baseline) in the period surgery and anesthesia. Their return to the initial value occurs only in the early postoperative period [41].

Recently the anesthetic gas xenon (Xe) in clinical anesthesiology is actively introduced. Xenon acts as an alternative to nitrous oxide in the combined endotracheal anaesthesia. Xenon, being the noble inert gas, easily penetrates through the lungs, well soluble in fats (solubility coefficient of oil-water equal to 20), not biotransformation and after the termination of gas supply for 5 minutes out from the body. Xenon does not have toxic effect on the organism of the mother and fetus, does not cause cardiodepression effect, has no effect on the morphology and tromboelastographic blood, does not change neuroendocrins status, provides reliable anesthesia protection. Despite the advantages of narcosis should remember about the serious problem of clinical anesthesiology - the problem of difficult intubation of the trachea, the most acute exactly in obstetric practice [52]. The main factor in the difficulties intubation during pregnancy areoropharyngeal edema of the mucous membrane and upper respiratory tract. So expect that when pregnancy with preeclampsia risk if intubation is increased in several times.

Some difficulties arise with the adequate ventilation of the lungs, caused by the reduction of gas exchange area of lung due to a reduction in vital capacity due to the increase in intra-abdominal pressure and swelling of lung tissue. Therefore, the parameters of artificial lung ventilation has its own peculiarities. First, the parameters of pulmonary ventilation should take into account the above changes lead to a reduction of diffusion-perfusion relationships. In addition, in pregnant women with preeclampsia very often develops pulmonary hypertension. Therefore, I recommend the following parameters of artificial ventilation of lungs respiratory minute volume 7-8 l/min respiratory rate not less than 18 at the moment and it is permissible to use a positive pressure on the exhale to 5 mm.hg. When using inhaled anesthetics proportions of gases should be 1:1 [52]. In recent years in obstetrics popularity receive methods of regional anesthesia: spinal, epidural and combined CSE for labour epidural anesthesia. In obstetric clinics of Europe and North America share of regional anesthesia reaches 80-85% [52,53,54]. The popularity of regional methods of anesthesia is due to their relative simplicity, availability and economic viability. In clinical practice has accumulated a great experience, demonstrating the high efficiency of regional anesthesia, its ability to reliably blockpain sensitivity, to prevent the neuro-vegetative reaction, provide good relax of muscles. Moreover, the trend in recent years - the displacement of General anesthesia regional methods [53].

Other positive aspects of neuroaxial methods are adequate analgesia, quick start (in 3-5 minutes after spinal anesthesia, 15-20 min after epidural anesthesia), lack of systemic toxicity [51,52,53].

Research on hemodynamics studying in the intraoperative period in women with physiological pregnancy during spinal anesthesia discovered that the most dangerous period of anesthesia is the time after a dose of local anesthetic because it is associated with a decrease in



sympathetic tonus of vessels [14]. Herewith on the average TPVR was $845 \pm 61,7 \text{ cm}^{-5}$, compensatory tachycardia on the average remains within 100 beats/min. In the end of the surgical intervention $\text{TPVR} = 1072 \text{ cm}^{-5}$. As a result of the research the authors of this work recommend the infusion therapy and the use of atropine for the prevention of decrease in average blood pressure.

In general, hemodynamics depends on many anesthesia factors: the anesthesia method, its technique, position of the patient, of the foetus, the application of vasoactive substances, including oxytocin [54]. In turn, the type of hemodynamics also affects the course of anesthesia. This is evidenced by the data of Tolmachev G.N. et al. [46] for the improvement of anesthetic management in abdominal delivery in pregnant women with hypertension. In the end, it was determined that anesthesia in pregnant women in both groups initially with eukinetics type of hemodynamics was homogeneous, but TPVR in the comparison group was slightly higher. The next important element of anesthesia is infusion therapy in the perioperative period [10].

Currently in clinical practice for the restoration VCV and reduce the interstitial fluid overload widespread preparations based on hydroxydextran starch [7,40,45].

According to E.N. Kakul et al. [17] in the research for the study of the quantity and quality of infusion therapy during the caesarean section, the following results - the use of balanced and unbalanced solutions in infusion therapy has the same positive effect on the system hemodynamics- were obtained. Thus, the use of balanced solutions unlike unbalanced induces no changes in acid-base status of venous blood. In the work of K.A. Piystunovich [35] a positive impact of Stabisol and Refortan on hemodynamics and hemostasis was revealed, Refortan's rheological effect was shown; there was no negative impact on the contractile function of the uterus and biochemical parameters. According to the author, these drugs can be recommended for use in intensive care at a cesarean section. The same result was obtained in Y.A. Bragin studies [8], who states that the traditional infusion therapy does not allow to fully correct the deficit of the VCV at severe preeclampsia. Inclusion in the program of intensive treatment of preeclampsia Refortan 6%, 10%, Stabisol 6% solutions contributes to the rapid elimination of the deficit of the VCV, a gradual decrease and counter stabilization of systemic blood pressure and TPVR.

Preparations based on hydroxydextran starch, and having the system inflammatory effects, permit their use in treatment of preeclampsia before and after delivery. One of the new drugs on the basis of hydroxydextran starch is Tetraspan [15].

There are reports of inclusion in the infusion therapy of parturient women with preeclampsia and metabolic acidosis hydroxydextran starch and Reamberin with the purpose of correction of water-sectoral shifts, improve the delivery and consumption of oxygen, normalization of metabolism [11]. Thus, in pregnant women with preeclampsia there are significant changes of the circulatory system and water balance, which requires an absolute exception of errors in tactics, application of the optimal method of anesthesia and adequate fluid therapy. Recognizing the fact that the main criterion of adequacy of anesthesia is stable hemodynamics, a mandatory condition becomes hemodynamic monitoring. This should not only rely on blood pressure metrics, heart rate, and central venous pressure, and also fully use modern methods of estimation of the central and peripheral hemodynamics, as well as water-sectoral balance. Objective information about the condition of hemodynamics and water balance, their correct interpretation will increase the level of understanding of the ongoing processes in the pregnant woman organism and enable the doctor anesthesiologist to properly manage and maintain well-grounded correction.



References:

1. Agapov I.A., D.V. Sadchikov, Suburbs M.V. Patogenes preeklampsii [Pathogenesis of preeclampsia]. Saratovskij medisinskij zhurnal [Saratov journal of medicine]. Saratov, 2011, Vol.7, №4, PP. 813-816.
2. Akker L.V., Warsaw B.J. Pokazatelioxidantnogo i antioxidentnogostatusa u beremennyh s gestosom [Indicators of oxidant and antioxidant status in pregnant women with preeclampsia]. Akusherstvo i ginegologia [Obstetrics and gynecology]. Moscow, 2000, №4, PP. 17-20.
3. Ajlamazjan E.K. Akusherstvo [Obstetrics]. The tutorial. Spec-lit 2010, 529 p.
4. Balykova E.V., Khachaturov E.A., Selova G.N. Sostojanie sentralnoj gemodinamiki pri raslichnyh vidach anestezii pri laparoskopicheskich operatsiyah po povodu raka tilstoj kishki u pogilych bolnyh [Status of central hemodynamics at the various types of anesthesia during laparoscopic operations on the occasion of colon cancer in elderly patients]. Anesteziologia I reanimatologia jurnal [Anesthesiology and resuscitation]. Moscow, 2012, №2, PP. 19-22.
5. Balich A.Y. Optimizatsia anestiologicheskoy taktiki pri abdominalnom rodorazreshenii: avtoref...kand.med.nauk [Optimization of anesthesiological tactics in abdominal obstetrics: the MD Dis.]. Moscow, 1993, 331 p.
6. Barkan V. Osobennosti disadaptatsionnykh reaktsiy serdecho-sosudistoy sistemy pri gestose: avtoref...kand.med.nauk [Features of disadaptation reactions of the cardiovascular system at preeclampsia: Author. diss ... cand. med. sciences: 14.00.16]. Chita, 2008. 25 p.
7. Bakhtina T.P. Podashev B. I. Protopopova .B. Evdokimov A.G. Diagnostika RDCV pri gestosakh [ARDS diagnostics at gestosis] Aktualnye problem rekonstruktivnoy I vosstanovitelnoy hirurgii. Sborniktrudov [Actual problems of reconstructive and restorative surgery. Collected papers]. Irkutsk, 1993, PP.56-58.
8. Bragin Y.A. Refortan and Stabizol application justification in gestosis complex therapy: Author. diss.... Candidate of medical sciences: 14.00.16. Saransk, 2006, 25 p.
9. Bryantsev M. D. Osenka sentralnoj gemodinamiki I organnoho krovotoka pri arterialnoj gipertenzii v tretiem trimester beremennosti: avtoref...kand.med.nauk [Assessment of Central hemodynamics and perfusion with arterial hypertension in the third trimester of pregnancy]. Ivanovo, 2010, 25 p.
10. Volkova A.V. Osobennosti sentralnoj gemodinamiki I gidkostnykh obemov u beremennykh s arterialnoj gipertenzij: avtoref....kand.med.nauk [Features of Central hemodynamics and liquid volumes in pregnant women with hypertension: author's abstract of dissertation for the degree of cand. of medical sciences]. Moscow, 2003, 26 p.
11. Galushka S.V., Nazarov B.F., Shifman E.M. Selesoobrasnost primeneniya kolloidov v terapii preeklampsii u rodilnis [Expediency of the use of colloids in the treatment of preeclampsia in puerperas]. Chirurgia [Surgery]. Moscow, 2007, №1, PP 1-2.
12. Gestos: bligajshie i otdalennye posledstvia [Preeclampsia: the nearest and long-term consequences]. Materially 36 megdunarodnogo kongresse po izucheniu patfisiologii beremennosti [Materials of the 36-th annual Congress of the international society for the study of the pathophysiology of pregnancy organization of preeclampsia]. Moscow, 2004, PP. 126-127.
13. Guriev D., Okhapkin N., Karpov V. Tehenie I ischidy beremennosti, osloznennoj preeklampsiej, v savisimosti ot tipa sentralnoy gemodinamiki [Course and outcome of pregnancy complicated by preeclampsia, depending on the type of maternal Central hemodynamics]. Akusherstvo I ginekologia [Obstetrics and gynecology]. Moscow, 2011, №7-2, PP.14-19.



14. Guryanov I.V. Shumov A.V. Optimisasia nejrovegetativnogo tormogenia I upravlenie gemodinamikoj pri subarahnoidalnoj anestesii vo vremaj operasii kesarevo sechenie u beremennyh s gestosom [Optimization of neurovegetative braking and hemodynamics management at subarachnoid anesthesia during cesarean section of pregnant women with gestosis]. *Anesthesiologia i reanimatologia [Anesthesiology and resuscitation]*. Moscow, 2012, №6, PP. 48-52.
15. Dzonoboeva G. N. Otimizasia kompleksnoj infuzionno jterapii u rodilnis s gestosom srednej I tiageloj stepeni (preeklampsii): avtoref....kand.med.naik [Optimization of integrated infusion therapy in postpartum women with moderate and severe gestosis (preeclampsia)]. Moscow, 2011, 26 p.
16. Zainullin I.A. Klinico-geneticheskie markery v opredelenii tiagesti gestosa: avtoref...kand.med.nauk [Clinical and genetic markers in determining the severity of gestosis: avtoref.diss ... Candidate of medical sciences: 14.00.01]. Chelaibinsk, 2009, 25p.
17. Kakula E.N. Dinamika pokazateley kislotnoshelochnogo sostoyania u pasientok posle operasii kesarevo sechenie pri provedenii razlichnyh vidov infuzionnoj terapii [Dynamics of indicators of acid-base balance in patients after caesarean section in carrying out various variants of infusion therapy]. *Anesthesiology and resuscitation*. 2012, №6, pp. 26-28.
18. Kalmykova I.N., Borisova E.O. Klinicheskaj farmocologia lekarstvennyh srestv, vlijushich na plod I novorogdenного ekskreturuysichsa s grudnym molokom [Clinical pharmacology of drugs that affect the fetus and newborn, and excreted with breast milk]. Moscow, 1997, 84 p.
19. Kingalova S.V., Szyvian P.B. Vybor anesthesiologicheskogo posobij pri kesarevom sechenii u pasientok s gestosom [The choice of anesthesia for cesarean section in women with preeclampsia]. *Materialy vsrossijskogo 7 -kongressa [Pros. All-Rus.7th Congress]* SPb., 2000, PP. 116-117.
20. Kinsh D.N., Vereshchagin E.I., Pasman N.M. Klinikobiochimicheskie aspekty sistemnoj vospolitelnoj reakcii pri gestose [Clinical and biochemical aspects of the systemic inflammatory response in gestosis]. *Perinatalnaj anesthesiologia i intensivnaj terapia materi, ploda, novorogdenного. Sbornik nauchnyh trudov [Perinatal anesthesiology and intensive care of mother, fetus and newborn: Coll. scientific. works]*. Ekaterinburg, 1999, PP. 105-109.
21. Kormakova T.L. Infuzionnaj terapia v kompleksnoj terapii akusherskoj patologii. Elektronnyj resurs [Infusion therapy in complex treatment of obstetric pathology] http://www.critical.ru/conftexts/2005/akusherstvo/art29_ak_2005.htm. Petrozavodsk, 2005
22. Korotkova M.E. Komplexnaj osenka krovobrashenia u beremennyh s arterialnoj gipertonij: pri raslichnyh variantach gemodinamiki; avtoref...kand.med.nauk [Comprehensive assessment of circulation in pregnant women with hypertension in different variants of hemodynamic: avtoref.diss ... Candidate of medical sciences: 14.00.01]. Yaroslavl, 2005, 117 p.
23. Kulikov A.V., Cossacks D.L., Egorov V.M. Anesthesia i intensivnaj terapia v akusherstve i neinotologii [Anesthesia and intensive care in obstetrics and neonatology]. Moscow, Medicine, 2001, 250 p.
24. Kulakov V.I., Serov V.N., Abubakirova A.M., Fedorova T. A. Intensivnaj terapij v akusherstve i genegologii [Intensive therapy in obstetrics and gynecology]. Moscow, Medical information Agency, 1998, 206 p.
25. Kulakova V.I., Prilepskij V.N, Radzinskij V.E. Rukovodstvo po ambulatorno-poliklinicheskoy pomoshi v akusherstve i ginegologii [Manual of outpatient care in obstetrics and gynecology]. Moscow, 2010, 1056 p.
26. Kulakov V.I. Akusherstvo i ginegologija [Obstetrics and gynecology]. M.: MIA, 2005, 640 p.



27. Lantsev E.A., Abramchenko V. V., Babaev V.A. Epiduralnaja anestezija i analgezija v akusherstve [Epidural anesthesia and analgesia in obstetrics]. Sverdlovsk, Ural University, 1990, 238 p.
28. Lailuc V.G. Serebralnoe krovoobrasenie i arterialnoe davlenie [Cerebral circulation and blood pressure]. Moscow, Real Time, 2004, 343 p.
29. Medvidinsky I.D. The concept of systemic inflammatory response model of preeclampsia / I.D. Medvidinsky, V.N. Serov, S.B. Tkachenko [et al] // Zh. Obstetrics and female diseases. – M., 2002. – № 1. – p. 33-39.
30. Mikheenko G.A. Vlijenie socialno-ekonomicheskich faktorov na formirovanie gestosa [Impact of socio-economic factors on the formation of preeclampsia]. Akushertstvo i ginekologija [Obstetrics and gynecology], Moscow, 2005, № 3, P.20-23.
31. Moiseyev V.S. Bolezni serdca [Heart Disease]. Moscow, Universum publishing, 2001, 463 p.
32. Okhapkin M.B. Preeclampsia: hemodynamic adaptation syndrome / M.B. Okhapkin, V.N. Serov, O.V. Lopoukhin // AG Info. - 2002. - № 3. - p. 9-12.33.
33. Podilskiy U.S. Narushenie vodnykh sektorov u rodilniz s eklampsicheskoy komoj [Violation of the water sectors in puerperas in eclampsia coma]. Saratovskij meditsinskij jurnal [Saratov journal of medicine]. Saratov, 2009, №2, PP. 185-187.
34. Podolskiy U.S. Intensivnaja jterapija eklampsicheskoy komy: avtoref...dokt.med.nauk [Intensive treatment of eclampsia coma: avtoref. dis. doctor of medical sciences]. Moscow, 2010.-27 p.
35. Piystunovich K.A. Opyt primeneniya Stabizola i Refortana v akusherckoy praktike pri operacii kesarevo sechenie [Experience of application Stabisol and Refortan in obstetric practice with caesarean section] Bulletin of the blood service in Russia, 2005, N 2, pp.35- 36.
36. Rogova E. F. Pochechnaja i matochnaja gemodinamika u beremennykh s gipertenziej [Renal and uterine hemodynamics in pregnant women with hypertension]. Terapevticheskij archive [Ter. Archive]. Moscow, 2001, №4, PP. 28-33.
37. Repina M.A. Eklampsija i materinskaja smertnost: monografija dlja vrachej [Eclampsia and maternal mortality: monograph for obstetrician-gynecologists]. SPb., 2005, 208 p.
38. Savelyeva G.M. Spravochnik po akusherstvu, ginekologii i perinatologii [Handbook of Obstetrics and Gynecology]. Moscow, 2006, PP. 159-174.
39. Serov V. N. Prakticheskoe akusherstvo: rukovodstvo dlja vrachej [Practical obstetrics: a guide for physicians]. Moscow, Medicine, 1997, 512 p.
40. Serikov M.E. Optimizacija anesteziologicheskogo posobia abdominalnogo rodorazreshenij beremebnykh s tajgelymi formami gestosa: avtoref...kand.med.nauk. [Optimization of anesthetic management of abdominal delivery of pregnant women with severe preeclampsia: avtoref.diss ... Candidate of medical sciences: 14.00.37]. Rostov-on-don, 2005, 26 p.
41. Sidorova I.S. Preeclampsia and maternal mortality / I.S. Sidorova, O.V. Zairatyants, N.A. Nikitina // Akusherstvo i ginekologija. - 2008. - № 2. - p. 13-15.
42. Sidorova I.S. Gestosis / I.S. Sidorova. –M. - Medicina, 2003. – 340 p.
43. Sivkov E.N. Optimizacija tehnologii nizkopotochnoj anestezii severanom pri operativnom rodorazreshenii: avtoref...kand. med. nauk [Optimization of the technology of low-anesthesia severan with operative delivery: avtoref... cand. med. science]. Novosibirsk, 2009, 25 p.
44. Stepanyan A.V. Obosnovanie differentsirivannogo podchoda k lecheniyu gestoza legkoj i srednej stepeni s uchetom vodnogo balansa i gemodinamiki: avtoref...kand.med.nauk [A differentiated approach justification to the treatment of mild to moderate preeclampsia in view of the water balance and the hemodynamics type of: avtoref.diss ... Candidate of medical sciences: 14.01.01]. Moscow, 2010, 24 p.



