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A STUDY OF THE INFLUENCE OF HELIOMETEOFACTORS ON CORTISOL AND ALDOSTERONE IN THE BLOOD OF PATIENTS WITH VARIOUS PSYCHOSOMATIC STATUSES

ABSTRACT

Arterial hypertension and ischemic heart disease continue to lead in the structure of cardiovascular diseases. In the years of high solar activity and the period of magnetic storms in the healthy and diseased organism are functional shifts, which are associated with exacerbation of cardiovascular diseases. The aim of the study was to determine the relationship between indicators of solar activity and the content of cortisol and aldosterone in the blood of able-bodied men with different temperament and high and low anxiety, hypertension. The prevailing temperament – choleric, sanguine, phlegmatic and melancholic – was identified using the psychological test John Eysenck and A. Belov, the presence and severity of depression – Je. Ahmetzhanov psychological tests. In the blood serum the content of cortisol and aldosterone radioimmunoassay method was determined. Gamma background environment was measured using the dosimeter «Master». Also took into account the morning the values of atmospheric pressure and air temperature. It is established that with increase of solar activity in the wolf numbers and radio flux at wavelength 10.7 cm is closely related to the increase in atmospheric pressure, temperature and γ-background environment (within the rules). With the increase in solar activity, atmospheric pressure, temperature and γ-background in jobs closely related to the increase in the functional activity of cells of the beam (cortisol) and decrease activity of the cells in the glomerular layer (aldosterone) adrenal sympathotonics with a predominance of choleric and sanguine temperament. In these conditions parasympathotony with the prevalence of the phlegmatic and the melancholic temperament the functional activity of cells of the beam and the glomerular layer was opposite such of choleric and sanguine. Multidirectional adaptive changes in activity of cells of the beam (cortisol) and glomerular (aldosterone) zones of the adrenal cortex in healthy choleric and sanguine and patients, in comparison with the phlegmatic and the melancholic, attests to the importance of temperament in adaptation to changes of heliogeophysical and meteorological factors.

Keywords: hypertension, solar activity, γ-background, hormones, correlation.

INTRODUCTION

Arterial hypertension (AH) and coronary heart disease (CHD) continues to lead in the structure of cardiovascular diseases (CVD) [8]. In conditions of chronic psycho-emotional stress increases the mortality rate and incidence of complications of hypertension and coronary artery disease [4]. In addition, a number of researchers find evidence that in years of high solar activity (SA) and the period of magnetic storms in the healthy and diseased organism are functional changes associated with reduction of quality of professional activity and worsening of CVD [4, 13, 15].

Objective: to establish the relationship between indicators of solar activity and the content of cortisol and aldosterone in the blood able-bodied men with different temperament and low and high anxiety suffering from hypertension.