45. Tanakov A.N. Metabolism kalsia v techenii beremennosti [Calcium metabolism during pregnancy]. Vestnik rossijskich akusherginekologov [Bulletin of the Russian obstetrician-gynecologists]. Moscow, 1996, №4-p.32-37.
46. Tolmachev G.N. Anestesiologicheskoe obespechenie abdominalnogo rodorazresnenia u beremennykh s gipertensiej [Anesthetic management of abdominal delivery in pregnant women with hypertension]. Anesthesiology and resuscitation, 2010, pp.13-17.
47. Khrapov K.N. Vliajnie nekotorykh metodov obshej anestezii na mozgovoj krovotok i serebrovaskulajrnuj reaktivnost po dannum doplerografii: avtoref...kand. med. nauk [Influence of some methods of general anesthesia on cerebral blood flow and cerebrovascular reactivity on transcranial Doppler data: avtoref. dis. .cand.med.science] 1997, 25, 25 p.
48. Khusainova J.F. Sostojnie sentralnoj i perifericheskij gemodinamiki, ee variebelnost v zavisimosti ot tiajgesti gestoza u beremennykh zhenshhin: avtoref...kand.med.nauk [Central and peripheral hemodynamics, its variability depending on the severity of gestosis in pregnant women: avtoref. dis. cand. med. science]. Ekaterinburg, 2005, 25 p.
49. Shifman E.M. Zilber A.P. Etudy kriticheskoy mediciny. Akusherstvo glazami anestesiologa [Studies of critical medicine. Obstetrics with anesthesiologist eyes]. Petrozavodsk, Publishing house of the University, 1997, 396 p.
50. Shifman E.M. Filippovich G.V. Spinnomozgovaj anesthesia v akusherstva [Spinal anesthesia in obstetrics]. Petrozavodsk, INTELTEC 2005, 558 p.
51. Shifman E.M., Khramchenko N.V., G.P. Tikhova Izmenenij funktsii serdsa pri beremennosti [Change of heart function during pregnancy]. Anestesiologia i reanimatologii [Anesthesiology and resuscitation]. 2012. №6, PP. 4-9.
52. Shmatova A.A. Nizkopotokovaj anesthesia sevoranom u beremennykh zhenshin pri kesarevom sechenii A low-flow sevoran anesthesia in pregnant women at caesarean section [electr.resourse]: // <http://medicalconference.info/nizkopotokovaya-anesteziya-sevoranom-u-beremennyh-zhenshchin-pri-kesarevom-sechenii/>
53. Yupatov EJ, Fatkulin.P.H. Znachenie issledovaniy gemodinamiki beremennykh dlaj osenki effektivnosti kompleksnoj terapii pozdnego gestoza [Pregnant hemodynamic study significance to assess the effectiveness of late preeclampsia complex therapy]. Kasanskij medisinskij jurnal [Kazan medical journal]. 2006, №4, V.4, PP. 288 - 292.
54. Anne Doherty, Yayoi Ohashi, Kristi Downey, Jose CA Carvalho Non-Invasive Monitoring Based on Bioreactance Reveals Significant Hemodynamic Instability during Elective Cesarean. Delivery under Spinal Anesthesia Rev Bras Anesthesiol SCIENTIFIC ARTICLE2011; 61: 3: 320-332http://www.scielo.br/pdf/rba/v61n3/en_v61n3a07.pdf
55. Arngrimsson R. Analysis of different inheritance patterns in pre-eclampsia/eclampsia syndrome Text. / R. Arngrimsson, H. Bjornsson, R.T. Geirsson // Hypertension in Pregnancy. 1995. - Vol. 14. - P.27-38.
56. Belfort M.A. Haemodynamic changes in gestation proteinuric hypertension: The effects of rapid volume expansion and vasodilator therapy Text. / V.A. Belfort, P.S. Uys, J. Dommise // Britain Journal Obstetrics & Gynecology. 1989. -Vol. 96. - P.634-641.
57. Coad N.R., et al. We buy an evaluation of blood loss during suction termination of pregnancy: ketamine compared with methohexitone // ActaAnesthesiolScand 1986. P. 253-255.

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Far Eastern Dentistry in Focus of Research And Publications on the History of Medicine and Health in the Russian Far East

V.V. Gonchar

Abstract

The article reviews the literature on the history and development of medicine and health in the Far East of Russia. It is noted that the available scientific research and publication does not provide a complete picture of healthcare development in the Russian Far East, because they not cover all territorial, historical, chronological and socio- economic framework of this process. Moreover, the development of medical specializations, including dental services, covered not enough, perfunctorily in the framework of the whole health care system. Most studies on the history of the organization and improvement of the Far East dentistry factual reflected peculiarities of this branch of medicine, especially the Soviet period. Today the history of dentistry in the Russian Far East is not selected as an independent object of study, and the available scientific works and publications affect individual questions in this topic. There is required a deep analysis of the early development of dental care , taking into account the geographical, social and political conditions that would avoid the mistakes of the past, to find the optimal path of development and to provide quality and affordable dental care at various social levels.

Keywords: Far East, dentistry, history of medicine.

Introduction

During the health care reform in Russia, studying the historical path traversed by individual health services should be considered as very important. It is noted that the health system in each country is a product of its unique environment, history, politics and national character. There is no universal health care model that is suitable for any country, and especially the health care system of our country is its way out of the Soviet state-owned monopoly that provides fairness to the population of free medical care for all of the same quality [42]. In this regard, the particular importance in addressing the strategic challenges in modern medicine is the historical experience of previous generations. Moreover, it is the study of the historical experience of formation and organization of medical services of the whole region of the country is a reflection of the state of development and medical services throughout the country. This will not only avoid the mistakes of the past, but also to find the most advanced and effective health development in our country.

The available literature on the subject in question is quite extensive and it can be divided into two large groups. The first group includes work on the history of medicine and public health of the Far East, the second - on the history of dentistry and dentistry.

On the history of the health of the Far East in the prerevolutionary period there are several scientific papers. State of the health care system work in the Far Eastern companies is analyzed in the study of Ja.I. Dobrusin "From the history of health and sanitary conditions of the city of Khabarovsk in the pre-revolutionary years" [13]. Publication B.N. Palkin [34] on the history of health care of the Far East is devoted to Amur congress of physicians in the pre-revolutionary period and their role in the development of social medicine of the Far Eastern region, but in these studies not contain information on the topic that we are studying.

The works on the history of the health of individual territories and regions of the Far East are the subject of particular interest. The monograph "Health Development Amur region" [17] belongs to Isakov A.V., where the state health described in the pre- Soviet period. Booklets of



A.G. Kozlov "From the History of Health Kolyma and Chukotka "[22,23] are the attempt to describe the history of the formation of Health in Kolyma and Chukotka. These works based on documentaries, published materials, including prerevolutionary. On large historical and journalistic material author paid attention to the organization of medical care to indigenous populations as well as the history of the organization and activities of the health department (management) Dalstroi. In 1995 appeared a monograph A.A. Moshensky and I.L. Zolotukhin, "Essays on the History of Health Sakhalin region" [32]. It highlights questions of establishment and development of medicine in Sakhalin from the middle of XVII century to the end of the XX century. The authors conducted a thorough analysis of the Soviet model of health care in Sakhalin. Meanwhile, the problems of the history of development of dental services in these studies are described insufficient.

The greatest number of works on the history of health care in the Far East devoted to the Civil War and the first years of Soviet power. This group of publications include the work of A.V. Isakov "Establishment of Soviet public health in the Far East (1917-1922)" [18], I.S. Zhdanov [16] B.N. Shchupak [48], but they not paid attention to the organization and development of dental services. PhD thesis J.K. Shomas "Guide of Far Eastern Party organization development of public health (1922-1928)" [47] devoted to the influence of the ruling party to the development of healthcare in the Far East in the first years of Soviet power. Particular attention in these studies devoted to the development and financing of health services, but the quality and accessibility of health care, including dental are not raised.

There are carried out a number of scientific researches on the history of the Far East healthcare. In thesis of G.A. Vlasov "Essays on the History of Health Khabarovsk Krai (1856 1869)" [3] the author gives an overview of the state of health in the Khabarovsk Territory, considering the development of health care in chronological order. Meanwhile, the researcher pays little attention to the problematic aspects of this process stops only successful endeavors. Dental care issues, the development of dental services are not studied.

Knyazkina T.A. in her thesis "Establishment and development of health care on the Kamchatka Peninsula in the period from 1917 to 1991" [20] attempted to comprehensively review the state of health on the Kamchatka Peninsula in the period 1917 to 1991. The paper considers the problem of the health system in Kamchatka and analyzes trends of forming a network of medical institutions, examines ways of providing medical facilities medical personnel. Meanwhile, there is not enough attention paid to the establishment and development of dentistry in the region.

Study of Nikolaev V.P. "The history of health care in Yakutia in XX century" [33] examines the characteristics of formation and development of Yakutia health at different stages of socio-economic and socio-political development of Russia. The author conducted a deep and comprehensive analysis of the health authorities in the development of the health care system of this vast region, revealed positive trends and directions, as well as negative aspects and disadvantages of this process. Unfortunately, the issues of dental care are not included in the goals and objectives of this research.

Papers of Ratmanov P.E. [38,39] analyzed the state of medical care to the population of the Far East in the early XX century, considered policy authorities operating in the region during the Civil War in the area of health, also showed activity Far sickness funds . There is traced the processes of establishment, development and characteristics of medical care to the insured in the Far Eastern Republic (FER) identified regional features and payment system for providing medical care to the insured in the Far East in the 20-s. In the works there is raised questions organization dental care to the insured and their families within the hospital and insurance offices.

The study of Ratmanov P.E. "Contribution of Russian doctors in medicine in China (XX century)" (2010) is the first comprehensive study of Russian medicine in China [37]. Work



recreates the complete picture of the activities of the Russian medicine in Manchuria, North China and Shanghai. The study is especially valuable because it gives a deep, comprehensive study of the activities of Russian doctors in medical support construction and operation of the Chinese Eastern Railway (CER), the organization of medical and sanitary affairs. There are analyzed the medical, scientific, social and educational activities of Russian doctors in China in 20-40-s years of XX century, assessed the contribution of medical care in this country. Establishment, organization and development of Russian dentistry and dental education in Harbin in the first half of the last century is undoubtedly interesting research [40].

In the beginning of XXI century the issues of establishment, development and present state of health of the Far East continue to be valid. During this period, there were a number of publications on this topic, which describes the health care industry, taking into account the new views on this process, as well as the current new socio - economic situation. These works include the publication of V. Korshunov [24].

The next group of papers devoted to the study of the establishment, organization and development of the national dentistry.

Organization and improving domestic dentistry and dentistry is reflected in the work of many authors: I.G. Lukomskii (1937), M.O. Kovarskii (1947), M.S. Katz (1963), A.I. Evdokimov (1967) , G.S. Kuklin (1974) , V.R. Golbraikh (1985) [7,15,19,21,26,29]. In these works there have been studied peculiarities of establishment and organization of specialized dental care in the Soviet era, although many of these works has a certain ideological extent. Regional aspects of dental care in these papers are not covered. Large-scale study with the characteristics features of the development of domestic dentistry was presented in a series of journal articles and monographic works G.N. Trojanskij [43,44,45].

In most publications, the development of domestic dentistry increasingly was seen globally, "by capital" within the specialty as a whole. In this case the hypothesis that the practice of Soviet medicine and dentistry in particular has been a consistent and universal throughout the USSR, and the experience can be extrapolated to the capitals of the country. Few works of the Soviet period give the brief characteristic features of the development of dentistry on a regional scale. These works include journal publications S.N. Vajsblat (1947) P.G. Golubev (1967), J.K. Metlitskaja (1959) , E. Simanovskaja (1976) [2,6,31,41].

Scientific papers of K.A. Pashkov [35,36] describe in detail the establishment and development of dentistry and dentistry in Russia to this day. The author focuses on dentistry in Kievan Rus (IX-XIII), Muscovy (XV-XVII), Russia (XVIII-XIX). Particular attention is paid to the last century dentistry, dental training profile scientific problems dentistry XX century. The author creates a scientifically based periodization history of domestic dentistry, identified the main stages of its development, and studied the regulatory framework organization of this type of medical care. In addition, he analyzes the history of development of leading scientific and organizational problems dentistry last century in its main structural sections. There is showed the role of the leaders of these sections - the founders of the leading research centers and schools. Unfortunately, the issues of regional dentistry are covered very briefly.

In the end of XX - beginning of XXI century there were a number of publications and research papers on how to reform dental service in Russia because of the changing socio-economic and political situation in the country. These works include publications of V.K. Leontiev and V.D. Vagner [1,27,28]. In these studies there were analyzed and described the dental service in Russia, discussed issues of further development, ways of improving dental care in Russia. Unfortunately, the specific features of regional dentistry in these papers were not raised. In this connection, scientific publications on the present state of dental services Khabarovsk Krai are specially interesting. These publications include work of L.F. Luchsheva, A.N. Pak, G.M. Kuzakova and A.V. Chaban [25,30,46], they mainly analyze the current state of the studied issue, give forecasts of further development and improvement.



Monographic papers of S.A. Gales and V.G. Dyachenko [4,5,14] give a systematic analysis of dental care in Khabarovsk region, including situational analysis of the distribution of dental pathology in the Far East of Russia, the structure of dental care, the substantiation of the main directions of the security concept of dental health in the new socio - economic conditions, formulated approaches to the formation of structural - organizational standards for the organization of dental care in municipalities with different population densities in the form of a "modular dental institutions". The disadvantages of these works, in our opinion, is the absence of in-depth analysis of the previous development of dental services Khabarovsk region, revealing the features of this development for the unique historical, geographical, social and political conditions, as well as the possibility of using fully gained positive experience.

In recent years, there is increased interest in national history, in particular the history of medicine and dentistry. In the Moscow State Medical and Dental University hosts the annual All-Russian scientific conferences, seminars and readings dedicated to the history of domestic issues dentistry. At these conferences there are discussed the history of dentistry and dentistry in Russia, the role and contribution of outstanding scientists in the development of scientific trends, issues of traditional medicine, the historical aspects of regional dentistry, interesting facts from the history of the profession in our country and abroad. A number of papers are full of historical research, drawing on the historical aspects, but most of the works devoted to the establishment and development of regional dentistry, including Far East, are very short [8,9,10,11,12].

Thus, the available publications do not provide a holistic picture of health development in the Russian Far East, as it does not cover all the chronological framework of this process. Our review of the literature showed that the history of formation and development of dental services in the Far East of Russia was not isolated as an independent object of study, not been the subject of historical and synthesis of medical and socio-hygienic study. Outside the field of view of researchers there are questions of appearance and deploying a network of public institutions and private dental practices, private dentists in the Amur region, the emergence and development of Soviet dentistry in the Far East, especially the organization of dental and dental care in the Far North, the formation of logistics, personnel policy. Meanwhile, only a few scientific papers briefly touched upon some aspects of this problem on quantitative performance indicators, and issues of dynamics and evolution of the development of dental care Far East region, availability, quality in general have not been studied.

References:

1. Vagner V.D. Prognoz i tendencii razvitija stomatologii s pozicii specialistov i naselenija [Forecast and trends of dentistry from the position of specialists and the population]: avtoref. dis. ... kand. med. nauk [Thesis]. Omsk, 1998, 23 p.
2. Vajsblat S.N. Dostizhenija sovetsoj stomatologii na Ukraine za 30 let [Achievements of Soviet dentistry in Ukraine for 30 years] Stomatologija [Dentistry]. 1947, №4, pp. 24-27.
3. Vlasov G.A. Ocherki po istorii zdravookhraneniya Khabarovskogo kraja (1856-1968 g.) [Essays on the History of Khabarovsk Krai Health care (1856-1968)]: dis. ... kand. med. nauk Tomsk, 1969, 424 p.
4. Galjosa S.A., Saprionova E.A. Strategija razvitija parodontologicheskoj pomoshchi i perspektivnye nauchnye issledovanija v oblasti parodontologii na territorii Khabarovskogo kraja [The development strategy of periodontal care and long-term research in the field of periodontics in the Khabarovsk Territory] Zdravookhranenie Dal'nego Vostoka [Healthcare of the Far East]. 2006, №1, 58 P.
5. Galjosa S.A., D'jachenko V.G. Upravlenie proizvodstvom stomatologicheskikh uslug v uslovijakh rynka [Production management of dental services in a market]. Khabarovsk: Izd. OOO «Amurblankizdat», 2008, 580 p.



6. Golubev P.G. K istorii zubovrachevaniya v Arkhangel'skoj oblasti [On the history of dentistry in the Arkhangel'sk region] Arkhangel'skij medicinskij institute [Arkhangel'sk Medical Institute]. 1967, pp.341-342.

7. Gol'brajkh V.R. Galereja vidnykh khirurgov otechestvennoj stomatologii [Gallery of domestic dentistry prominent surgeons]. Volgograd, 1985, 63 p.

8. Gonchar V.V. Osobennosti stanovleniya zubovrachebnoj pomoshchi Korjaskogo nacional'nogo okruga [Features of development of Koryak National District dental care] Materialy VI Vserossijskoj konferencii «Istorija stomatologii» [Proceedings of the VI All-Russian Conference "History of Dentistry"]. Moscow: MGMSU, 2012, pp.59-61.

9. Gonchar V.V. K voprosu ob organizacii zubovrachebnoj pomoshchi korennomu naseleniju Krajnego Severa Dal'nego Vostoka v 20-kh 30-kh godakh XX veka [On the organization of dental care to indigenous population of the Far North of Far East in the 20 - 30-s of XX century] Materialy chtenij, posvjashchennykh pamjati G.N. Trojanskogo «Zubovrachevanie v Rossii: istorija i sovremennost'» [Proceedings of readings in memory of GN Trojan "Dentistry in Russia: Past and Present"]. Moscow: MGMSU, 2012, pp.32-34.

10. Gonchar V.V. Ocenka stomatologicheskoy pomoshchi ranenym vo vremja vooruzhennogo konflikta u ozera Khasan [Evaluation of dental care to the wounded during an armed conflict at Lake Khasan] Materialy IX Vserossijskoj konferencii s mezhdunarodnym uchastiem «Istoricheskij opyt mediciny v gody Velikoj Otechestvennoj vojny 1941-1945 gg.» [Proceedings of the IX All-Russian conference with international participation "The historical experience of medicine in the Great Patriotic War of 1941-1945"]. Moscow: MGMSU, 2013, pp.46-48.

11. Gonchar V.V. Bolezni polosti rta u prishlogo naselenija Dal'nego Vostoka Rossii v nachale XX veka [Oral disease in non-aboriginal population of Russian Far East in the early XX century] Materialy chtenij, posvjashchennykh pamjati professora G.N. Trojanskogo «Zubovrachevanie v Rossii: medicina i obshchestvo» [Proceedings of the readings in memory of Professor GN Trojan "Dentistry in Russia: medicine and society"]. Moscow: MGMSU, 2013, pp.33-35.

12. Gonchar V.V. Stecenko E.G. K voprosu organizacii zubovrachebnoj pomoshchi detjam Khabarovskogo kraja v pervoj polovine XX veka [On the question of the organization of dental care for children of Khabarovsk Krai in the first half of the XX century] Aktual'nye problemy stomatologii detskogo vozrasta: Sb. nauch. statej II regional'noj nauchno-prakticheskoy konferencii s mezhdunarodnym uchastiem po detskoj stomatologii [Actual problems of pediatric dentistry: Articles of II regional scientific and practical conference with international participation in pediatric dentistry]. Khabarovsk: Izd-vo «Antar», 2012, pp.62-65.

13. Dobrusin Ja.I. Iz istorii zdravookhraneniya i sanitarnogo sostojanija goroda Khabarovska v dorevoljucionnye gody [From the history of health and sanitary conditions of the city of Khabarovsk in the years before the Revolution] Sb. nauch. tr. i avtoref. Khabarovskogo instituta jepidemiologii i gigieny [Proc. scientific articles and theses of Khabarovsk Institute of Epidemiology and Hygiene], No. 4, 1958, pp.11-18.

14. D'jachenko V.G., Galjosa S.A. Upravlenie stomatologicheskoy pomoshch'ju v uslovijakh jekonomiki perekhodnogo perioda [Dental care management in an economy in transition period]. Khabarovsk, 2004, 640 p.

15. Evdokimov A.I. Nastojashchee i proshloe sovetskoj stomatologii 1917-1967 [Present and past of the Soviet dentistry 1917-1967] Stomatologija [Dentistry]. 1967, №5, pp. 6-13.

16. Zhdanov I.S. Iz istorii zdravookhraneniya na Dal'nem Vostoke [Healthcare history of the Far East] Sovetskoe zdravookhranenie [Soviet healthcare]. 1974, №9, pp. 49-52.

17. Isakov A.V. Razvitie zdravookhraneniya v Amurskoj oblasti [Healthcare development in the Amur region]. Khabarovsk: Kn. izd-vo, 1967, 86 p.



18. Isakov A.V. Stanovlenie sovetskogo zdravookhraneniya na Dal'nem Vostoke (1917-1922) [Development of the Soviet public health in the Far East (1917-1922)] Sovetskoe zdravookhranenie [Soviet healthcare], 1978, №4, pp.70-73.

19. Kats M.S. Istorija sovetskoj stomatologii [The history of the Soviet dentistry]. Moscow: Medgiz, 1963.

20. Knjaz'kina T.A. Stanovlenie i razvitie zdravookhraneniya na Kamchatke v period s 1917 g. po 1991 g. [Establishment and development of health care on the Kamchatka Peninsula in the period from 1917 to 1991]: avtoref. dis. ... kand. istor. nauk [Thesis]. Petropavlovsk-Kamchatskij, 2007, 27 p.

21. Kovarskij M.O. Ocherki istorii zubovrachevanija v Rossii v XVIII i nachale XIX veka [Essays on the History of Dentistry in Russia in XVIII and early XIX century] Stomatologija [Dentistry], 1947, №1, pp.49-51.

22. Kozlov A.G. Iz istorii zdravookhraneniya Kolymy i Chukotki (1864- 1941 gg.) [Healthcare history of Kolyma and Chukotka (1864 - 1941 gg.)]. Magadan: Kn. izd-vo, 1989, 38 p.

23. Kozlov A.G. Iz istorii zdravookhraneniya Kolymy i Chukotki (1941-1954 gg.) [Healthcare history of Kolyma and Chukotka (1941-1954 gg.)] Magadan: Kn. Izd-vo, 1991, 118 p.

24. Korshunov V. Ocherki po istorii Dal'nego Vostoka. Stanovlenie sistemy zdravookhraneniya [Essays on the History of the Far East. Establishment of health system] Amurskij meridian, 2005, pp.13-14.

25. Kuzakova G.M. Zdravookhraniju goroda Komsomol'sk-na-Amure 70 let [Healthcare of Komsomolsk -on-Amur - 70 years] Zdravookhranenie Dal'nego Vostoka [Healthcare of the Far East], 2002, №1, pp.86-88.

26. Kuklin G.S. Organizacija stomatologicheskoj pomoshchi v SSSR [Organization of dental care in the USSR]. Moscow, 1974, 20 p.

27. Leont'ev V.K. Stomatologicheskaja sluzhba Rossii i perspektivy ee razvitija v novykh uslovijakh khozjajstvovaniya [Dental Service of Russia and its prospects in the new economic conditions] Stomatologija [Dentistry], 1997, V.76, №2, 47 p.

28. Leont'ev V.K. O sostojanii stomatologii v Rossii i perspektivakh ee razvitija [On the state of dentistry in Russia and prospects of its development] Stomatologija [Dentistry], 2002, №1, pp.75-83.

29. Lukomskij I.G. Razvitie nauchnoj stomatologii v SSSR [Development of scientific dentistry in the USSR] Stomatologija [Dentistry], 1937, №5, pp.27-42.

30. Luchsheva L.F. Pak A.N. Stomatologicheskaja sluzhba Khabarovskogo kraja: problemy i perspektivy razvitija [Dental Service Khabarovsk region: problems and prospects] / Zdravookhranenie Dal'nego Vostoka [Healthcare of the Far East]. 2002, №1, pp.10-13.

31. Metlickij Ju.K. Razvitie stomatologii v Belorusskoj SSR [Development of dentistry in the Byelorussian SSR] Zdravookhranenie Belorussii [Healthcare of Belarus]. 1959, №1, pp.18-19.

32. Moshenskij A.A. Zolotukhin I.L. Ocherki istorii zdravookhraneniya Sakhalinskoj oblasti [Essays on the history of Sakhalin Healthcare]. Vladivostok: Dal'nauka, 1995, 204 p.

33. Nikolaev V.P. Istorija zdravookhraneniya Jakutii v XX veke [Health History of Yakutia in the XX century]: avtoref. dis. ... d-ra med. nauk [Thesis]. Moscow, 2007, 50 p.

34. Palkin B.N. S'ezdy vrachej Priamur'ja v dorevoljucionnyj period i ikh rol' v razvitii obshchestvennoj mediciny [Congress of Amur doctors in the pre-revolutionary period and their role in the development of community medicine] Materialy II vsesojuznogo s#ezda istorikov mediciny. Itogi i perspektivy issledovanij po istorii mediciny. Tom II. [Proceedings of the II All-Union Congress of historians of medicine. Results and prospects of research on the history of medicine. Volume II]. Tashkent: Medicina, 1980, pp.290-292.



35. Pashkov K.A. Zubovrachevanie i stomatologija v Rossii IX XX vekov. Osnovnye jetapy i napravlenija razvitija [Tooth healing and dentistry in Russia IX - XX centuries. Milestones and trends]: avtoref. dis. ...d-ra med. nauk [Thesis]. Moscow, 2011, 47 p.
36. Pashkov K.A. Zubovrachevanie i stomatologija v Rossii. Osnovnye jetapy i napravlenija razvitija (IX -XX vek): monografija. 2-e izd., pererab. i dop. [Tooth healing and dentistry in Russia. Main stages and directions of development (IX-XX century): monograph. 2nd ed., Rev.] Kazan': Centr innovacionnykh tekhnologij, 2011, 312 p.
37. Ratmanov P.E. Vklad rossijskikh vrachej v medicinu Kitaja (XX vek) [The contribution of Russian doctors in medicine in China (XX century)]: avtoref. diss. ... dokt. med .nauk [Thesis]. Moscow, 2010, 48 p.
38. Ratmanov P.E. Medicinskaja pomoshch' zastrakhovannym na Dal'nem Vostoke v pervye desjatiletija XX veka [Medical care to the insured in the Far East in the first decades of the XX century]: avtoref. diss. ... kand. med .nauk [Thesis]. Moscow, 2002, 32 p.
39. Ratmanov P.E., Kapitonenko N.A., Zakharchenko V.V. Medicinskoe strakhovanie na Dal'nem Vostoke v 20-e gody [Health insurance in the Far East in the 20s] Problemy social'noj gigieny, zdravookhraneniya i istorii mediciny [Problems of social hygiene, healthcare and medical history], 2000, №6, pp. 53-54.
40. Ratmanov P.E. Iz istorii ruskogo zubovrachebnogo obrazovanija v KHarbine v pervoj polovine XX veka. [From the history of Russian dental education in Harbin in the first half of XX century] Rossijskij stomatologicheskij zhurnal [Russian Journal of Dentistry], 2008, №3, pp.65- 67.
41. Simanovskaja E.Ju. Stanovlenie stomatologii na Zapadnom Urale [Formation of dentistry in the Western Urals] Stomatologija [Dentistry], 1976, №1, pp.86-89.
42. Skvorcova V. Vystuplenie ministra zdravookhraneniya na Pervom nacional'nom s'ezde vrachej [Speech of the Minister of Health at the First National Congress of the doctors]. Retrieved from: <http://pravitelstvo RF./docs/21008>
43. Trojanskij G.N. Istorija razvitija sovetской ortopedicheskoy stomatologii [History of the Soviet prosthetic dentistry]. Moscow, 1975, 140 p.
44. Trojanskij G.N. Istorija sovetской stomatologii [The history of the Soviet dentistry]. Moscow, 1983, 144 p.
45. Trojanskij G.N., Belolapotkova A.V. Zubovrachebnaja pomoshch' v zemskoj medicine [Dental care in the zemskaja medicine] Sb.nauch. tr. NII im. N.A. Semashko [Article of Research Institute N.A. Semashko]. Moscow, 1991, pp.79-80.
46. Chaban A.V. Osnovnye napravlenija razvitija stomatologicheskoy pomoshchi v KHarbovskom krae v uslovijakh rynka [The main directions of development of dental care in the Khabarovsk Krai in the market conditions] Sb. nauch. tr. «Aktual'nye voprosy sovremennoj parodontologii» IX Dal'nevostochnyj mezhdunarodnyj simpozium stomatologov [Proc. scientific conference "Topical Issues of Periodontology" IX International Symposium Far dentists], Vladivostok, 2001, pp.34-36.
47. Shomas Ju.K. Rukovodstvo dal'nevostochnoj partijnoj organizacii razvitiem narodnogo zdravookhraneniya (1922-1928gg.) [Guide of the Far East party organization by the development of public health (1922 - 1928)]: avtoref. dis. ... kand. ist. Nauk [Thesis]. Tomsk, 1970, 25 p.
48. Shchupak B.N. Iz istorii zdravookhraneniya v Kamchatskoj oblasti [From the history of health care in the Kamchatka Region] Sovetskoe zdravookhranenie [Soviet healthcare]. 1962. № 5, pp.71-73.

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Dehydroepiandrosterone: Biomarker of Senescence. Biosynthesis and Regulating Mechanisms

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Abstract

This review presents and summarizes the results of recent studies on dehydroepiandrosterone (DHEA) which plays an important role in longevity regulation. During ontogenesis DHEA and DHEA-sulfate content steadily declines. At the same time, the mechanisms regulating secretion of these hormones and factors determining their age dynamics remain largely unsolved. The paper presents different mechanisms of regulation of adrenal secretion of DHEA and DHEA-sulfate involving adrenocorticotrophic hormone (ACTH), prolactin, luteinizing hormone and insulin.

Keywords: androgens, DHEA, ACTH, senescence, hormonal regulation.

Interest to DHEA sharply increased in recent years, more than 30,000 works were published. This is due to a broad scope of collected information on DHEA ability to reduce the risk of several pathologies related to senescence. It was found that there is a negative feedback between the level of DHEA and obesity, cholesterol level in the blood lipoproteins, risk of cardiovascular pathology, breast cancer and osteoporosis.

Free dehydroepiandrosterone form (DHEA) and DHEA-sulfate form (DHEA-S) are synthesized and secreted by the reticular zone of adrenal cortex. The biological riddle is that DHEA is synthesized only by adrenals of primates, humans and all species of monkeys. Release of DHEA during the day repeats cortisol and ACTH dynamics. With age, the amplitude of DHEA releases decreases from 74% at a young age to 45% at the elderly age [36].

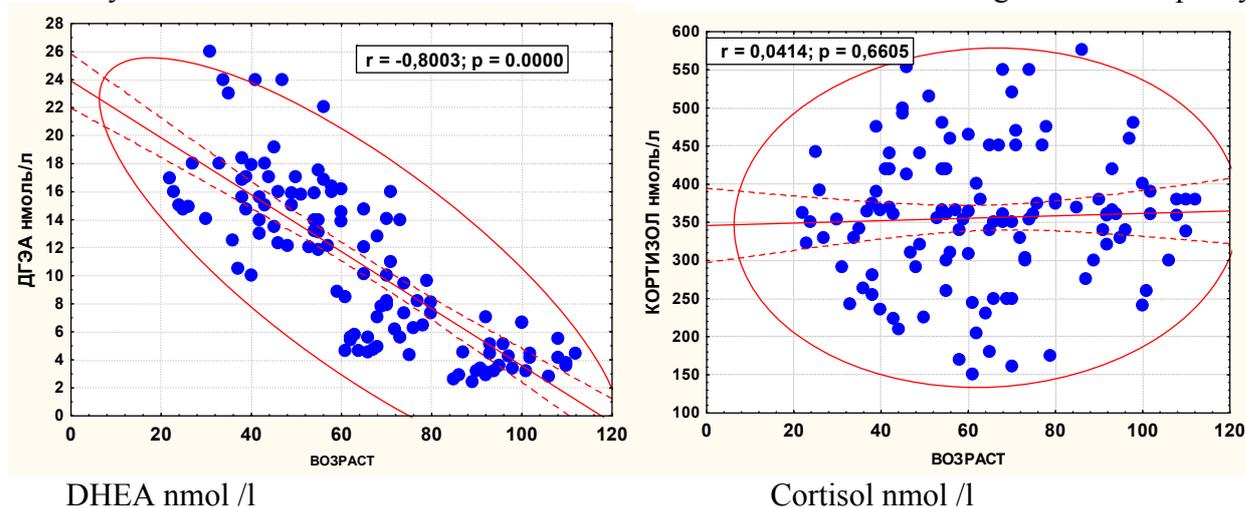
DHEA-sulfate presents the highest concentration in peripheral blood among the whole spectrum of steroids, including cortisol. DHEA-S concentration is 200-1000 times higher than testosterone content in the blood of healthy males, and 5000-25000 times greater than 17 β -estradiol in women. DHEA-S level in the blood of men aged 25 - 30 years reaches 6 - 8 mmol/l, later steroids production decreases and by age 80 plasma DHEA-S content does not exceed 1.0-1.5 mmol/l [35,11,34,31]. The highest DHEA and DHEA-S concentration fall rate is presented between the ages from 50 to 60. Metabolic clearance of sulfate steroid is up to 15 l/day. While daily production in reproductive age is 25-30 mg. The half-life of the hormone is 8-10 hours, and of a free form is not more than 30 minutes. DHEA-S content during the day does not significantly change remaining stable throughout the day and night period. This can be explained by delayed metabolic clearance. At the same time its free form has distinct diurnal variations decreasing to 16-17 hours at a young age. Diurnal variations of DHEA considerably repeat cortisol diurnal rhythm [1]. DHEA-S is characterized by gender differences, in women its concentration is 15-20% lower than in men of the same age. However, the age-related decrease of DHEA-S production in women has the same pattern as that of men. According to some reports [32] DHEA levels in young women are higher than in men of similar age. After the age of 50 gender differences in plasma concentrations disappear. At the same time, DHEA-sulfate has no gender differences at a young age, but its level is significantly lower in women than in men after the age of 50. DHEA-S is characterized by pronounced individual variations regardless of gender. Some authors attribute this to genetic factors [6]. We suppose that this may also be due

to the stress situations caused by acute and chronic diseases, which can activate and inhibit production of steroid. Unlike a free form, DHEA-S has a high affinity to albumin, and this connection is strong. In contrast to [glucocorticoids](#), testosterone, and estradiol, DHEA does not have a specific transport protein, and binds to albumin in 90% and only a small part of circulating DHEA binds to globulin.

Unlike the sulfate form, concentration of free DHEA in the blood is significantly low - in the range of 14-50 nmol/l. Age dynamics of free DHEA is the same as that of steroid sulfate. By age 80 its level generally does not exceed 5 nmol/l. Metabolic clearance of the free form is 1700 l/day. At the young age its production ranges from 2 to 7 mg/day (5,25,26), and its half-life is not longer than 8-30 minutes.

We carried out a research on the dynamics of the content of adrenal androgens of androstenedione and dehydroepiandrosterone in men of different age groups living in the Caucasus, including a group of centenarians (WHO classification) of 90-112 years old [18]. The study included only apparently healthy men.

Significant androstenedione level reduction (an average by 55%) is observed at the age of 20 - 75. Later the hormone content stabilizes at the level of 8-10 nmol/l and 10.6 nmol/l in centenarians in comparison with 19 nmol/l in young men. Along with androgens reduction the level of precursors also decreases with age: pregnenolone (beta coefficient = -0.58 P = 0.000), progesterone (beta coefficient = -0.27 P = 0.003), 17 α -hydroxypregnenolone (beta coefficient = -0.78 P = 0.000), 17 α -hydroxypregnenolone (beta coefficient = -0.74, P = 0.000). Median content of DHEA progressively decreased from 17 nmol/l in men of 20-35 years old to 4 nmol/l in centenarians. According to our results, DHEA quantitative dependence on the age of apparently healthy men (beta coefficient = -0.80, P = 0.000) obeys the equation of linear regression of $DHEA = 23.23 - 0.1947 \times \text{age}$. However, the content of the vital adaptive hormone cortisol keeps at a constant level in all age groups, including centenarians. DHEA and cortisol dynamics is presented in the figure. Age-related decrease of androgen and precursors levels reflects the tendency for the total extinction of adrenal glands capacity.



DHEA nmol /l

Cortisol nmol /l

Fig. Comparative dynamics of DHEA and cortisol content in the blood of men of different age groups, including centenarians.

Nowadays it is assumed that ACTH controls the biosynthesis of adrenal androgens DHEA, DHEA-S and androstenedione. The results of experimental studies with hypophysectomy prove it. In this case, we observe reticular zone atrophy along with atrophy of a zona fasciculata and adrenal weight decreased by 50% [5]. At the same time, exogenous ACTH administered in hypophysectomized chimpanzees is accompanied by cortisol production only, while secretion of DHEA and DHEA-S does not change [13]. However, ACTH exposure to the regulation of secretion of DHEA is confirmed by experiments on the other primate species which



is a male hamadryads baboons with DHEA content comparable to adult men hormone levels (20-40 nmol/l). Acute exposure of ACTH intravenous administration along with stimulation of cortisol and precursors of adrenal hormones causes increase of the blood DHEA level, although increase of its concentration is less apparent. Under repeated exposure of a prolonged-release drug, stimulatory effect of ACTH on the secretion of DHEA increases. While the first injection of ACTH causes DHEA maximum level of 48 nmol/l, the 5th injection resulted in 100 nmol/l. After monkeys were made ACTH injections, the DHEA reaction increase occurs in response to the action of endogenous trophic hormones during immobilization stress. The amplitude of cortisol maximum growth in response to the stress factor before and after ACTH administration did not differ (530 ± 237 and 570 ± 124 nmol/l), while DHEA increased twofold (24 ± 7 and 67 ± 14 nmol/l) [3].

However, there are significant quantitative differences in reaction of some adrenal cortex zones to ACTH administration. Release of cortisol increases tenfold, while secretion of adrenal androgens increases a few times only, with more apparent increase of DHEA secretion but not androstenedione and his precursor 17α -hydroxyprogesterone, i.e. activation of steroidogenesis occurs by the route pregnenolone - 17α -hydroxypregnenolone - DHEA.

Intensity of steroidogenesis activation in the reticular zone upon ACTH administration is determined by age. It is minimal before the puberty, it grows in the initial period of puberty, and upon the end of the puberty activation of adrenal androgens synthesis is comparable to the age group of 25-30 years old, when their basal production reaches its maximum. With age, intensity of the reticular zone reaction somewhat reduces. There are differences in adrenals reaction to single and lasting (during several days) administration of ACTH. The later is accompanied by an increased secretion of DHEA along with its sulfate form [26].

A number of clinical settings illustrate the important role of ACTH in DHEA synthesis control. For example, a long-term therapy of a number of somatic diseases with glucocorticoids is known to be accompanied by inhibition of ACTH and cortisol secretion, and causes DHEA secretion inhibition as well [14].

In case of congenital adrenal hyperplasia genetic disorders lead to a decrease of activity of the various enzyme systems of steroidogenesis, resulting in reduction of cortisol secretion and increase of ACTH secretion. The latter, in its turn, activates formation and secretion of DHEA and such steroidogenesis precursors as 17α -hydroxyprogesterone, 17α -gidrooksipregnenenolon etc. Such pattern is typical for a partial defect of 3β -hydroxysteroid dehydrogenases, 21 -hydroxylase but not for 11β -hydroxylase. In the latter case DHEA synthesis even reduces. Therapy of such patients with cortisol derivatives inhibits increased production of ACTH, wherein adrenal androgens synthesis, DHEA in particular, also decreases. Dynamics of corticosteroids suppression, including DHEA and DHEA-S upon e.g., dexamethasone administration, and their restoration after cancellation occurs at different rates. Cortisol returns to the initial level faster than DHEA and DHEA-S, indicating that there is the additional factor regulating steroidogenesis in the reticular zone of adrenal glands along with ACTH.

Another sample illustrating contribution of the alternative system to regulation of adrenal androgens synthesis is Cushing's disease when the level of circulating cortisol is high, DHEA-S content may increase, while the free form may decrease [1]. In this case, we observe dissociation in the activity of steroids biosynthesis in the reticular zone and zona fasciculata. Perhaps this is due to inhibitory effect of excess amount of cortisol on enzyme systems activity in the way sequence: pregnenolone - 17 -hydroxypregnenolone - DHEA. Its activating effect on sulfo-transferase, i.e. at the metabolic level is also possible.