MATERIAL AND METHODS

In the period from 1995 to 2015, the clinic surveyed 848 technical workers men aged 44-62 years (average 54±1.8 years), which in the cardiology Department established hypertension stage II (GB-II, grade 2, risk 3). Disease duration was on average 11.6±1.4 years. The presence of essential hypertension was defined according to the criteria set out in [6, 10, 11]. Controls were 422 healthy men, compatible on basic anthropo-social indicators. The prevailing temperament – choleric (Ch) sanguine (Sg), phlegmatic (Ph) and melancholic (M) was measured using a psychological test [12] by 3 times testing before treatment (0) and after 3, 6, 9 12 months of antihypertensive therapy (AHT). The amount of reactive and personal anxiety was determined according to [14]. To lowanxiety (LA) defined as those who scored 32,0±0,6 points, to highanxiety (HA) between 42.8 ±0.4 points and above. Mild depression according to the methodology [2] was only among highanxiety phlegmatic (HA/Ph) and melancholic (HA/M). At the conclusion of the psycho in the inpatient treatment they need. Highanxiety choleric (HA/Ch) and sanguine (HA/Sg) received anxiolytic that 96% Sibazon 2.5 mg in the morning and at night and HA/Ph and HA/M antidepressant that 96% Coaxil 12.5 mg morning and night (in 4% of Zoloft 25 mg./day), in addition lowanxiety (LA) individuals [13,15]. Antihypertensive therapy was carried out as an outpatient [5] and included drugs that have been approved by order No. 254 of the health Ministry of Russia dated 22.11.2004 for the treatment of hypertension: β-blockers (βAB), angiotensinase inhibitors of the enzyme, diuretics (Hydrochlorothiazide), Cardiomagnyl [9]. From βAB patients 96% received Metoprolol 200 mg/day. (4% of cases its analogues), and LA/Ch and LA/Sg for 100 mg/day.) and Hydrochlorothiazide: HA/Ch and HA/Sg at 25 mg/day, and LA 12.5 mg/day. Of aceis in patients 96% took Enalapril 20 mg/day. (4% similar) + Veroshpiron 100-200 mg/day. (75%), rarely (25%) and hydrochlorothiazide 25 mg/day, because the content of potassium in the blood have been lower than those of Ch and Sg. LA/Ph and LA/M were administered Enalapril 10 mg/day. + hydrochlorothiazide (hydrochlorothiazide) - 12.5 mg/day. All received Panangin 2 tablets./day. and Cardiomagnyl on 1 tab./day. Using the criteria [3], we have found that in healthy persons and in patients with a predominance of choleric and sanguine temperament active divisions of ANS shifted towards the sympathetic predominance, and the same persons of phlegmatic and melancholic temperament in the direction of the parasympathetic division of the ANS.

Cortisol and aldosterone in serum was conducted with radioimmunoassay method using reagents of the company «CEA-IRE-SORIN» [7]. Clinical studies were carried out from 8.00 to 10.00 in the morning on an empty stomach, before taking AHT. Data on the dynamics of SA in the wolf numbers (the WN, conv. units) and radio emission at a wavelength of 10.5 cm (RF) received from the Department of ionospheric magnetic forecasting of

the Western-Siberian administration for Hydrometeorology and environmental monitoring (Novosibirsk). Gamma (γ)-background (ur/h) environment was measured at the workplaces of respondents (dosimeter «Master») from 8.00 to 10.00 daily (20 measurements) and compared with the data of the Department of ionospheric magnetic forecasting of the Western-Siberian administration for Hydrometeorology and environmental monitoring. Variations of γ-background in the period from 1995 to 2015. do not go beyond the normal regional values (7,0-9,0 μr/h). At the same time took into account the morning the values of the atmospheric pressure (P, mm Hg) and temperature (C) air in workplaces and outside them. Data were processed by methods of variation statistics (M±m) using standard software package «Statistica 7.0» and parametric student's t–test and calculation of coefficient of correlation by Pearson (r). Were considered as statistically significant p-value<0,4. The study was performed in compliance with the Helsinki screening and treatment and approved by the ethics Committee of the Novosibirsk state medical University 20.11.2009, minutes No. 18.

THE RESULTS AND DISCUSSION

The analysis of the content of hormones for the entire study period showed a significantly higher level of cortisol and aldosterone in the blood in patients with AH compared with healthy persons of corresponding temperament, despite treatment (table. 1, 2). However, in the groups of healthy and patients with hypertension cortisol was significantly decreased, but aldosterone was increased in temperamental range from Ch to M: Ch > Sg > Ph > M (cortisol) and Ch < Sg <Ph < M (aldosterone) (table. 1, 2).

The analysis of the dynamics of Solar activity showed an increase from 1995-1996 to 2000-2002 Decline of the SA was to 2005-2006 and remained so until 2014, Again, less pronounced but significant increase in SA in 2015 noted Between the values of WN and RF is a direct, a high degree of significance correlation. The study showed a significant increase in power of γ-background in the workplaces surveyed in the same years as the increase in SA. The change in the γ-background was within the boundaries of the regional norm. The correlation analysis between WN and RF on the one hand and the power γ of the background, on the other, showed the presence of reliable, direct and high-degree of significance of the relationship. Because ionizing radiation from the Sun and space trapped by the Earth's ionosphere, the increase of γ-background in the workplaces due to the increase in the content of radioactive gas radon. It can be assumed that with increasing SA there was an increase in the allocation of radon gas from the soil. However, under these conditions showed a significant decrease of the coefficient of utilization of oxygen by tissues (CUOT) in healthy individuals and patients, increased minute volume of blood (MVB) and the proportion of persons with such complications. It can be assumed that the high level of social tension, which peaked in the years of high SA, could weaken the reserve capacity of the organism [1, 4] and contribute to the potentiation of the action of the complex of the heliogeophysical factors, including the increase of γ-background. It is possible that the decrease in CUOT in the peak years of SA – result of the exposure of any one, but rather a complex natural and social factors. The consequence of combined effects has been the development of reactions with an increase in voltage in the cardiovascular system (for MVB) and the proportion of persons with such complications.