Cushing's syndrome is characterized by a high level of cortisol production and reduction of DHEA and its sulfate form concentration in peripheral blood compared with healthy people. These patients have a low ACTH blood level, i.e. its dynamics and dynamics of adrenal androgens are unidirectional which shows dependence of androgens production on ACTH. It is



interesting that upon damage of zona glomerulosa (aldosteronoma) large amounts of aldosterone are released while DHEA and DHEA-S production level does not change.

ERC RAMS (Endocrinology Research Center of Russian Academy of Medical Sciences) Laboratory of Biochemical Endocrinology and Hormonal Analysis along with WMA abdominal surgery clinic (St. Petersburg), carried a research on amount corticosteroids in blood of patients with Cushing's disease at different periods after bilateral adrenalectomy. It was found that cortisol level, as expected, had sharply reduced and did not exceed 60 nmol/l, which is several times less than the lower limit of normal and that circadian rhythm was absent. Corticosterone and aldosterone had a similar quantitative pattern. However, DHEA-S plasma concentration was reduced, but in a less degree. Notably DHEA-S level remained high, primarily in young patients with a 3-year period after adrenalectomy. They had DHEA-S of 1162 ± 882 nmol/l in the morning (2800 ± 400 nmol/l in control), and 1607 ± 958 nmol/l in the evening (2300 ± 301 nmol/l in control). In the period of 10 years after adrenalectomy DHEA-S level did not exceed 440 ± 200 nmol/l in the morning. All cases are characterized by wide individual variations. It can be assumed that there are two possible sources for DHEA formation in adrenalectomized patients: increase of their synthesis in the gonads or their production stimulation in additional adrenal cortex tissue by excessive production of ACTH. There is also the third source - residual tissue of a removed adrenal. In this case we also observe dissociation in amounts of cortisol and aldosterone on the one hand and DHEA on the other hand [4].

Defining the role of ACTH in regulation of DHEA production is complicated by the fact that, unlike the system ACTH - cortisol with feedback mechanism, such a mechanism does not exist in ACTH - adrenal androgens system. Exogenous administration of large doses of DHEA is not accompanied by suppression of ACTH production by adenohipophysis. So far there is no explanation for this phenomenon.

In 1983 Parker, a well-known researcher in the field of Biochemical Endocrinology announced the excretion of glycoprotein with a molecular weight of 66 kD from human pituitary, which selectively activates secretion of adrenal androgens [28]. All attempts to repeat these data have not been successful, so now this opinion is rejected. The second candidate for the role of adrenal androgen production controller is prolactin. In this direction a large number of clinical and experimental studies were conducted. Their results are contradictory. Prolactin receptors were detected in the reticular zone [33]. Some authors established DHEA-S increase upon hyperprolactinemia caused by adenohipophysis micro adenoma [29]. However, this clinical setting when prolactin inhibits production of gonadotropins and biosynthesis of steroids in the gonads, the influence of prolactin is presumably mediated.

During our research a direct, significant correlation of prolactin and DHEA was found in a large cohort of patients with the normal prolactin level [22].

Hitherto prolactin exposure to regulation of adrenal androgens synthesis is not proven. In "in vitro" conditions prolactin stimulates DHEA production, but it is not a specific exposure of the hormone to the reticular zone as both cortisol and aldosterone production greatly increases [17]. Moreover, no regular connection between age dynamics of adrenal androgens and prolactin during adrenarache and senescence was found.

In 1942 F. Albright who was one of the pioneers in the field of biochemistry steroids put forward the hypothesis of a possible role of gonadotropins in regulation of adrenal androgens production [9]. This hypothesis was not confirmed. In children without gonads and with a high level of both gonadotropins, DHEA secretion remains unchanged [23].

Receptors for LH were defined in the reticular zone and zona fasciculata of the adrenal cortex, the expression of which increases with prolonged increase of gonadotropin level. It was discovered that hCG stimulates production of DHEA-S by human fetal adrenals, but specificity of this effect has not been proved. However up to the present imbalance of adrenal steroidogenesis and influence of LH on this process remains a big question. Relatively recently,



it was reported that the tissue of human adrenal glands expresses LH receptor gene, which is found in the reticular zone and adjacent parts of the zona fasciculata [27].

It is known that insulin has a stimulating effect on synthesis and secretion of androgens by gonads, activating testosterone production by Leydig's cells and ovarian theca - cells.

Infusion of insulin to diabetics maintaining euglycemic condition causes a decrease of insulin-like growth factor I and globulin binding sex hormones (SHBG) and DHEA-S. The content of free and total testosterone does not change [7].

Insulin infusion is followed by a decrease of concentration of DHEA and its sulfate form only in men, apparently due to decrease activity of 17.20 desmolases and 50% increase of metabolic clearance and possibly also due to change of DHEA-S in lipid DHEA-S form [15].

Our research showed that in patients with type 1 diabetes, reducing of adrenal androgens DHEA and DHEA-S outruns the age dynamics of hormones. The average level of DHEA-S in patients with diabetes aged under 30 years is 3604 ± 484 nmol/l, and 5185 ± 350 nmol/l ($P = 0.047$) in the same age control group. The level of DHEA-S in patients of 30-45 years old is 2477 ± 550 nmol/l and 3588 ± 350 nmol/l in the control group. In men older than 45 years, the differences between patients with IDDM and control group are almost absent: 2713 ± 235 nmol/l and 2535 ± 215 nmol/l, respectively [2]. Uncontrolled hyperglycemia induces decrease production of DHEA and its sulfate form in diabetics [19]. Medicamental reduction of insulin resistance is followed by increase DHEA-S production [16]. And conversely DHEA-S secretion in men decreases upon the age-related increase of insulin resistance.

It turns out the role of immuno-endocrine mechanisms in regulation of adrenal androgen production. They play an important role in maturation and zone differentiation of the adrenal cortex. Direct intercellular contacts between lymphocytes and steroid secreting cells of the reticular zone were discovered. Activated macrophages of the reticular zone secrete IL-1 and IL-6 interleukins and α - tumor necrosis factor (TNF - α). IL-6 is a local factor regulating steroidogenesis in the reticular zone, where a high density of IL-6 receptors was found [30,24,10,20].

Regulation of synthesis and metabolism of DHEA and DHEA-S during pregnancy has its own characteristics [21,37,11,25,8]. This is due to formation of fetoplacental system as a functional complex. Low density lipoprotein cholesterol produces pregnenolone and progesterone in placenta. Pregnenolone entering the fetus is used for the synthesis of DHEA-S, which transforms into 16-hydroxy DHEA-S in liver and adrenals of the fetus. Then it undergoes hydrolysis by steroid sulfatase in the placenta and is disposed along with DHEA for the formation of estrone, estradiol and estriol in the placenta, i.e. estrogens are formed from the fetus C19 steroids as activity of 17 α -hydroxylase / C17-20 desmolases is very low in the placenta. Estriol conjugates in the mother's liver and then is excreted in urine. It is the main marker of the fetoplacental system function. It must be noted that there are quantitative differences in DHEA-S production by adrenals of the fetus and an adult: fetal production of DHEA-S (200 mg/day) is much higher than in adults (up to 30 mg/day). This is considerably due to a very low activity of 3 β -hydroxysteroid dehydrogenase in the germinal zone of the fetus adrenal cortex. The germinal zone reduces during 3 months after a childbirth, along with decrease of DHEA blood level which remains low up to 6 years old. Later some unidentified factors "turn on" the production of DHEA, which gradually increases and reaches a maximum up to 30 years old, and then begins to decline steadily at 60 ng/ml/year.

Summarizing the results of various researches mentioned above, it should be admitted that the question of what factors are directly involved in the regulation of adrenal androgens production remains open. Influence of ACTH is very important, but not the only one. Possibly dissociation of ACTH, cortisol and adrenal androgens dynamics during adrenarache and senescence can be explained not so much by additional factors, but primarily by changes in the enzyme systems activity providing synthesis of steroids by $\Delta 4$ - and $\Delta 5$ - route.



Currently DHEA is widely used as an "anti-aging" hormone in the United States and Western Europe. It slows the aging process, promotes metabolism in obesity, stimulates the immune system and has anti-cancer effect. Thereby we observe improving of health-related quality of life of older people, which is particularly important for post-menopausal women, providing them with the missing estradiol, which outside the gonads can in an "intracrine" way transform into estradiol in target tissues.

References

1. Goncharov N.P. V monografii: Kortikosteroidy: metabolizm, mehanizm dejstvija i klinicheskoe primenenie [The monograph: Corticosteroids: metabolism, mechanism of action and clinical application] N.P. Goncharov, G.S. Kolesnikova. Moscow: Adamnt, 2002, pp.62-75.
2. Metabolizm androgenov u muzhchin, bol'nyh saharnym diabetom 1 tipa [Metabolism of androgens in male patients with type 1 diabetes] N.P. Goncharov, G.V. Kacija, S.Ju. Kalinchenko [et al.] Problemy jendokrinologii [Problems of Endocrinology]. 2001. №4. pp.23-27.
3. Rol' AKTG v reguljacii sekrecii degidrojepiandrosterona u primatov [Role in the regulation of ACTH secretion of DHEA in primates] G.V. Kacija, V.M. Gorllushkin, T.N. Todua [et al.] Problemy jendokrinologii [Problems of Endocrinology]. 1990. №1. pp.58-61.
4. Uroven' gljukokortikoidov i nadpochechnikovyh androgenov v otdalennye sroki posle adrenaljektomii [Levels of glucocorticoids and adrenal androgens late after adrenalectomy] N.P. Goncharov, G.S. Kolesnikova, V.I. Voroncov [et al.] Problemy jendokrinologii [Problems of Endocrinology]. 1995. №24. pp.27.
5. Habiner D. F. Sintez i sekrecija gormonov [Synthesis and secretion of hormones] D.F. Habiner Jendokrinologija i metabolizm [Endocrinology and Metabolism] – Moscow: Medicina. 1985. pp.60-113.
6. A genetic component to the variation of dehydroepiandrosterone sulfate / J.I. Rotter, F.L. Wong, E.T. Lifrak [et al.] // The Journal of Clinical Endocrinology and Metabolism. – 1985. - 34(8). – P.731-736.
7. Acute hyperinsulinemia, androgen homeostasis and insulin sensitivity in healthy man / P. Ebeling, U.H. Stenman, M. Seppala [et al.] // Ibid. – 1995. - 146(1). - P.63-69.
8. Adrenal function in preterm infants: ACTH may not be the sole regulator of the fetal zone / P.C. Midgley, K. Russell, N. Oates [et al.] // Pediatric Research. – 1998. – Dec.44(6). – P.887-93.
9. Albright F. Syndrome characterized by primary ovarian insufficiency and decreased stature. Report of 11 cases with a digression on hormonal control of axillary and pubic hair / F. Albright, P.H. Smith, R.A. Frazer // The American Journal of the Medical Sciences. – 1942. – 204. – P.625-648.
10. Bornstein S.R. Clinical review 104: Adrenocorticotropin (ACTH) -and non ACTH - mediated regulation of the adrenal cortex: neural and immune inputs / S.R. Bornstein, G.P. Chrousos // Ibid. – 1999. – 84. – P.1729-1736.
11. Changes in concentrations of cortisol, DHAS and progesterone in fetal and maternal serum during pregnancy / A. Donaldson, U. Nicolini, E. Symes [et al.] // Ibid. – 1991. – 35. – P.447-451.
12. Changes in serum concentrations of conjugated and unconjugated steroids in 40- to 80-year-old men / A. Belanger, B. Candas, A. Dupont [et al.] // Ibid. - 1994. - 79(4). - P.1086-1090.



13. Dissociation of cortisol and adrenal androgen secretion in the hypophysectomized, ACTH-replaced chimpanzee / B. Albertson, W. Hobson, B. Burnett [et al.] // *Ibid.*- 1984. – 59. – P.13-19.
14. Dissociation of cortisol and androgen secretion in patients with secondary adrenal insufficiency / G.B.Jr. Culter, S.E. Davis, R.E. Johnsonbaugh [et al.] // *Ibid.*- 1979. - 49(1-3). – P.604-609.
15. Effect of insulin on serum levels of dehydroepiandrosterone metabolites in men / B. Lavalley, P.R. Provost, Z. Kahwash [et al.] // *Ibid.* – 1997. - 46(1). – P.93-100.
16. Effects of insulin reduction with benfluorex on serum dehydroepiandrosterone (DHEA), DHEA sulfate, and blood pressure in hypertensive middle-aged and elderly men / J.E. Nestler, N.A. Beer, D.J. Jakubowicz [et al.] // *Ibid.*- 1995. - 80(2). – P.700-706.
17. Functional aspects of the effect of prolactin (PRL) on adrenal steroidogenesis and distribution of the PRL receptor in the human adrenal gland / A. Glasow, M. Breidert, A. Haidan [et. al.] // *Ibid.*- 1996. – 81. – P.3103-3111.
18. Goncharov N.P. Adrenal and gonadal steroid levels in long-living males from highland regions of the Southwestern Caucasian Mountains / N.P.Goncharov, G.V. Katzya // *The Aging.* – 1998. – Male.1 – P.200-205.
19. Hyperglycemia decreases dehydroepiandrosterone in Japanese male with impaired glucose tolerance and low insulin response / A. Yamauchi, I. Takei, S. Nakamoto [et al.] // *The Journal of Clinical Endocrinology and Metabolism.* – 1996. - 43(3). – P.285-290.
20. Interleukin-6 and the interleukin-6 receptor in the human adrenal gland: expression and effects on steroidogenesis / G. Páth, S.R. Bornstein, M. Ehrhart - Bornstein [et al.] // *Ibid.* – 1997. – 82. – P.2343–2349.
21. Interrelationships of circulating maternal steroid concentrations in third trimester pregnancies / J. Buster, R. Chang, D. Preston [et al.] // *Ibid.* - 1979. – 48. – P.139-149.
22. Koryakin M. The possible role of prolactin in adrenal androgens regulation / M. Koryakin, N. Goncharov, A. Akopyan // *International Congress on Andrology.* Montreal. - 2001.
23. Lack of correlation between gonadotropin and adrenal androgen levels in gonadal children / P.A. Lee, A. Kowarski, C.J. Migeon [et al.] // *The Journal of Clinical Endocrinology and Metabolism.* – 1975. - 40(4). - P.664-669.
24. Lymphocytes stimulate dehydroepiandrosterone production through direct cellular contact with adrenal zona reticularis cells:a novel mechanism of immuno-endocrine interaction / W.G. Wolkersdorfer, T. Lohmann, Ch. Marx [et al.] // *Ibid.* – 1999. – 84. – P.4220-4227.
25. Maternal and amniotic fluid steroids throughout human pregnancy / M. Nagamani, P. McDonough, J. Ellegood [et al.] // *American Journal of Obstetrics and Gynecology.* - 1979. – 134. - P.674-683.
26. Miller W.L. The molecular basis of premature adrenarche: a hypothesis / Miller W.L. / *Acta Paediatrica, International Journal of Paediatrics, Supplement.* – 1999. - 88(433). – P.60-66.
27. Novel presence of luteinizing hormone/chorionic gonadotropin receptors in human adrenal glands / J.E Pabon, X. Li, Z.M. Lei [et al.] // *The Journal of Clinical Endocrinology and Metabolism.* – 1996. – Jun.81 (6). – P.2397-400.
28. Parker L.N. A 60,000 molecular weight human pituitary glycopeptide stimulates adrenal androgen secretion / L.N. Parker, E.T. Lifrak, W.D. Odell // *Ibid.* – 1983. - 113(6). – P.2092-2096.
29. Plasma androgens in women with hyperprolactinaemic amenorrhoea / F. Bassi, G. Giusti, L. Borsi [et. al.] // *Ibid.* (Oxf). – 1977. - 6(1). – P.5-10.



30. Relevance of major Histocompatibility Complex Class II expression as a hallmark for the cellular differentiation in the human adrenal cortex / Ch. Marx, S.R. Bornstein, W.G. Wolkersdorfer [et al.] // *Ibid.*– 1997. – 82. – P.1136-1140.
31. Serum dehydroepiandrosterone sulfate levels as an individual marker / G. Thomas, N. Frenoy, S. Legrain [et al.] // *Ibid.* - 1994, - 79(5): - P.1273-1276.
32. Sex differences in the twenty-four-hour mean plasma concentrations of dehydroisoandrosterone (DHA) and dehydroisoandrosterone sulfate (DHAS) and the DHA to DHAS ratio in normal adults / B. Zumoff, R.S. Rosenfeld, G.W. Strain [et al.] // *Ibid.*– 1980. - 51(2). – P.330-333.
33. Steroid hormone receptors in adrenal glands of fetal and adult rhesus monkeys / J. Hirst, N. West, R Brenner [et al.] // *Ibid.*- 1992. – 75. – P.308-314.
34. The relation of smoking, age, relative weight, and dietary intake to serum adrenal steroids, sex hormones, and sex hormone-binding globulin in middle-aged men / A.E. Field, G.A. Colditz, W.C. Willett [et al.] // *Ibid.* - 1994. - 79(5). – P.1310-1316.
35. Vermeulen A. Adrenal androgens and aging / A. Vermeulen // London: Academic Press. - 1980. - P.201-217.
36. Vermeulen A. Dehydroepiandrosterone sulfate and aging / A. Vermeulen // *Ann N Y Acad Sci.* - 1995, - Dec.29(774). - P.121-127.
37. Yuen B. HCG, prolactin, estriol and DHAS concentrations in cord blood of premature and term newborn infants / B. Yuen, E. Mincey // *American Journal of Obstetrics and Gynecology.* - 1987. – 156. – P.396-401.

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Ethnic Characteristics of Eye Structure and Prevalence of Primary Glaucoma Separate Forms

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Abstract

According to WHO data glaucoma is rated as the second cause of blindness (13 % of cases) and hyoposeeing in the world after cataract (47 %).

Racial accessory is the important factor influencing the prevalence of separate forms of glaucoma. Different races are subject to one or another form of glaucoma owing to the certain anatomic features of eyes. Prevalence of different forms of glaucoma is studied thoroughly at European ethnic group. Prevalence of primary open-angle glaucoma (POUG) among the European populations is higher, varying from 0.4 to 4.1%. Among the Afro-Americans the high frequency rate of POUG is revealed, being six times higher in comparison with the Europeans. At the majority of Mongoloids owing to anatomic-physiological features of the visual organ closed-angle glaucoma (ZUG) is more widespread.

In the territory of Russia the prevalence of PG among the Mongoloid population is most studied at representatives of various ethnic groups living in the territory of Eastern Siberia.

The carried-out literary review revealed variability of incidence and prevalence of PG not only among various races, but also in each of them, and also showed the relevance of epidemiological surveys at various ethnic groups.

Keywords: epidemiological surveys, ethnic characteristic, closed-angle glaucoma, open-angle glaucoma.

Introduction

According to WHO data glaucoma is rated as the second cause of blindness (13 % of cases) and hyoposeeing in the world after cataract (47 %) [12, 29]. According to H.A. Quigley (2006) a number of glaucoma patients will increase to 79,6 million by 2020 all over the world, 74 % of them referring to open-angle glaucoma (OAG). Natives of Asia with glaucoma will make up 47 % and 87 % with close-angle glaucoma (CAG). The glaucoma as the cause of bilateral blindness by 2020 will comprise 5,9 million with the open-angle form and 5,3 million with the close-angle one. [43].

Ethnicity is considered to be an important factor influencing on prevalence of separate glaucoma forms [12, 43]. Three common ethnic groups are as follows: the European (Euroasian, Caucasian), the Mongolian (Asian-American) and the Equatorial (Negroid – Australian), which are divided into subgroups consequently. Now, according to some scientists, there are 34-40 races noted. Ethnic features are hereditary and adaptive to living conditions.

All races are equivalent in biological and psychological relations. Genetic distinctions do not mean the superiority of any race, ethnic or other group. On the contrary, they underline the evolutionary value of the variety which has allowed mankind not only to develop all climatic zones on the Earth, but also to adapt to those considerable changes of the environment resulted from human activity [2].

High frequency rate of glaucoma and its position in the structure of blindness and hyoposeeing induce ophthalmologists of all continents to conduct epidemiological researches and studies concerning to ethnic characteristics of the disease. Different races are subject to either one or another form of glaucoma owing to certain anatomic ocular characteristics [20, 48].



The prevalence of different forms of glaucoma among the Eurasian ethnic group has been studied thoroughly. The primary open-angle glaucoma among European populations varies from 0,4 to 4,1 % [10]. According to M.W. Tuck and coauthors POAG is noted most frequently in Great Britain, among the European populations its prevalence makes 1,2 % [52]. S. Pardhan and coauthors carried out the comparative analysis of blindness as the result of glaucoma among the Europeans and natives of Southern Asia in Great Britain. In age group the percentage ratio has amounted to 29,3% at patients of 65 years and older among the Europeans, while 17,4 % among the Asians correspondingly [34]. As the result of the large-scale epidemiological research in the Netherlands (The Rotterdam Study) POAG prevalence has been established among Europeans amounting 1,1 % as a whole, increasing from 0,2 % in age group of 55-59 years to 3,3 % among persons at the age of 85-89 years. POAG prevalence was noted at a higher level almost three times at men than at women [49]. F. Topouzis and coauthors during the epidemiological research The Thessaloniki Eye Study (Greece) have revealed that prevalence OAG has rated from 3,8 % to 5,5 % [40]. The same data were revealed by epidemiological researchers of Spain as well confirming that the prevalence POAG in the European populations was higher among men (2,4 %) as compared with women (1,7 %), making 2,1 % in total and increasing with the years [35]. A. Ringvold in the literary review devoted to questions of the glaucoma epidemiology in the countries of northern Europe notices that OAG is observed more often in Finland, the central Sweden, Norway and Iceland in comparison with Southern Sweden and Denmark that can be somewhat connected with a low rate of pseudoexfoliative syndrome (PES) in southern regions [46].

American ophthalmologists reveal essential distinctions in prevalence and disease of glaucoma among Europeans and Negro races [44]. J.M. Tielsch with coauthors have conducted the large-scale research The Baltimore Eye Survey and revealed the high frequency rate of POAG among the Afro-Americans which is six times higher in comparison with Europeans, affecting people of younger ages (manifested at 10 year-old younger ones) with quick progression. The Afro-Americans are considered to be less sensitive to preparations of intraocular pressure reduction, followed in most cases by insufficient hypotensive efficiency after surgical treatment [41]. Among the Latin Americans OAG prevalence is higher than at the Europeans as well and comparable to its frequency among the Negro race [28].

The Mongolian or Asian-American huge race is one of the most numerous races in the world. It covers about 50 % of all population in the globe. The Mongolian race is divided into some small races: the North Asian, Arctic, South Asian, Far Eastern and American races.

Owing to anatomic-physiological features of the visual organ the close-angle glaucoma was mostly extended among the Mongolians [22, 25]. At patients with CAG or with risk of its development the following anatomic features are typical in most cases: reduction of cornea curvature diameter and radius [31, 33]; smaller anterior chamber (AC) and its volume reduction [31, 32]; increase of lens thickness and curvature [30, 31]; more anterior position of the crystalline lens [30,31]; increase of lens thickness in relation to length of optical axis [27]; reduction of axial length [31, 32].

Among representatives of the Mongolian races there is a significant ethnic variety, and these distinctions are traced in prevalence of various forms of primary glaucoma (PG). According to N.A. Quigley with coauthors CAG is mostly extended among inhabitants of China and Mongolia, and also indigenous population of the North America and the island Greenland (Eskimos) [42]. In the course of population's surveys concerning the Eskimos of northwest Alaska it has been revealed that PCAG amounted to 90,9 % of all glaucoma cases. The women have undergone the illness almost four times more frequently than the men [47]. The research carried out in China has revealed that 9,4 million senior people of 40 years and older have glaucoma optic nerve defeat, 5,2 millions of them (55 %) have one eye blindness and 1,7 million



people (18 %) are blind on both eyes. PCAG is the cause of bilateral blindness in 91 % of cases [26].

However, in the epidemiological studies carried out among various ethnic groups in Singapore the tendency of prevalence POAG is noted. According to P.J. Foster with coauthors POAG and PCAG have rated 1,78 and 1,13 % accordingly among ethnic Chinese of Singapore [50].

The epidemiological studies carried out in Japan have revealed a PCAG lower level in comparison with other Asian populations. According to Y. Shiose with coauthors PCAG frequency rate has summed 0,34 %, and the number of cases of low pressure glaucoma (LPG) almost four times exceeded the number of POAG cases with high IOP 2,04 % and 0,58 % accordingly [24]. The similar showings with LPG higher rate noted by H. Katsushima and coauthors revealed that frequency of LPG, POAG and PCAG among the investigated contingent has amounted accordingly 2,6, 0,59 and 0,47 % [23].

The prevalence of PCAG among Europeans is much lower in comparison with Asians, being 0,04 % according to The Beaver Dam Eye Study (USA), 0,06 % - The Melbourne Visual Impairment Project (Australia), 0,09 % - Roscommon (Ireland), 0,17 % - Bedford glaucoma survey (Great Britain), 0,27 % - The Blue Mountains Eye Study (Australia), 0,4 % - The Baltimore Eye Survey (USA), 0,6 % - The Egna-Neumarkt Study (Italy) [21, 36, 37, 38, 39, 45, 51].

There were several tentatives for studying ethnic aspects of glaucoma in the period of the USSR. In territory of the former USSR the disease of glaucoma amounted from 0,9 to 3,5 %, at the same time indices within one republic could range from 0,2 to 6 % [14]. The prevalence PCAG in the literature is noted among the majority of patients in the Central Asia (Turkmen, Kazakhstan, Tajikistan, Kirghizia and Uzbekistan). In Uzbekistan the disease of PG among the population of 40 years and older reached 1,5-2,5 %. OAG was noted at 20,1 %, CAG - in 79,9 %. CAG prevailed among representatives of Uzbek nationality [7]. The natives of Turkmenistan had PCAG more often (59,8 %), than POAG (31,5 %) [17]. M.K. Dikambaeva with coauthors revealed the prevalence of CAG in Kirghizia at women (80,6 %), while it being diagnosed at 20,9 % Kirghiz men [5]. The PG large-scale epidemiological research in Tazhdikistan presented by Akhrorova Z.D. has revealed a mosaic structure of the disease and PG prevalence in various geographical zones of republic [1].

In Russia, among not numerous epidemiological studies, the most part is devoted to studying of the illness, its frequency rate and physical inability among the European race. POAG frequency rate is becoming higher with the years. If 40-45 and 50-60 year-old people are numbering 0,1 % and 1,5-2 % of the population, those of 75 and older amount to 10 % [15]. For today in most regions of Russia glaucoma is the main reason of primary physical inability owing to eye diseases, rating from 23 to 57 % of all cases of physical inability [6, 12, 16]. In the territory of Russia PG prevalence among the Mongolian population is studied more thoroughly at representatives of various ethnic groups living in the territory of Eastern Siberia (inhabitants of Altai, Khakas, Tuvians).

Genetically modern Altaians represent the Mongolian group, possessing nearby the European characteristics. According to A.V. Kolbasko the glaucoma in Gorniy Altai has been revealed at 3,3 per 1000 population (3,3 ‰). It is noticed that among Altaians the glaucoma is manifested earlier than among the Europeans, therefore it is necessary to conduct prophylaxis for early diagnostics of the glaucoma among the inhabitants of Mountain Altai since 30 years [9].

According to V. P. Puzyreva with coauthors the Tuva population is genetically closer to the Altaians, the Evens, the Evenks and the Jukagirs than to the Mongols, the Chukchis and inhabitants of Tibet as well. [3]. These showings reflected to clinical-epidemiological features of the glaucoma among the natives of the republic Tyva, the latter ones being samples in Tkachenko's survey. It was revealed that the number of natives was 63,1 % of the total number



suffering with OAG, and 36,9 % referring to the European group accordingly. As for CAG form, there were 88,1 % natives and only 11,9 % Europeans. POAG relative density among the native adult population was lower than among the arrived ones (75,4 % vs 91,3 %). It is to be noted, that POAG at natives of the Republic Tyva proceeded in a narrow-angle form - a narrow profile of iridocorneal angle (ICA) , it being diagnosed at 58,8 % surveyed. This parameter was noted 7,3 times more frequently than at Europeans [18].

Karamchakova L.A. studying the population of Khakassia has revealed that POAG has amounted to 89,3-93,5 % from total number of glaucoma, while PCAG and CG being only 1,3-2,5 % and 1,3-2,9 % accordingly. The relative density of the Khakases with POAG has ranged 23,5-23,8 %, and 76,2-76,3 % at Europeans, that is caused by the big relative density of the European population. The natives comprised about 1/3 of the total number of patients with PCAG, the other 2/3 refer to the European group. Among patients with mixed form the Khakases have made up 37-47 %, the Europeans being 53-63 % accordingly [8]. Thus, in spite of the fact that the CAG form is traditionally considered to be prevailing at the Mongolian group, OAG form with narrow (including beakshaped) and mid-latitude ICA was extended among the Tuvinians and the Khakases, this characteristic identifying from other Mongolian races [11].

The Yakuts, from Evenk language 'yakolsy', the self-name 'sakha', are one of the most numerous natives of Siberia, comprising the majority of indigenous population of the Republic Sakha. The physical appearance of Yakuts is characterized by Central Asian anthropological type of the Mongolian race. The ethnic genesis of Yakuts has come to the end to the beginning of XVI century, when they underwent the absorption by southern Baikal Turkic immigrants. The immigrants were of the mixed Turkic-Mongolian origin, while the local tribes were presented as the Tungus Evens, the Evenks, the Jukagirs and other relative paleoasian tribes representing the ancient population of Yakutia [4]. The controversial data of the numerous surveys concerning to PG prevalence among the non-homogenous Mongolian races and unclear heterogeneous origin of Yakuts served as the stimulus for studying the glaucoma epidemiology in RS (Y). As the result of the epidemiological studies of the natives RS(Y), PG samples were revealed: 1) a higher level of general glaucoma in the republic (1247,2 per 100 thousand adult population) which exceeds the data all over the Russian Federation on 48,5 % [19]; 2) POAG high frequency rate (64,5 %) with typical narrow «beakshaped» profile of anterior chamber angle (ACA) (57 %), with high exogenic pigmentation of drainage system; 3) short front-back eyes (FBS) less than 23,0 mm; 4) relatively smaller linear (except thickness of iris) ocular parameters at all investigated PCAG patients at ultrasonic biomicroscopy (UBM) in comparison with emmetrope group without glaucoma [13]; 5) among PCAG indigenous people 65 % of cases with relatively pupillary block in ACA closing, and 35 % with flat iris syndrome.

This literary review carried out has revealed the variability of PG disease and its prevalence not only among various ethnic groups, but also in each of them, as well as has shown the necessity of epidemiological surveys among various ethnic groups.

The literature list

1. Ahrorova Z.D. Primary glaucoma in Tajikistan (Clinical-epidemiological and medical-social surveys) / Z.D.Ahrorova //Clinic. ophtalm. - 2002. - № 2. - P. 51-55.
2. Borinsky S.A. Ethnogenome: history with geography / S.A.Borinsky, E.K Khusnutdinova // The Man - 2002. - № 1. - P. 19-30.
3. Genetic-epidemiological research of the population of Tuva / V.P. Puzyrev [etc.]. - Tomsk: the Science, 1999 – P. 256.
4. Gogolev A.I. History of Yakutia (The review of historical events since the beginning of the XX-th century.) / A.I.Gogolev. - Yakutsk: Publishing house of the Yakut university, 2000. - P. 201.



5. Dikambaeva M. K. Characteristics of glaucoma in the Kirghiz Soviet Socialist Republic / M.K.Dikambaeva, A.P.Abrashina // Characteristics of visual organ pathology in the conditions of Central Asia: coll. scient. works - Frunze, 1988. - P. 15-18.
6. Disease of glaucoma in the Samara region over the last 5 years: tendencies and prospects / E.B.Nikiforova [etc.]// Glaucoma: theories, tendencies, technologies: Coll. scient. works. - M, 2011. - P. 227-230.
7. Kamilov H.M. Ways of improvement of glaucoma prophylactic medical examination with a computer // H.M. Kamilov, A.A.Akramov, F.N.Haitov // 6th All-Union congress of ophthalmologists: Abstr. reports - M, 1985. - P.68.
8. Karamchakova L.A. Ethnic characteristics of primary open-angle glaucoma among natives of Republic Khakassia: Diss. ... Kand. Medical sciences / L.A.Karamchakova - Krasnoyarsk, 2008. - P.117.
9. Kolbasko A.L. Ethnic ophtalmopathology in the Republic Altai population. Abst. diss.... Dr.s of medical sciences / A.L.Kolbasko - Novokuznetsk, 2000. - P.38.
10. Komarovskikh E.N., Kozin E.V. Diagnostics and treatments of primary open-angle glaucoma / E.N.Komarovskiy, E.V.Kozin. - Krasnoyarsk: the Krasnoyarsk writer, 2012. - P.36.
11. Komarovskiykh E.N. Ethnic aspects of glaucoma at Mongolian race / E.N.Komarovskiykh, T.P. Tkachenko, L.A.Karamchakova // Glaucoma. - 2005. - № 3. - P. 7-11.
12. Libman E.S. Epidemiological characteristic of glaucoma / E.S.Libman, E.A.Chumaeva, J.E.Elkina// HRT club of Russia: Coll. scient. works - M, 2006. - P. 207-212.
13. Some ethnic characteristics of anatomic-topographical parametres of eyeball structure among natives of the Republic Sakha (Yakutia) with glaucoma / V.V. Neroev [etc.] // Russian Ophthalm. Magazine. - 2013. - № 2. - P. 52-57
14. Nesterov A.P. Primary glaucoma / A.P.Nesterov. - M: Medicine, 1975. - P.264.
15. Nesterov A.P. Primary open-angle glaucoma: pathogenesis and treatment principles / A.P.Nesterov // Clinic. ophtalm. - 2000. - № 1. - P. 4-5.
16. Primary glaucoma as a medical-social problem in the Central region of Russia / N.P.Chigovanina [etc.] // Glaucoma: problems and decisions: Coll. scient. works - M, 2004. - P. 444-446.
17. Tachmuradov B. Characteristics of close-angle glaucoma in Turkmenistan / B.Tachmuradov // Congress of ophthalmologists of Russia, 8th: Abstr. reports - M, 2005. - P. 219.
18. Tkachenko T.P. Primary open-angle glaucoma among natives of Republic Tyva. Diss. ... Kand. Medical sciences / T.P. Tkachenko. - Krasnoyarsk, 2006. - P.116
19. Epidemiology of glaucoma in the Republic Sakha (Yakutia) / V.V. Neroev [etc.] // The Yakut medical journal. - Yakutsk. - 2013. - № 2 (42). - P. 73-76.
20. AGIS Investigators. The Advanced Glaucoma Intervention Study (AGIS): 9. Comparison of glaucoma outcomes in black and white patients within treatment groups // Am. J. Ophthalmol. - 2001. - Vol. 132. - No. 3. - P. 311-320.
21. Bedford glaucoma survey / J.L. Bankes [et al.] // Br. Med. J. - 1968. - Vol. 30. - No. 1. - P. 791-796.
22. Congdon N., Wang F., Tielsch J.M. Issues in the epidemiology and population-based screening of primary angle-closure glaucoma / N. Congdon, F. Wang, J.M. Tielsch // Surv. Ophthalmol. - 1992. - Vol. 36. - No. 6. - P. 411-423.
23. Effect of tonometry on a glaucoma population study / H. Katsushima [et al.] // Nihon Ganka Gakkai Zasshi. - 2002. - Vol. 106. - No. 3. - P. 143-148.
24. Epidemiology of glaucoma in Japan - a nationwide glaucoma survey / Y. Shiose [et al.] // Jpn. J. Ophthalmol. - 1991. - Vol. 35. - No. 2. - P. 133-55.
25. Foster P.J. The epidemiology of primary angle closure and associated glaucomatous optic neuropathy / P.J. Foster // Semin. Ophthalmol. - 2002. - Vol. 17. - No. 2. - P. 50-58.



26. Foster P., Johnson G. Glaucoma in China: how big is the problem? / P. Foster, G. Johnson // *Br. J. Ophthalmol.* – 2001. – Vol. 85. – No. 11. – P. 1277-1282.
27. Garudadri C.S., Chelerkar V., Nutheti R. An ultrasound biomicroscopic study of the anterior segment in Indian eyes with primary angle-closure glaucoma / C.S. Garudadri, V. Chelerkar, R. Nutheti // *J. Glaucoma.* – 2002. – Vol. 11. – No. 6. – P. 502-507.
28. Giangiaco A., Coleman A.L. The epidemiology of glaucoma / A. Giangiaco, A.L. Coleman Eds.: Grehn F., Stamper R. *Glaucoma.* – Springer Berlin Heidelberg, 2009, XIV, 118 p. – P. 13-21.
29. Global data on visual impairment in the year 2002 / S. Resnikoff [et al.] // *Bull World Health Organ.* – 2004. – Vol. 82. – No. 11. – P. 844-851.
30. Increased lens vault as a risk factor for angle closure: confirmation in a Japanese population / M. Ozaki [et al.] // *Graefes Arch. Clin. Exp. Ophthalmol.* – 2012. – Vol. 250. – No. 12. – 1863-1868.
31. Lowe R.F. Etiology of the anatomical basis for primary angle-closure glaucoma Biometrical comparisons between normal eyes and eyes with primary angle-closure glaucoma / R.F. Lowe // *Br. J. Ophthalmol.* – 1970. – Vol. 54. – P. 161-169.
32. Ocular biometry in occludable angles and angle closure glaucoma: a population based survey / R. George [et al.] // *Br. J. Ophthalmol.* – 2003. – Vol. 87. – No. 4. – P. 399-402.
33. Ocular parameters in the subgroups of angle closure glaucoma / R. Sihota [et al.] // *Clin. Experiment. Ophthalmol.* – 2000. – Vol. 28. – No. 4. – P. 253-258.
34. Pardan S., Mahomed I. The clinical characteristics of Asian and Caucasian patients on Bradford's Low Vision Register / S. Pardan, I. Mahomed // *Eye.* – 2002. – Vol. 16. – No. 5. – P. 572-576.
35. Prevalence of primary open-angle glaucoma in a Spanish population: the Segovia study / A. Anton [et al.] // *J. Glaucoma.* – 2004. – Vol. 13. – No. 5. – P. 371-376.
36. Prevalence of glaucoma in the west of Ireland / M. Coffey [et al.] // *Br. J. Ophthalmol.* – 1993. – Vol. 77. – P. 17-21.
37. Prevalence of glaucoma and intraocular pressure distribution in a defined population. The Egna-Neumarkt Study / L. Bonomi [et al.] // *Ophthalmology.* – 1998. – Vol. 105. – No. 2. – P. 209-215.
38. Prevalence of glaucoma. The Beaver Dam Eye Study / B.E. Klein [et al.] // *Ophthalmology.* – 1992. – Vol. 99. – No. 10. – P. 1499-1504.
39. Prevalence of open-angle glaucoma in Australia. The Blue Mountains Eye Study / P. Mitchell [et al.] // *Ophthalmology.* – 1996. – Vol. 103. – No. 10. – P. 1661-1669.
40. Prevalence of open-angle glaucoma in Greece: The Thessaloniki eye study / F. Topouzis [et al.] // *Am. J. Ophthalmol.* – 2007. – Vol. 144. – P. 511-519.
41. Primary open-angle glaucoma in blacks: a review / L. Racette [et al.] // *Surv. Ophthalmol.* – 2003. – Vol. 48. – No. 3. – P. 295-313.
42. Quigley H., Congdon N., Friedman D. Glaucoma in China (and worldwide): changes in established thinking will decrease preventable blindness / H. Quigley, N. Congdon, D. Friedman // *Br. J. Ophthalmol.* – 2001. – Vol. 85. – No. 11. – P. 1271-1272.
43. Quigley H.A., Broman A. The number of people with glaucoma worldwide in 2010 and 2020 / H.A. Quigley, A. Broman // *Br. J. Ophthalmol.* – 2006. – Vol. 90. – No. 3. – P. 262-267.
44. Quigley H.A., Vitale S. Models of open-angle glaucoma prevalence and incidence in the United States / H.A. Quigley, S. Vitale // *Invest. Ophthalmol. Vis. Sci.* – 1997. – Vol. 38. – No. 1. – P. 3883-3891.
45. Racial variations in the prevalence of primary open-angle glaucoma. The Baltimore Eye Survey / J.M. Tielsch [et al.] // *JAMA.* – 1991. – Vol. 266. – No. 3. – P. 369-374.
46. Ringvold A. Epidemiology of glaucoma in northern Europe / A. Ringvold // *Eur. J. Ophthalmol.* – 1996. Vol. 6. – No. 1. – P. 26-29.