Sympathotonics choleric and sanguine. The study showed a significant increase in cortisol and decrease aldosterone in the blood in healthy individuals and patients Ch and Sg temperament, starting with 1995-1996 (years of low SA) for 2000-2002 (high SA). In the same period significantly increased the γ-background in the workplace. In the following years there was a decrease of SA and γ-background in the workplace, which was associated with a significant reduction in cortisol and increase of aldosterone in individuals of all groups choleric and sanguine temperament. The concentration of hormones to 2005 to further reliably close or insignificantly differed from that of 1995-1996 (table. 1, 2). With the increase of SA and γ-background by 2015, we found an increase in cortisol and decrease aldosterone in the blood in healthy and patients with hypertension individuals Ch and Sg temperament (table. 1, 2). Correlation analysis between the dynamics of WN, RF and γ-background on the one hand and the content of hormones in healthy individuals and patients Ch and Sg, on the other, showed the presence of a direct and high degree of significance of the relationship with cortisol and same but opposite with the content of aldosterone. Thus, Ch and Sg sympathotonics with the increase of SA and γ-background jobs combined increase in the functional activity of cells of the beam (cortisol), and decreased activity of glomerular cells (aldosterone) zones of the adrenal cortex.

Air temperature and atmospheric pressure. The analysis performed between The air and cortisol showed a direct and weak, and Then in the workplaces surveyed average and the close degree of correlation in healthy and patients choleric, at the time, as in the group of healthy sanguine correlation was direct and secondary, and in patients With a high degree of significance. In these conditions, the correlation between The outdoor and the content of aldosterone was reversed and the close groups of patients the choleric and sanguine, and moderate in their respective groups of healthy and Ch and Sg. Between With in the workplace and the content of aldosterone in the blood in healthy and patients of Ch and Sg an inverse correlation and close relationship. These data can be interpreted as the fact that with the increase From the air combined trend of increase in cortisol, but lower aldosterone in groups sympathotonics Ch and Sg From healthy persons and patients with hypertension. However, the focus of adaptive shifts in content of hormones in response to a change in The air coincided with that of WN, RF and γ-background. It is known that in conditions of development of adaptive reactions of increased function of the cells predominantly fascicular zone of the adrenal cortex (cortisol), the activity of cells in the glomerular (aldosterone) is reduced.

The coefficients obtained between the dynamics of atmospheric pressure and the content of hormones in sympathotonics Ch and Sg, showed the presence of significant direct and close correlations with cortisol and reverse average in groups of healthy and patients, and a significant inverse close in groups of healthy and patients With temperament. On the basis of obtained data we can conclude that with increase in atmospheric pressure in the body healthy, and With and patients on the background of AHT outpatient combined increase activity of cells of the beam (cortisol) and decrease activity of the cells in the glomerular zone of the adrenal cortex.

Parasympathotony phlegmatic and melancholic. The study showed a significant decrease of cortisol and the increase of aldosteron in blood from healthy individuals and patients AH phlegmatic and melancholic temperament with 1995-1996 (low SA) for 2000-2002 (high SA) (tab. 1, 2). In subsequent years, the SA and γ-background was lower than in 2000-2002, which was associated with a decrease in the content of aldosterone and cortisol increase in these groups. The increase of SA and γ-background environment by 2015. was accompanied by a significant decrease of cortisol and

Table 1

Table 1. Dynamics of serum cortisol (nmol/l) in serum at the HA patients (P) on the empirical background of AGT and in healthy individuals (H) from 1995 to 2015.