47. The prevalence of glaucoma among Eskimos of northwest Alaska / S.M. Arkell [et al.] // Arch. Ophthalmol. – 1987. – Vol. 105. – No. 4. – P. 482-485.
48. The prevalence and causes of bilateral and unilateral blindness in an elderly urban Danish population. The Copenhagen City Eye Study / H. Buch [et al.] // Acta. Ophthalmol. Scand. – 2001. – Vol. 79. – No. 5. – P. 441-449.
49. The prevalence of primary open-angle glaucoma in a population-based study in the Netherlands. The Rotterdam study / I. Dielemans [et al.] // Ophthalmology. – 1994. – Vol. 101. – No. 11. – P. 1851-1855.
50. The prevalence of glaucoma in Chinese residents of Singapore: a cross-sectional population survey of the Tanjong Pagar district / Foster P.J. [et al.] // Arch. Ophthalmol. – 2000. – Vol. 118. – No. 8. – P. 1105-1111.
51. The prevalence of glaucoma in the Melbourne Visual Impairment Project / M.D. Wensor [et al.] // Ophthalmology. – 1998. – Vol. 105. – No. 4. – P. 733-739.
52. Tuck M.W., Crick R.P. The age distribution of primary open angle glaucoma / M.W. Tuck, R.P. Crick // Ophthalmic. Epidemiol. – 1998. – Vol. 5. – No. 4. – P. 173-183.

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6. Bessmertny Alexander Markovich, Dr.M, senior research associate, Federal State Budgetary Institution MSI of eye illnesses named after Helmgoltz of Ministry of Health of Russia, 105062, Moscow, Sadovaya-Chernogryazskaya St., 14/19, ph. (495) 608-40-65, e-mail: glaucoma@igb.ru,
7. Robustova Olga Vyacheslavovna, K.M.S., ophthalmologist of Federal State Budgetary Institution MSI of eye illnesses named after Helmgoltz of Ministry of Health of Russia. 105062, Moscow, Sadovaya-Chernogryazskaya St., 14/19, (495) 608-40-65, e-mail: olga_robustova@mail.ru.

Informational Technologies at Clinical Examination of Children in the Republic Sakha (Yakutia)

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Abstract

Within the program of pediatrics service modernization in the Republic Sakha (Yakutia) in 10 arctic districts: Anabarsky, Abyjsky, Oleneksky, Bulunsky, Ust-Yansky, Allaikhovsky, Nizhne-Kolymsky, Sredne-Kolymsky, Zhigansky and Kobyasky fixed automated systems of prophylactic examination are set. In this article the results of using given technologies are presented. The aim of this article is to demonstrate possibility of using automated system of prophylactic examinations in the Arctic districts of Yakutia. 166 children were examined according the automated system of prophylactic examinations. On the first stage – cardiorheumatology (92.8%), then endocrinology (50.3%), ophtalmological (40.4%), dental (36.7%), pulmonology and otorhinolaryngological pathology. As V.G. Chasnyk says the types of pathologies often observed in children are considered as a populational pathology which needs more attachments for prophylactics and treatments.

Keywords: children, automated system of prophylactic medical examinations, prophylactic medical science.

Introduction

Automated system of prophylactic medical examinations (AKDO) is recognized as more convenient for screening-diagnostic actions of first step. The second step is outcall of specialists for diagnostic and medical aid considering revealed profiles of pathology. The third step is outcall of ambulatory medical team of surgeons for rendering of specialized medical aid directly on the places of residence (order of Ministry of health care of Republic of Sakha (Yakutia № 01-8/4-378 from 07.03.2012) 2.

For people in remote areas of north of Yakutia costs on the consultative and diagnostic assistance are in many times higher than the costs of citizens living close to the medical institutions. It is difficult to deliver medicaments, foodstuff and other cargo for hospitals because of difficult transport infrastructure.

Therefore, high – qualified medical help becomes unavailable for most people of districts.

The objective. To demonstrate possibility of using automated system of prophylactic examinations in the districts of the Far North of Yakutia on the results of works on Oleneksky district.

Characterization of Oleneksky district. Oleneksky district is situated on the north-west part of the Republic Sakha (Yakutia) on the Arctic zone. It is the most large district which occupied 1/10 part of the whole territory of Republic – the area of district is 321.7 square km. The distance between Olenek and Yakutsk is 2020 km.

There are 4 localities: Olenek, Kharyalakh, Zhilinda, Eyik. Eyik and Zhilinda are situated far away, in winter they can get there on the ice road, and in summer on the river or on air. The air distance between Olenek and Zhilinda 195 km, on the ice road is 300 km, on the car the way takes 9 hours. The air distance between Olenek and Eyik is 350 km, on the ice road it is 600 km, on the car the way takes 24 hours. The population is 4155 people. You can see it on the table № 1. The density of population – 0.0012 men in square km.



Table 1.
The dynamics of population in Oleneksky district

	2010	2011	2012
The population	4028	4113	4155
Children 0-17 years old	1349	1372	1376
0-14 years old	1104	1127	1142
Teenagers	245	246	234
Children under 1 year old	95	80	99

Olenek central hospital, Zhilinda hospital, Kharyalakh medical station, Eyik hospital perform medical prophylactic aid in district.

Only Olenek central hospital has license of pediatrics.

Medical staff. There is 1 doctor of common practice in Oleneksky district, 2 pediatricians. The district has status of less setting (Zhilinda, Kharyalakh) there physician works; in Eyik there a doctor of common practice works.

The results and discussing. 166 children were examined according the system of AKDO. In Olenek – 177, in Zhilinda 31 children, in Kharyalakh – 16 children, in Eyik – 2.

On the first stage – cardiorheumatology (92.8%), then endocrinology (50,3%), ophthalmological (40.4%), dental (36.7%), pulmonology and otorhinolaryngologist pathology. As V.G. Chasnyk says the types of pathologies often observed in children are considered as a populational pathology which needs more attachments for prophylactics and treatments.

Using such technologies on the places we detected the problem – there work only 2 pediatricians, who work on the system of AKDO. It takes 20-25 minutes to observe 1 child. Therefore, in our opinion, it is expediently using such technology at school by school doctors.

The system of AKDO is more comfortable to conducting screening-diagnosis functions of first step. The second step is outcall of specialist for diagnosis and medical aid considering the types of pathology. It essentially soothes the works of specialists. The systems of AKDO make possible to leg to objective valuation not only the health of individual patients, but also children. Full-fledged fulfillment of technology will be possible in wide consolidating of medical workers, parents and school. 1

Table №2

Frequency of pathology in profiles of pathologies in Oleneksky district

Pathology profile	Total	Boys	Girls
Examined, prs	166	82	84
Healthy children, prs	2	0	2
Children with pathology, prs	164	82	82
Cardiological	92,8	92,7	92,9
Endocrinological	51,2	56,1	46,4
Ophtalmological	40,4	36,6	44,0
Dental	36,7	36,6	36,9
Pulmonological	21,1	24,4	17,9
Neuropathological	20,5	26,8	14
Allergological	13,3	14,6	11,9
Otorhinolaryngological	11,4	13,4	9,5
Gastroenterological	7,2	7,3	7,1

**References:**

1. Voronsov I.M. Creation and using automated systems for monitoring and screening diagnostics of health disorders / I.M. Voronsov, V.V. Shapovalov, Y.M. Sherstyuk. - St. Petersburg «Kosta» 2006, p. 331.
2. Samsonova M.I. Ethnic and Ecological factors in formation of health of teenagers in the Republic Sakha (Yakutia) in process of their growth and development /M.I. Samsonova: MD thesis abstract. - Khabarovsk, 2012, p. 35.
3. Chasnyk V.G. Ethnic and regional causes of regulations in a child's development in the Far North / V.G. Chasnyk, E.V. Sinelnikova, T.E. Burtseva [et al.]. - Yakutsk, 2008. - 197 p.

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The Role of Inflammatory Responses in the Development of Viliuisk Encephalomyelitis Degenerative Processes

Nikitina R.S., V.L. Osakovski

ABSTRACT

The authors made a comparative analysis of the clinical characteristics of the two groups of Vilyuisk encephalomyelitis (VE) patients to assess the role of inflammatory responses in the development of neurodegenerative processes in this disease. In our paper we show that at inflammatory onset of the disease younger age debut of disease and more expressed clinical symptoms are observed.

Inflammatory reactions make complications and exacerbate the severity of the clinical course of the disease, accelerating neurodegeneration in patients with primary encephalopathy (a special form of encephalopathy, which leads to the VE development).

Keywords: Vilyuisk encephalomyelitis, inflammation, encephalopathy.

INTRODUCTION

Viliuisk encephalomyelitis is a special form of neurodegenerative disease historically first revealed on the territory Mastakh Vilyui District of Yakutia .

Feature of the disease is manifested with chronic clinics, which by nature of the course can be divided into two large groups. The first group includes chronic patients with experienced inflammatory VE start, the second - patients who have not registered or inflammatory beginning manifested with less severe form [1]. In this paper, we first used intrathecal IgG synthesis test for separation into two groups of VE patients and neurological comparative analysis was done. A positive test indicates a pronounced inflammatory response of the brain of the patient, which is associated with the manifestation of onset and presumed infectious etiology. However, despite the differences in the clinical course, the two groups form the original contingent of patients with chronic neurodegenerative process, the nature of which is still undisclosed. The **purpose** of this paper is to analyze the role of inflammatory responses in the development of degenerative processes of the disease.

MATERIALS METHODS

In the work we used VE patients' registers of the clinical department of the Health Institute. The analysis was performed on the material of patients history, the diagnosis of the disease was carried out on the basis of clinical criteria developed by domestic neurologists.

Laboratory criteria for separating teams served as a test for intrathecal synthesis of IgG [2] . Comparative analysis of the clinical characteristics of these two groups of patients to assess the CEs role in the development of inflammatory reactions of neurodegenerative processes conducted on 149 patients , including 61 with a positive test (oligoclonal synthesis IgG), 88 with a negative test.

10 VE patients with intrathecal synthesis of IgG (+) and 10 patients without synthesis oligoclonal IgG (-) on the detailed difference of clinical indicators were separately analyzed.

RESULTS OF THE STUDY

Gender ratio in the analyzed groups of patients were as follows: in the group with a positive test 60% of men by 40 % of women, respectively, with a negative test 46% men 54% women. The disease occurs more often in women without marked inflammatory reactions than men.

Comparative analysis of age at onset (the debut of the disease) in both groups of patients is shown in Figure 1. Patients did not experience chronic VE expressed inflammatory reactions



during the clinical course, the disease begins to develop later than the patients experienced an acute inflammatory beginning.

The age of onset of the disease process with a positive oligoband VE (+) covers the period from 24y.o. to 69 years, the average is 34 years.. When oligoband negative (-) covers the period from 17 years to 50 years, mean disease onset is 42 years. Patients predisposed to acute inflammatory VE top sick earlier than patients whose clinic takes place without marked inflammatory reactions.

Analysis of quantitative evaluation of symptoms conducted on patients with positive oligoband 10 people, including 5 males and 5 females, and negative oligoband 10, including 4 men and 6 women.

The analysis results can be summarized as follows:

1. Dementia, dysarthria, pyramidal syndrome and tone are expressed in patients with a positive result, is less pronounced in patients with a negative result.
2. In patients with positive oligoband Babinski symptom is less pronounced in contrast to patients with negative oligoband.
3. Brain atrophy on MRI results was more pronounced in patients with a positive oligoband and is 2.3 points for patient with (+) and 1.01 points for the patient with VE (-).

CONCLUSIONS

At acute inflammatory VE debut of disease happens at the earlier age and exhibits more pronounced clinical signs of disease nosology. Aggravating factors in the development of acute inflammatory reactions in these patients may be hypothermia, stress, childbirth and infection. Patients with negative oligoband are less susceptible to these factors. Inflammatory reactions complicated clinical course of the disease and accelerated neurodegeneration in patients with primary encephalopathy (a special form of encephalopathy, which leads to the development of Vilyuisk encephalomyelitis).

REFERENCES

1. Goldfarb L.G., Gajdusek / Viluisk encephalomyelitis in the Yakut people of Siberia // Brain. – 1992. – P. 961-978
2. Green A.J.E., Sivtceva T.M., Danilova A.P. et. al. Viluisk encephalitis: intratecal synthesis of oligoclonal IgG. // J. Neurol. Science. – 2003. – Vol. 212. – P. 69-73.

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Optimizing the Use of Radiological Methods of Diagnosis at Examining Children and Adolescents for Tb

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Abstract

The authors proved high informative content of the computed tomography (CT), on the basis of the study of diagnostic informative content of radiographic research methods used in the survey of children and adolescents on primary pulmonary tuberculosis. CT diagnostic significance indicators exceed informative content of traditional radiographic techniques (radiography and linear tomography) in 2-2.5 times. A comparative assessment of radiation doses received during conventional radiological methods and CT is given. The authors revealed the dependence of the received radiation dose from the age, the highest radiation burden falls on young children and adolescents. In the result of the research, a high radiation dose at linear tomography at low diagnostic informative content was defined, thus indicating the need to abandon this method at testing children and adolescents to primary tuberculosis, in favor of CT.

Keywords: diagnostic informative content, radiation dose, x-ray methods, children and adolescents.

Introduction

In concordance with the WHO reports, diagnostic imaging methods play important role in the choice of adequate therapy, and these methods must be made accessible wherever there is a need in them. But the responsibility required to prevent an unnecessary use of these methods is at least as important.

In foreign countries, the efficiency of radiologic diagnosis is often assessed based on the so called 3D principle (diagnosis, dose and dollar) [16]. Following the contemporary understanding of radiation safety, any radiologic examination must be both useful, and harmless, or in other words, the expected benefit must at least outweigh possible risk.

Chest x-ray is the most often performed x-ray procedure over the world, making 50% of all the radiologic examinations [13]. In tuberculosis (TB) management, radiologic examinations are indispensable in determining the disease site and stage. The most common clinical form of TB in children is intrathoracic lymphadenopathy, which means, that the diagnosis is aimed at timely detection of TB infection in these particular organs, and the latter has a great significance in terms of prevention of disease complications, spreading or progression to chronic disease [3,8].

In accordance with the current regulations on the organization of regular medical checkup and registration of TB patient cohorts by anti-TB institutions (Russian Federation Health Ministry Order no. 109 "On improvement of tuberculosis preventive measures in the Russian Federation" dated March 21, 2003), the coverage and frequency of x-ray examinations among children and adolescents are based on the use of standard examination package, which includes chest x-ray and linear tomography of mediastinum.

Conventional chest x-ray remains the basic method of primary examination of thoracic organs, due to its rather small radiation exposure, low cost and fairly high diagnostic value, compared to other radiologic imaging methods. Effective dose for chest x-ray in adult patients is 0.1 (digital detector) mSv to 0.4 (photographic film) mSv, according to various authors [7,4].

Effective dose equivalent (EDE) is a conventional notion, designating the dose of uniformly distributed radiation, which corresponds to the dose of actual radiation received by a certain organ (sum of organs) in terms of risk for late effects (measurement unit is a Sievert). Average EDE caused by radiation for medical purposes is estimated as 1.5 mSv/year. Roughly



speaking, exposure of 1 million population would result in approximately 37.5 to 56.3 diseases, 18.75 deaths, or 6 congenital abnormalities [12,15].

Linear tomography is a body section radiography method used as a conventional radiologic exam method in 10-15% of patients (in pediatric TB patients performed significantly more often: one in two patient is irradiated at least once a year), to refine the chest x-ray findings on abnormal macro-zones in lung tissue, hilum and mediastinum. Using standard chest x-ray and linear tomography, abnormalities in the intrathoracic lymph nodes can be diagnosed effectively only if the lymph nodes are markedly enlarged [2,5,9,17].

According to R.V. Stavitsky (1994), EDE for longitudinal linear tomography is higher than the EDE for chest x-ray or even fluoroscopy [13].

Today, using computed tomography (CT), which is currently recommended as an adjunctive method in cases suspected for minor forms of intrathoracic lymph node TB, it is possible to determine exactly the abnormalities in all groups of lymph nodes or lung tissues, to assess correctly the morphologic patterns in the infected lymph nodes, to describe the localization, extent and stage of the infection.

As it follows from published reports, routine CT in pediatric TB usually shows multiple calcified lymph nodes sized 0.2 to 0.5 sm. in 74.6% of cases. This is true even for latent tuberculosis infection, signaling that a good diagnosis in intrathoracic lymph node TB is not achieved by means of standard radiologic examinations [1,10,11].

CT is a radiologic imaging method of high diagnostic value, but is associated with relatively high radiation doses. Alternative opinions occur in the literature. Studies conducted in the Russian Scientific Center of Roentgenradiology have shown that deleterious effect from irradiation during CT was significantly lower, than during conventional longitudinal linear tomography [6].

Relative disadvantage of CT is its high cost, compared to conventional radiologic imaging methods, which limits its wider use.

As far as radiologic diagnosis involves ionizing irradiation, its use in pediatrics must be for good reasons, because children are more sensitive to radiation, which can disrupt normal development. According to F. Stive (1988), effect of ionizing radiation can manifest as general developmental delay, suppression of brain function, bone growth plates, liver function, blood, immune and endocrine systems [18].

All in all, chest x-ray, linear tomography and CT as methods of thoracic organ imaging are unequal in their diagnostic values, radiation exposure and cost. Knowledge of the capacities and feasibility of each method or their combination is both important and crucial, and it is the specialists in radiologic diagnosis who must act as experts in wise use of diagnostic methods and choice of optimal patient examination strategy [14].

Aim: to optimize the use radiologic imaging methods in examining children and adolescents for TB, based on diagnostic value of the methods and radiation exposure.

The following **tasks** were formulated to achieve the aim:

1. To assess the diagnostic value indicators (sensitivity, specificity, efficiency) for conventional radiologic imaging methods (chest x-ray, linear tomography) and CT in detection of intra thoracic lymph node TB among pulmonary TB patients.

2. Determine radiation doses for children and adolescents using different radiologic chest imaging methods (chest x-ray, linear tomography, CT) and either reference or dosimetry-derived effective doses.

Material and methods

To calculate the diagnostic value of conventional methods and CT, we used clinical radiologic data from 221 pediatric patients, who were examined in the Pediatric Regular Medical Checkup (Dispensary) Department of the Research & Practice Center for TB, and 374 pediatric patients from T.P.Dmitrieva Republican Pediatric TB Sanatorium.



Optimal choice of radiologic imaging methods to examine children and adolescents for primary TB of chest organs was made based on calculation of the diagnostic value of each method, including:

- Diagnostic sensitivity (percent of cases tested positive among patients with TB);
- Diagnostic specificity (percent of cases tested negative among patients without TB);
- Diagnostic efficiency (mean value between sensitivity and specificity);
- Positive predictive value (probability of the presence of TB in cases tested positive);
- Negative predictive value (probability of the absence of TB in cases tested negative).

For the purposes of dose load calculation, patients were divided to 4 age groups: 0-3, 3-7, 7-14 and 14-17 years (50 patients in each group). Dose load was determined using two calculation methods: reference dose-based and dosimetric.

For reference doses we used mean dose values for each of the radiologic imaging methods, developed by the Dosimetric Research Laboratory of the Russian Scientific Center of Roentgenoradiology and Moscow Technical Engineering Institute.

Reference doses provide very approximate effective dose values, due to the lack of account for patient size variability and the specific technical characteristics of the imaging equipment.

Dosimetric calculation of radiation doses was based on DAP meter readings.

Chest x-ray and linear longitudinal tomography were performed with Multix Pro system manufactured by Siemens, equipped with KermaX plus DDP dosimeter for determination of effective dose. DAP ($\mu\text{Gy} \cdot \text{m}^2$) and air radiation field meter readings were measured independently of the distance between the x-ray tube and the patient.

Then the DAP value ($\mu\text{Gy} \cdot \text{m}^2$) is converted to age-specific effective radiation dose (E), using the formula:

$$E = F \cdot K_d, \text{mcSv, where}$$

F stands for DAP, $\text{cGy} \cdot \text{sm}^2$;

K_d stands for conversion coefficient to age-specific effective radiation dose, depending on the radiologic exam method used, plane, imaging size, source to skin distance, x-ray tube kilovoltage, $\text{mcSv}/(\text{cGy} \cdot \text{sm}^2)$.

Mean age-specific conversion coefficients for effective doses are given in the Standard Procedures MUK 2.6.1.1797-03 "Monitoring the effective patient dose in medical X-ray studies".

CT was performed using "Somatom Emotion Duo" dual-rows spiral scanner (Siemens). Effective dose was calculated using the calculation method developed by the Federal Radiologic Center (Saint-Petersburg Research Institute for Radiologic Health), Radiological Health Department of the Russian Medical Academy of Postgraduate Education, Russian Federation Health Ministry Department of State Sanitary-Epidemiological Surveillance, Research & Practice Center for Medical Radiology and ZAO (Joint Stock Company) "Meditsinskaya tekhnologiya" (Standard Procedures MUK 2.6.1.1797-03).

Computer Tomography Dose Index (CTDI) is used to characterize source axis dose distribution in the air or absorbed dose distribution per 1 scan. Next, effective doses are derived using conversion coefficients. CTDI values depend on physical technical equipment parameters (tube voltage, filtration, scan thickness etc.) and are proportional to exposure values (amount of electricity) mAc . Then, DLP_i ($\text{mGy} \cdot \text{sm}$) is determined:

$$E_i = e_{DLP} \cdot DLP, \text{ where}$$

e_{DLP} - conversion coefficient ($\text{mSv} \cdot \text{mGy}^{-1} \cdot \text{sm}^{-1}$) for each anatomic slice i , normalized for standard phantom-derived DLP value.

Effective dose values in children are smaller due to small body size. To calculate DLP in children, 16 sm. diameter phantom is used, irrespective of the body region studied. Table 1 shows conversion coefficients (e_{DLP}) for children of different ages.

Table 1
Age-specific conversion coefficients for converting *DLP* values for 16 sm diameter phantom to effective doses in children

Examination area	e_{DLP} for adults, $\text{mSv} \cdot \text{mGy}^{-1} \cdot \text{sm}$	Age-specific conversion coefficient (years)					
		>15	15	10	5	1	0
Head	0.0023	1.0	1.2	2.0	3.2	5.1	9.5
Trunk	0.0081	1.0	1.2	1.8	2.6	4.0	7.9

Results

During the phase 1 of the study, we calculated diagnostic values of conventional radiographic methods (chest x-ray, linear tomography) in 221 patients, who were examined in the Pediatric Regular Medical Checkup (Dispensary) Department of the Research & Practice Center for TB. After complete clinical radiographic examination, 53 out of total number of patients examined had localized active TB and residual post-TB alterations in the lungs and intrathoracic lymph nodes (true positive cases). In 43 patients, localized TB was excluded after complete clinical radiographic examination (true negative cases). In 69 patients with lung and hilar abnormalities detected by conventional methods, additional CT examination coupled with laboratory tests did not confirm the presence of localized TB (false positive cases). On the contrary, 56 patients with supposedly absent TB in the lungs and intrathoracic lymph nodes based on conventional methods, CT and laboratory tests established the presence of localized TB (false negative cases).

Radiologic exam results from 374 patients examined in the T.P.Dmitrieva Republican Pediatric TB Sanatorium in 2013 were used to determine diagnostic value of CT. After analyzing all clinical and radiological data, localized TB in various progression stages and post-TB alterations were found in 72 out of 374 patients (true positive cases). After the comprehensive clinical and radiological examination including CT, localized TB was excluded in 282 patients (true negative cases). In 18 patients, in whom CT showed the presence of lung and mediastinal abnormalities, clinical laboratory test results did not confirm the localized TB (false negative cases). 2 patients with apparently normal baseline CT scans, in whom localized TB was excluded based on laboratory results, dynamic CT examination revealed calcifications in the intrathoracic lymph nodes (false negative cases). Based on these findings, we calculated diagnostic values for each radiologic imaging method (Table 2).

Table 2
Comparison of diagnostic values of radiologic imaging methods in children and adolescents during establishing the diagnosis of primary TB of the respiratory organs

Method of radiologic examination	Sensitivity	Specificity	Efficiency	PPV	NPV
Plain chest x-ray + linear tomography	48%	38%	43%	43%	43%
CT	97%	94%	95%	80%	99%

Apparently, CT showed the highest diagnostic value in diagnosing TB-induced alterations in the lungs and intrathoracic lymph nodes. Diagnostic values of conventional radiographic methods were lower by a factor of 2-2.5.

During the phase 2 of the study, we assessed radiation exposure in 200 patients from various age groups, who were examined for primary TB using different radiologic imaging methods. Results are shown in Table 3.

Table 3

Dose loads in children and adolescents during chest organs examinations performed with different imaging methods and using either reference radiation doses or DAP meter derived doses

Method of radiologic examination	EDE ₅ , mSv / scan							
	Mean age							
	0-3 (n=50)		3-7 (n=50)		7-14 (n=50)		14-18 (n=50)	
	Dose calculation		Dose calculation		Dose calculation		Dose calculation	
	Reference doses	Dosimetry	Reference doses	Dosimetry	Reference doses	Dosimetry	Reference doses	Dosimetry
Chest x-ray	0.03	0.04	0.05	0.03	0.07	0.03	0.10	0.05
Linear tomography	1.14	0.20	1.02	0.15	1.38	0.15	0.90	0.23
CT	1.7	0.77	1.7	0.66	2.1	0.76	2.8	1.11

Concluding from published reports, effective doses calculated based on reference doses are too approximate, and due to impossibility to account for all physical and technical factors the margin of error can reach $\pm 150-250\%$.

Age-specific effective doses for posterior-anterior chest x-ray ranged from 0.03 to 0.10 mSv (based on available reference doses) and from 0.03 to 0.05 mSv (based on DAP meter readings).

Alterations in intrathoracic lymph nodes were detected by means of standard chest x-ray alongside with linear longitudinal tomography. Effective doses were rather high (0.9-1.3 mSv for reference-based calculation and 0.15-0.23 mSv for DAP measurement-based calculation) due to the following reasons: 1) the need to cover large imaging areas by a direct beam and under various angles, to visualize important organs, and hence to increase radiation amount to achieve proper photographic density; 2) posterior-anterior plane, usually associated with intensive irradiation of the liver, stomach, esophagus, lungs, as these organs are not shielded by the skeletal system. Effective doses for linear tomography were 5 times higher compared to those for plane chest x-ray.

Age-specific radiation doses for CT were 1.7-2.8 mSv (calculated based on reference doses) and 0.66-1.11 mSv (calculated based on DAP meter readings). Radiation doses for CT were 2 (reference-based effective doses) or 4-5 times higher (DAP meter-derived effective doses), compared to linear tomography.

DAP meter-derived calculation of the effective doses showed age-dose relationship: the highest radiation doses were associated with infancy and adolescence in all imaging methods studied. Likewise, radiosensitivity is known to be dependent on the age: the smaller the age, the higher the radiosensitivity.

Conclusions. Comparison of the results of conventional radiographic examination (chest x-ray and linear tomography) with the results of CT showed that:

- Calculation of diagnostic values confirmed superiority of CT over chest x-ray and linear tomography in diagnosing TB-induced alterations in intrathoracic lymph nodes and lung tissue;
- Radiation exposure during linear tomography and CT is significantly (5 to 25 times) higher than exposure during chest x-ray;
- Linear tomography is irrelevant in the contemporary context, due to its low diagnostic value and high radiation exposure;
- In children and adolescents from risk groups for TB (contact patients, patients with tuberculin skin test conversion, and patients with hyperergic reaction to 2 TU or Diaskintest) CT should be



preferred, and conventional radiographic imaging methods (chest x-ray and linear longitudinal tomography) should be avoided, due to higher diagnostic value of CT.

a.

References:

1. Aksenova V.A. et al. Kliniko-rentgenologicheskaya diagnostika pervichnykh i vtorichnykh form tuberkuleza u detey i podrostkov v sovremennykh usloviyakh: posobie dlya vrachey [Clinical radiographic diagnostics of primary forms of tuberculosis in children and adolescents in contemporary settings: guidebook for physicians]. Moscow; 2003. 45 p. Russian.
2. Gegeeve F.E. Sravnitel'naya kharakteristika rentgenologicheskikh metodov diagnostiki 'malykh' form tuberkuleza vnutrigrudnykh limfaticeskikh uzlov [Comparative characterization of x-ray studies for diagnosing minor forms of tuberculosis of intrathoracic lymph nodes]. Probl Tuberk Bolezn Legk, 2006, no. 1, pp. C. 23-28. Russian.
3. Dovgalyuk I.F., Korneva N.V. Kliniko-epimiologicheskie osobennosti tuberkuleza u detey Severo-Zapada Rossiyskoy Federatsii [The clinical and epidemic features of tuberculosis in children of the northwest areas of the russian federation]. Probl Tuberk Bolezn Legk, 2011, no. 3, pp. 12-16. Russian.
4. Stavitskiy R.V., etal. Dozovye nagruzki na detey pri rentgenologicheskikh issledovaniyakh [Radiation dose in radiographic examination of children]. Moscow: KABUR; 1993. 163 p. Russian.
5. Il'ina N.A. Vozmozhnosti komp'yuternoy tomografii v diagnostike vospalitel'nykh zabolevaniy legkikh u detey [Capacities of computed tomography in diagnosis of inflammatory lung diseases in children]. Synopsis of Cand.Med.Sc.(MD) Thesis. Saint-Petersburg; 2001. 25 p. Russian.
6. Kotlyarov P.M. Luchebye metody v diagnostike zabolevaniy organov dykhaniia [Radiologic methods in the diagnostics of respiratory diseases]. Russkii Meditsinskii Zhurnal, 2001, vol. 1, no. 5, pp. 197-200. Russian.
7. Stavitskiy R.V., ed. Meditsinskaia radiologiya: tekhnicheskie aspekty, klinicheskie materialy, radiatsionnaya bezopasnost' [Medical radiology: technical aspects, clinical material, radiation safety]. Moscow: MNPI; 2003. 343 p. Russian.
8. Ovchinnikova YU.E. et al. Prichiny khronicheskogo techeniya tuberkuleza vnutrigrudnykh limfaticeskikh uzlov u detey, osobennosti klinicheskikh proyavleniy i terapii [Causes of chronic tuberculosis of intrathoracic lymph nodes in children, the specific features of clinical manifestations and therapy]. Tuberk Bolezn Legk, 2010, no. 1, pp. 40-44. Russian.
9. Rozenshtraukh L.S., Rybakova N.I., Viner M.G. Rentgenodiagnostika zabolevaniy organov dykhaniia [Radiographic diagnosis of respiratory diseases], 2nd ed. Moscow: Meditsina; 1987. 640 p. Russian.
10. Smetanin A.G., Dauletanova YA.V. Osobennosti vizualizatsii vnutrigrudnykh limfaticeskikh uzlov pri latentnoy tuberkuleznoy infektsii u detey [Features in the imaging of intrathoracic lymph nodes in pediatric latent tuberculosis infection]. In: Novye tekhnologii v epidemiologii, diagnostike i lechenii tuberkuleza vzroslykh i detey: nauch.-prakt. konf. molodykh uchenykh [New technologies in epidemiology, diagnosis and treatment of tuberculosis in adults and children: young scientists research & practice conference]. Moscow; 2011. p. 62-63. Russian.
11. Stavitskaia N.V., Doroshenkova A.E. Osnovy razrabotki personifitsirovannoy programmy profilaktiki tuberkuleza u detey s latentnoy tuberkuleznoy infektsiey [Bases for elaboration of a personified tuberculosis prevention program in children with latent tuberculosis infection]. Tuberk Bolezn Legk, 2010, no. 8, pp. 37-43. Russian.



12. Stavitskiy R.V., Viktorina V.P. Osnovy radiatsionnoy zashchity v rentgenologicheskoy praktike [Basics of radiation protection in practical radiography]. Moscow: Meditsina; 1968. 108 p. Russian.
13. Stavitskiy R.V. et al. Radiatsionnaya zashchita v meditsinskoj rentgenologii [Radiation protection in medical radiography]. Moscow: Kabur; 1994. 272 p. Russian.
14. Ternovoy S.K., Sinitsyn V.E. Razvitie komp'yuternoy tomografii i progress luchevoj diagnostiki [Progress in computed tomography and radiodiagnosis]. Radiologiya – Praktika, 2005, no. 4, pp. 17-22. Russian.
15. Usol'tsev V.I., Chuykova N.V. Lucheveye nagruzki na detey pri rentgenodiagnostike [Radiation exposure in children during radiographic diagnosis]. 1994. 6 p. Saint-Petersburg. Russian.
16. Chikirdin E.K. Rentgenologicheskoe oborudovanie s ponizhennoy dozodoi nagruzkoj [Low radiation dose radiologic equipment]. Vestnik rentgenologii i radiologii, 1994, no. 4, pp. 60-61. Russian.
17. Bosch-Marcet J. et al. Comparison of ultrasound with plain radiography and CT for the detection of mediastinal lymphadenopathy in children with tuberculosis. Pediatr. Radiol., 2004, vol. 34, no. 11, pp. 895-900.
18. Stive F.E. Strahlenschutz in Kindesalter International Empfehlungen zur Frage der trahlenexposition in Kindes und Yugendalter. Radiol. Diagn., 1988, vol. 29, no. 1, pp. 143-155. German.

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b.



Injuries in The Rs (Y) Children

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Abstract

In the present article we presented the study results of the dynamics of injury indicators of different etiology among children of the Sakha Republic (Yakutia). We marked increase in the number of home, school and beating injuries among children. At analyzing the age characteristics of injuries we revealed the greatest number of home injuries among children in the age period from 2 years to 5 years, street injuries in children from 7 to 13 years. We also marked seasonality of the street and car injury with the increase in spring and summer (March-May - June-August). Seasonality of bite injuries in the summer (June -July-August) was noted.

Keywords: injuries, fractures, bruises, beatings, katatrauma, car injury.

Introduction

According to the WHO data, quantity of trauma at children in economically developed countries increases from year to year. Prevention of children's traumatism is an important medico-social problem. The child's trauma can lead to serious consequences, and sometimes to death. Quite often trauma, got in the childhood, becomes the reason of permanent functional violations in an organism. So, changes can lead to a curvature or extremity shortening. The hems remaining after burns pull together joints, limiting their mobility. Insufficient physical activity of fingers owing to wound of a brush limits subsequently choice of profession. After concussion the affected for many years complain of headaches, sleeplessness, bad memory, impossibility to concentrate [1, 2].

In children of early age home accidents are generally observed: falling, bruises, burns, poisonings, wounds by sharp, pricking subjects, hit in airways of emetic masses, various small subjects. All these injuries are connected with irresponsible behavior of parents.

Children of early age suffer from street (transport) traumatism less often. But also here the inattentive relation of adults to observance of traffic regulations, their indiscipline, and insufficient supervision over the child is the main reason of accidents. In prevention of children's traumatism adults have to consider constantly features of development and behavior of the child of early age.

Research objective: To study dynamics of traumas of various etiology in children of Republic Sakha (Yakutia).

We analyzed the reports of reception and diagnostic office of National Centre over the last 5 years.

Results of research: Growth of number of traumas of various etiology in children in the Republic Sakha (Yakutia) over the last 5 years is noted. So, indicators of home accidents of 2009 made the 3477th child, for 2013 5037 children (table 1) addressed with home accidents already. From among addressed, children who demand medical care and supervision are hospitalized. In the Republic of Sakha (Yakutia) increase of number of a beating among children over the last 5 years is noted. In 2009 are hospitalized with a beating in National Centre - 78 patients (57.9%), in 2010 of-113 children, in 2011 – 73 children, in 2012 - 91 child, in 2013 - 89 children. Over the last 5 years the number of children with home and street accidents (Tabl 1) increased. In age structure of the children who have addressed with different types of street traumas in an accident ward of National Centre children aged from 7 до13 prevail years. Home accidents are noted more often in age group from 2 to 5 years, it is connected with expansion of contacts of the child and oversight of parents. Sports traumas are more often noted at children of 10-15 years.

Seasonality of street and autoinjuries with increase during the spring and summer periods (March-May-June-August) is noted.

Seasonality of the bitten traumas is noted during the summer period (June-July-August is also marked.

Unfortunately, scheduled maintenance on the prevention of traumas at children in the Republic of Sakha (Yakutia) is insufficient. Further, carrying out preventive actions (work with parents and teachers) is necessary.

Conclusions:

1. Growth of quantity of traumas in children in RS (Y) over the last 5 years is noted.
2. Implement and development of programs of the prevention of traumatism in children in schools, training of teachers in first-aid treatment in children with traumas are necessary.

References

1. Boichev B.A. Operativnaya ortopediya i travmatologiya [Operative Orthopedics and Traumatology]. Sofia: «Meditsina i fizkul'tura» ["Health and Physical Education"], 1992, pp. 43-49.
2. Volkov M.V. Bolezni kostej u detej [Bone disease in children]. Moscow: Meditsina, 2005, pp.34-45.

Table 1

Type of injury of children for 2009 until 2013 years

Type of injury	2013	2012	2011	2010	2009
Home traumas	5037	4827	4258	4070	3477
Street traumas	3242	3427	3140	3047	2874
School traumas	885	725	719	750	643
Sport traumas	316	343	296	252	211
Bitten traumas	115	144	141	162	157
Autotraumas	158	205	198	162	157
Katatraumas	207	236	192	223	245
Beating traumas	89	91	73	113	78
Burns	0	1	2	0	5
Fire-arm Wound	2	1	3	1	4



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Role of Natural Food From Local Products in a Diet of the Population Of the Republic of Sakha (Yakutia)

ABSTRACT

One of the main conditions of safe human life in extreme conditions is high-quality food which compensates negative impact of climate on an organism therefore at the northern people the huge attention was paid for a long time to good healthy food.

The original ideas put in a traditional image of food of northerners: the dairy food, koumiss, saltless diet, the natural food, the increased consumption of high-calorific food in the conditions of low temperatures and many other things in the conditions of chronic tension are expedient and are propagandized around the world.