Years		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Just
Choleric	П. 50*	380,6 ± 2,4	380,6 ± 2,4	354,4 ± 2,2	353,2 ± 2,4	358,7 ± 2,3	568,9 ± 3,0	615,4 ± 2,8	630,5 ± 3,6	631,2 ± 2,4	665,6 ± 3,4	398,9 ± 3,7	421,1 ± 3,4	423,2 ± 3,5	425,5 ± 3,4	428,8 ± 3,4	477,8 ± 3,4	504,5 ± 3,0	589,0 ± 3,0	646,7 ± 3,4	667,8 ± 3,3	570,0 ± 3,4	500,0 ± 0,2
	Зд 50*	340,2 ± 2,4	340,2 ± 2,4	339,9 ± 2,6	337,9 ± 2,5	349,0 ± 2,5	504,4 ± 3,9	543,5 ± 3,4	446,0 ± 3,7	449,0 ± 3,2	457,0 ± 2,7	411,2 ± 2,4	419,2 ± 2,7	424,4 ± 2,3	368,9 ± 2,7	370,9 ± 2,7	387,6 ± 2,7	398,9 ± 3,3	469,9 ± 3,3	476,7 ± 2,7	630,9 ± 3,9	552,3 ± 2,7	429,4 ± 0,2
Sanguine	П. 52*	338,6 ± 2,4	338,6 ± 2,4	383,5 ± 3,3	340,9 ± 2,4	435,6 ± 2,3	506,3 ± 3,3	533,5 ± 3,5	544,5 ± 3,7	424,5 ± 3,2	435,6 ± 3,2	391,2 ± 3,3	385,3 ± 3,1	380,0 ± 3,2	373,4 ± 3,1	383,4 ± 3,1	383,3 ± 3,1	400,9 ± 3,6	436,7 ± 3,6	523,6 ± 3,1	578,9 ± 3,3	520,0 ± 3,1	430,4 ± 0,3
	Зд 50*	316,7 ± 2,4	346,7 ± 2,4	342,2 ± 2,9	345,6 ± 2,4	356,5 ± 3,3	393,3 ± 3,9	398,0 ± 3,3	398,2 ± 3,9	405,9 ± 3,3	399,5 ± 3,0	399,5 ± 3,3	390,0 ± 3,2	348,0 ± 3,4	347,0 ± 3,2	344,0 ± 3,2	311,8 ± 3,2	311,9 ± 3,6	301,9 ± 3,6	301,7 ± 3,2	400,9 ± 3,3	393,3 ± 3,2	356,8 ± 0,3
Phlegmatic	П. 54*	279,6 ± 3,9	279,6 ± 3,9	270,6 ± 3,8	264,1 ± 3,9	260,6 ± 3,8	224,9 ± 3,0	234,5 ± 3,6	245,9 ± 3,6	279,3 ± 3,3	289,3 ± 3,6	367,6 ± 3,3	370,0 ± 3,7	356,6 ± 3,3	338,4 ± 3,7	281,0 ± 3,7	291,2 ± 3,7	300,9 ± 2,6	320,0 ± 2,6	330,0 ± 3,7	250,0 ± 3,3	248,7 ± 3,7	289,7 ± 0,2
	Зд 52*	312,6 ± 4,6	312,6 ± 4,6	299,8 ± 3,3	309,6 ± 4,0	298,0 ± 3,3	250,5 ± 3,6	245,9 ± 3,3	270,9 ± 3,9	278,0 ± 3,3	288,8 ± 3,8	360,6 ± 3,3	397,6 ± 4,2	355,0 ± 3,3	379,6 ± 3,8	363,6 ± 4,2	363,6 ± 4,2	345,6 ± 3,2	343,3 ± 4,2	378,9 ± 4,0	288,9 ± 3,3	255,6 ± 3,4	319,0 ± 0,2
Melancholic	П. 50*	265,5 ± 1,5	265,5 ± 1,5	263,5 ± 3,3	266,9 ± 1,5	261,7 ± 3,3	236,3 ± 2,0	226,3 ± 3,3	230,6 ± 2,0	246,6 ± 0,06	247,0 ± 3,0	277,7 ± 3,3	271,1 ± 3,0	288,3 ± 3,3	267,4 ± 3,0	263,9 ± 3,0	269,3 ± 3,0	276,3 ± 3,6	239,4 ± 3,6	240,6 ± 3,0	235,6 ± 3,3	234,3 ± 3,0	255,9 ± 0,1
		290,4 ± 4,8	290,4 ± 4,8	284,0 ± 3,4	293,9 ± 3,8	289,1 ± 3,3	245,5 ± 3,8	246,7 ± 3,3	260,0 ± 4,1	278,8 ± 3,3	288,8 ± 4,2	358,9 ± 0,04	380,6 ± 4,2	288,4 ± 3,3	289,9 ± 4,2	298,9 ± 4,2	290,0 ± 4,2	295,5 ± 4,0	289,7 ± 4,0	270,4 ± 4,2	252,2 ± 3,3	250,5 ± 4,2	282,5 ± 0,1