Now national sour-milk products as a healthy and nutritious product experience the rebirth and need for them at the population of Yakutia starts increasing, thereby everything is surer being defined in the food market not as a delicacy, and as a daily dietary and environmentally friendly product.

Production of the northern domestic and trade animals, nature gifts has a high nutritional value because it contains large amounts of proteins, fats, minerals, vitamins and biologically active agents (BAA). Therefore it is a valuable national resource, on the rational use of which it should be paid special attention.

High biological and nutrition value of the Yakut national products allow to include them not only in the menu of catering establishments but also in a diet of social food.

Keywords: traditional food, natural food, food ration, foodstuff.

INTRODUCTION

The metabolism which is a fundamental principle of life, in an organism is provided with the processes proceeding at the most different levels – from organismal to cellular and subcellular – and directed on homeostasis maintenance. Over millions of years of animal evolution metabolism was formed as a result of the organism's relationship with nature, part of which he was himself. More than 40 thousand generations of ancestors of the person (from them more than 15 thousand generations of people) consumed exclusively natural food which components acquired by an organism, became the integral material structures of his body. The food available to the person had natural, natural complexes of biologically active agents inherent in everyone product and a ratio of the main components.

One more circumstance distinguishing food of the modern person from created evolution, that the most various combinations of feedstuffs in one meal, having artificial character depending on addictions and traditions of the certain person and the whole communities is now consumed is. In this case, as it will be shown further, activity of a gastrointestinal path is at a loss and broken and the metabolism is broken finally [11].

Food has to satisfy need of an organism for all necessary food components: proteins, fats, carbohydrates, vitamins, water, mineral substances, cellulose, etc. It is natural that providing this condition demands accurate planning of a diet. Thus it is necessary to consider surely not only needs of the person, but also his specific, professional, household and other features, and also the current functional state. So, for people of an asthenic constitution (the thin-boned, thin person with a narrow thorax, high activity of exchange processes) it is recommended to use more than



high-calorie products: grain, sweet berries and the fruit, the poorly thermally processed vegetables, vegetable and animal fats, fowl, fish, sour-milk products and so forth. For people of a hypersthenic constitution (the powerful frame, well developed muscular system, tendency to the body weight accumulation, and the lowered activity of exchange processes) mainly easy food can be recommended: grain, vegetable oils, fruit and vegetables with the high content of cellulose, bean, spices, fowl, etc. Intermediate characteristics of food are recommended to people of a normosthenic constitution (an average constitution, intermediate activity of a metabolism). At a diet choice the special attention should be paid and on level of intellectual development of the person, and on type of its higher nervous activity [9, 4].

During the planning and a choice of a food allowance it is necessary to give preference to the products which have been grown up in the region as they bear in themselves information on features of climate and a growth place. The prerequisite of such recommendation is that plants usually develop those substances which help them to counteract adverse local conditions; – it is natural that the person consuming these products, itself being a bioparticle of this region, raises the adaptation opportunities. Not smaller value has also compliance of nature of food to seasons of a year cycle. So, at an external heat in the summer heat reproduction by an organism reduces, and heatloss is increased by the use of the crude vegetable products having considerable moisture content, low caloric content and causing rather small statistical and dynamic effect, in itself raising body temperature. On the contrary, the use of the natural products having not only high power potential (fats, porridges, nuts), but also stimulating heat generation (meat, a bird) and containing in the concentrated look abundance of biologically active agents (for example, dried fruits) is more preferable in the winter.

According to the epidemiological researches conducted in Russia, it is revealed that one of the reasons of deterioration of health of adult population, women and children, very low education level in questions of healthy food is. It is everywhere proved that low social level of the population, change of food habits lead to violations of food [14].

Systematic large-scale epidemiological researches of a condition of the actual food and population health in various regions of Russia and the world allowed to establish a number of the basic facts:

- The lowest level of energy consumption at the population of the developed countries of the world, including Russia;
- The most widespread violations of the food status lead to decrease in level of health and promote development of such diseases, as cardiovascular, diabetes of the second type, osteoporosis, etc. [11].

Estimating food of the population of Russia as a whole and its regions it is possible to draw a conclusion on discrepancy of the developed structure of consumption of foodstuff to the modern principles of healthy food. The package of measures is necessary for situation change towards formation of a healthy food allowance for the majority of the population. Considering considerable distinctions and possibilities of regions, in each subject of federation it is necessary to develop the program considering features and prospects of development of regions [4, 5].

In works of many scientists distinctions in types of food of the population living in different geographic latitudes are shown. So, for indigenous people of Yakutia the proteinaceous and lipidic type of food promoting formation of "polar metabolic type" is characteristic. It is characterized by the high contents in a daily diet of protein (15% and above), fat (35% and above), carbohydrates (50% and below), unlike "the European type" in which carbohydrates prevail. For a detailed assessment of a condition of food and its interrelation with health, and also for increase of efficiency of the republican programs directed on improvement of a state of health of the population, it is necessary to carry out continuous monitoring of food of various segments of the population of the Republic of Sakha (Yakutia) [10].



One of the main conditions of safe human life in extreme conditions is high-quality food which compensates negative impact of climate on an organism therefore at the northern people the huge attention was paid for a long time to good healthy food.

The Republic of Sakha (Yakutia) is one of large subarctic and Arctic regions of the Russian Federation. That emphasizes special climatogeographic, natural and landscape conditions and features of influence of these factors on a population state of health. In this regard, ensuring optimum activity of the population of Far North gains extremely important social and medical importance. The special place is taken thus by questions of catering services of various groups of the population [7]. Moreover Far North is a multicomponent extreme factor for the person and has versatile negative impact on a human body of a specific production and ecological component, causing a number of changes of a metabolism and functional activity of all its systems, as well as changes need of an organism for energy, food and biologically active components of food [14, 18]. It is known that in the course of acclimatization of the person to extreme conditions of Far North the factor of food plays exclusively large role in preservation of health and ensuring efficiency of the person.

In the analysis of consumption of food in households for 2001-2012 it is shown that the first place in food of inhabitants of Yakutsk belongs to the grain products, the second – dairy, the third – to potatoes, and meat and fish products were displaced on the fifth and eighth place, respectively. Results of this research confirm that nature of food of city (Yakut) population underwent essential changes, and the structure of consumption of food comes nearer to the European type.

To V. M. Tyaptirgyanova (2004) it is established that the actual consumption of meat products on one inhabitant of Yakutsk below recommended sizes for 56,2%, dairy products – for 60%, fishes – for 34,6%, eggs – for 52%, vegetables – for 41%, fruit – for 94%, sugar and candy stores – for 41,8%, and consumption of fats, bakeries, potatoes above recommended sizes for 4,6%, 38,3%, 13% respectively [18].

By researches of the last years it is proved that food sets of inhabitants of RS(Ya) were characterized by decrease in quantity of products of an animal origin, fruit and increase in a quota grain and sweets. In a food allowance the ratio of proteins of an animal and a phytogenesis, $\omega 6$ and $\omega 3$ polynonsaturated fatty acids is broken[8].

Irrespective of an ethnic origin of inhabitants the structure of diets, their chemical composition gets carbohydrate type, characteristic for inhabitants of the European countries. Irrespective of seasons of year, food allowances are characterized by the low content of water-soluble vitamins.

It is also established that in a carbohydrate component of a diet the refined carbohydrates prevail and the average daily power value of food allowances of the population decreased to Central European sizes – 2506 kcal. It is proved that food of inhabitants of northern regions doesn't correspond not only recommended for these areas of the republic, but also to the standard norms of food. The diet of the people of the North which differed earlier the high content of proteins, fats, comes nearer to the "European" type, generally at the expense of a carbohydrate component [10, 6].

In the analysis of mineral and vitamin structure of food allowances of adult population of RS(Ya) according to 6 uluses and 2 cities (2001-2012) considerable deficiency of mineral substances and vitamins which has nature of the combined insufficiency is revealed. Deeper deficiency of mineral substances and vitamins at the female population is noted. Deeper deficiency of potassium, magnesium, iron and vitamins A, is revealed by B2, PP, C at indigenous people. Among not indigenous people deficiency of calcium, phosphorus and B1 vitamin is noted.

Numerous literary data testify to characteristics of structure of food of the indigenous and alien people of the North connected with the use not carbohydrates, and a significant amount of



meat and fish, fats that causes traditionally developed proteinaceous and fatty type of food with deficiency of many micro and macronutrients. It should be noted that features of the actual food of the Republic of Sakha in modern conditions are studied insufficiently. At the same time, given about the actual food of various groups of the indigenous and alien people of the Republic of Sakha, justifications of qualitative and quantitative structure of a grocery set and development of physiological norms of food for various groups of the population of Far North are necessary for carrying out improving actions [12, 6].

The people Sakha throughout long historical time developed the original system of the balanced food with a rational ratio of all elements necessary for the correct metabolism in an organism [1, 9].

The original ideas put in a traditional image of food of northerners: the dairy food, koumiss, saltless diet, the natural food, the increased consumption of high-calorific food in the conditions of low temperatures and many other things in the conditions of chronic tension are expedient and are propagandized around the world.

Our North is famous for valuable grades of fish. Stroganina from fresh-frozen "white" fish and various fish dishes were at all times the supplier not only valuable protein, phosphorus, calcium, vitamins *rp.* And, D and others, but also the valuable cod-liver oil compensating for the deficiency of vegetable fats. Besides, in fats of the fishes living in cold waters, there are the specific polynonsaturated elements which are so necessary for a human body – for its beauty, force and endurance.

Fish is high on the list on a nutrition value among food of an animal origin (meat, a bird, milk, eggs, etc.). It is caused by existence in a product of full-fledged proteins, easily assimilable fats, vitamin-rich which prevent fragility of blood vessels, interfere with cholesterol adjournment in a liver of the person and prevent his organism from harmful effects X – beams. They are the main source of the thermal energy necessary for commission of physical and mental work. Some nonsaturated acids can be recommended as a powerful tool for atherosclerosis and coronary heart disease prevention.

Fishes present at meat not proteinaceous (extractive) nitrogenous substances play an important role in digestive processes, causing allocation of digestive juice and appetite to food. Some of these substances can serve as a plastic and power material (peptides, free amino acids) [9].

Northern fish, is rather rich with the content of calcium and the phosphorus, allowing to consider them as an additional source of receiving preparations of calcium.

Meat of northern animals, including the Yakut horse, northern domestic deer, the Yakut cattle differs a high nutrition value, protein-rich, fats, macro - and microcells, vitamins, polynonsaturated fatty acids [12, 13].

In the conditions of influence of low temperatures at northerners the specific so-called "polar", proteinaceous and lipidic type a metabolism was developed. It means that in the north food has to be based with a little big inclusion of proteins and fats at the smaller relative power importance of carbohydrates [10].

In this regard in a diet of the person in the conditions of the North the considerable share is occupied by meat products among which the important place is taken by meat of the Yakut horses. The best on flavoring and dietary qualities meat products turn out at a face of the young horses that have been grown up at the year-round pasturable contents. Meat of them is high-calorific, has a pleasant exterior and is evenly penetrated by fatty layers. Zherebyatina is much easier digested and acquired, than beef and concedes in it only to venison.

It is good in boiled form, as a main dish, especially tasty and useful in crude as stroganina [2, 13, 15].

Fat substantially causes a nutrition value of meat, his tenderness, raises tastes. Horse fat soft, yellow; at foals and young growth the almost white. The melted fat being smeared, yellow



color. On the chemical composition and organoleptic indicators it doesn't concede to fats of other lethal animals. Fat of horses has high iodine number, easily swimming trunks, is rich with fatty acids, carotene and vitamin A. The fat use жеребятины interferes with adjournment of cholesterol and development of an atherosclerotic plaque [10, 13].

Horse liver is very useful product. It contains vitamins A, B1, B2, B6, B12, C, PP, and also calcium, magnesium, phosphorus, and iron [13].

Blood has high nutritional value. Blood contains many full-fledged proteins. Its main advantage – it contains iron in easily acquired form [9].

National dairy products of Yakuts are the traditional food providing requirement of the population in nutrients in severe conditions of Yakutia. So, Yakuts at the expense of dairy products provided more than 50% of requirement for food. Therefore in old times each family tried to use milk without loss, preparing from milk in summer months oil, cottage cheese, various sour-milk products (sorat, the byyrapakh), and recycled milk on choxon, the hayakh, tar which consumed in winter time in the fall [1, 9, 15, 16].

In Yakutia as in the southeast regions of the CIS and in some countries of Asia, sour-milk drink from mare's milk - koumiss is widespread. In the medical purposes it is used at pulmonary tuberculosis. It improves digestion, blood formation, exchange processes in an organism, promotes suppression of putrefactive processes in intestines, to increase in stocks of all vitamins B an organism thanks to what organism resilience to diseases increases [3, 9].

These valuable qualities of koumiss are caused by all complexes of the curative substances which are its part: proteins, carbohydrates (lactose), enzymes, microcells, antibiotics, vitamins: A, B1, B2, B12, D, E, C (especially high content), etc.

Now national sour-milk products as a healthy and nutritious product experience the rebirth and need for them at the population of Yakutia starts increasing, thereby everything is surer being defined in the food market not as a delicacy, and as a daily dietary and environmentally friendly product [1, 9, 17].

The problem of dysbacteriosis becomes more and more actual in Yakutia in connection with decrease in the immunological reactivity arising at people generally owing to ecological changes. Therefore for maintenance and restoration of microflora of a digestive tract it is necessary to use the Yakut national sour-milk products. containing natural additives from unique Yakut raw materials. Follows also will emphasize that such biologically active supplements, as products of processing of wild berries, wild-growing food plants etc. have to take an appropriate place as a part of the combined dairy products having provided finishing them to the most broad masses of the population, increase of biological value of food without any increase in its caloric content that is especially important for prevention of violation of a fatty exchange and cardiovascular diseases.

High biological and nutrition value of the Yakut national products allow to include them not only in the menu of catering establishments but also in a diet of social food.

It doesn't raise doubts that food of the person is one of the most important factors of its activity. The correct catering services allow to support and strengthen health, and violation as it, unfortunately, most often and happens in the modern world, conduct to emergence of many alimentary diseases.

References

1. Abramov A.F. Stepanov K.M. Vasil'eva V.T. Tehnologija proizvodstva jakutskih nacional'nyh molochnyh produktov [Production technology of the Yakut national dairy products] Monografiya [monograph]. Yakutsk: Sahapoligrafizdat, 2006, pp.108.
2. Abramov A.F. Androsov S.N. Himicheskij sostav i kalorijnost' mjasu zhrebjat jakutskoj loshadi dlja proizvodstva nacional'nyh vidov mjasnyh polufabrikatov [Chemical composition and caloric content of meat of foals of the Yakut horse for production of national



types of meat semi-finished products] V kn. Rol' sel'skohozjajstvennoj nauki v stabilizacii i razvitii APK Krajnego Severa [In book. Role of agricultural science in stabilization and development of agrarian and industrial complex of Far North]. Novosibirsk: 2003, pp.191-192.

3. Abramov A.F. Neustroev M.P. Stepanov K.M. Robbek N.S. Mjasnaja produktivnost' i pishhevaja cennost' mjasa domashnih severnyh olenej Yakutii [Meat efficiency and quality of meat of breeds of the horses divorced in Yakutia]. Moscow: FGBOU DPOS RAKO APK, 2011, pp.117.

4. Abramov A.F. Ivanov R.V. Alekseev N.D. Stepanov K.M. Mjasnaja produktivnost' i kachestvo mjasa porod loshadej, razvodimyh v Jakutii [Meat efficiency and quality of meat of breeds of the horses divorced in Yakutia] Yakutsk: Ofset, 2013, pp.84.

5. Ammosova T.V. Proizvodstvo kumysa [Production of koumiss] Yakutsk: Yakut. kn. izd-vo, 1974, pp.94.

6. Baturin A.K. Pitanie naselenija Rossii: social'nye aspekty [Food of the population of Russia: social aspects] VII Vseross. Kongress Gosudarstvennaja koncepcija Politika zdorovogo pitaniya v Rossii [The VII All-Russian congress State concept Of the politician of healthy food in Russia]. Moscow, 2003, pp.53-54.

7. Buganov A.A. Agbaljan A.A. Ionova I.E. Vlijanie faktora pitaniya na sostojanie zdorov'ja naselenija Krajnego Severa [Influence of a factor of food on a state of health of the population of Far North] Medicina truda i promyshlennaja jekologija [Medicine of work and industrial ecology]. № 4, 2003, pp.25-28.

8. Eganjan R.A. Karamnova N. S. Gambarjan M. G. Osobennosti pitaniya zhitelej Krajnego Severa Rossii [Features of food of inhabitants of Far North of Russia] Pitanie [Food]. №11, 2008, pp.78-80.

9. Egorov I.Ja. Protod'jakonov A.P. Chernjavskij V.F. Ivanov K.I. Tjaptirgjanova V.M. Bezopasnost', jetnotradicionnye podhody i sovremennaja nauchnaja obosnovannost' korrekcii pitaniya severjan [Safety, ethnotraditional approaches and modern scientific validity of correction of food of northerners] Aktual'nye problemy reproduktivnogo zdorov'ja v uslovijah antropogenogo zagrjaznenija: Mat.mezhd.simp. [Actual problems of reproductive health in the conditions of anthropogenous pollution: Mat. of the intern. Symp]. Kazan', 2001, pp.148-149.

10. Ionova I.E. Agbaljan E.V. Vitaminnyj i mikronutrientnyj status korennyh zhitelej krajnego Severa [Vitamin and mikronutriyentny status of aboriginals of Far North] VII Vseross. Kongress. Gosudarstvennaja koncepcija. Politika zdorovogo pitaniya v Rossii [The VII All-Russian congress. State concept. Of the politician of healthy food in Russia]. Moscow, 2003, pp.207-208.

11. Gabysheva M.N. Zvereva A.N. Kul'tura pitaniya jakutov [Culture of food of Yakuts] St. Petersburg, 2012, pp.232.

12. Krivoshapkin V.G. Pitanie — osnova formirovanija zdorov'ja cheloveka na Severe [Food — a basis of formation of health of the person in the north] Zh. Nauka i obrazovanie [M.Science and education]. № 1, Yakutsk, 2002, pp.57-60.

13. Onishhenko G.G. Harakteristika pitaniya naselenija Rossijskoj Federacii [Characteristic of food of the population of the Russian Federation] Materialy kruglogo stola Zdorovoe pitanie – zdorov'e nacii [Materials of a round table Healthy food – nation health]. Nizhnij Novgorod, 2003, pp.14 – 16.

14. Tutel'jana V.A. Gapparova M.M. Kaganova B.S. Lechebnoe pitanie: sovremennye podhody k standartizacii dietoterapii [Medical foods: modern approaches to dietotherapy standardization] Moscow, 2010, pp.8-15.

15. Savvin A.A. Pishha jakutov do razvitija zemledelija [Food of Yakuts before agriculture development]. Yakutsk: IGI AN RS (Ja), 2005, pp.376.

16. Seroshevskij V.L. Jakuty [Yakuts] Moscow: Izd-vo ROSSPJeI, 1993, pp.297-315.



17. Stepanov K. M. Tehnologija proizvodstva jakutskih nacional'nyh kislomolochnyh produktov novogo pokolenija [The production technology of the Yakut national sour-milk products of new generation] Zhurnal Molochnaja promyshlennost' [The Magazine the Dairy industry]. № 11, 2009, pp.32-34.

18. Tjaptirgjanova V.M. Alekseev D.L. K voprosu o fakticheskom pitanii naselenija Respubliki Saha (Jakutija) [To a question of the actual food of the population of the Republic of Sakha (Yakutia)] Aktual'nye voprosy neinfekcionnoj zaboлеваemosti v Respublike Saha (Jakutija): Tez.dokl. [Topical issues of noninfectious incidence in the Republic of Sakha (Yakutia): Thes. of reports] Yakutsk, 2000, pp.56.

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