Note: here and below *- the number of individuals in the group; the number of blood samplings from one specimen 4,2±0,2 30 days of 46.2 ±1.2 per 12 months.

Table 2

Table 2. Dynamics of the content of aldosterone (PG/mg) in the blood serum of the HT patients (P) on the empirical background of AGT and in healthy individuals (H) from 1995 to 2015.

Years		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Just
Choleric	П. 50*	71,6 ± 0,3	71,6 ± 0,3	65,5 ± 0,5	58,9 ± 0,4	51,7 ± 0,4	51,7 ± 0,4	57,9 ± 0,4	58,9 ± 0,6	63,4 ± 0,3	60,6 ± 0,5	68,9 ± 0,4	69,4 ± 0,6	58,9 ± 0,3	59,8 ± 0,3	72,4 ± 0,6	72,4 ± 0,6	65,6 ± 0,3	64,4 ± 0,6	63,7 ± 0,5	54,7 ± 0,5	57,0 ± 0,5	62,8 ± 0,03
	П. 50*	60,6 ± 0,4	60,6 ± 0,4	58,5 ± 0,4	55,8 ± 1,2	47,7 ± 1,2	46,7 ± 1,1	51,5 ± 0,4	48,1 ± 1,3	50,1 ± 0,5	53,1 ± 0,9	60,8 ± 0,5	59,9 ± 1,2	61,5 ± 0,8	62,6 ± 1,1	62,6 ± 1,1	62,6 ± 0,8	60,1 ± 0,9	48,5 ± 1,3	59,6 ± 0,9	50,7 ± 0,5	50,0 ± 0,8	55,8 ± 0,03
Sanguine	П. 52*	84,5 ± 0,3	84,5 ± 0,3	74,9 ± 0,5	70,2 ± 0,5	57,8 ± 0,5	58,7 ± 0,4	57,9 ± 0,5	59,0 ± 0,4	61,4 ± 0,3	66,4 ± 0,3	76,4 ± 0,5	76,8 ± 0,5	80,9 ± 0,4	80,9 ± 0,4	83,8 ± 0,3	83,8 ± 0,3	78,6 ± 0,5	78,4 ± 0,4	78,4 ± 0,3	68,4 ± 0,4	60,0 ± 0,4	72,8 ± 0,04
	П. 50*	62,9 ± 0,6	62,9 ± 0,5	63,8 ± 0,3	58,3 ± 0,8	58,9 ± 0,4	51,7 ± 0,3	50,9 ± 0,4	48,1 ± 0,3	50,0 ± 0,4	56,9 ± 0,6	57,0 ± 0,5	58,3 ± 0,4	59,9 ± 0,5	64,6 ± 0,6	64,8 ± 0,4	64,8 ± 0,4	60,8 ± 0,4	59,7 ± 0,4	48,0 ± 0,5	52,7 ± 0,5	50,8 ± 0,5	57,5 ± 0,03
Phlegmatic	П. 54*	95,7 ± 0,4	95,7 ± 0,4	97,5 ± 0,3	99,7 ± 0,5	103,6 ± 0,4	106,3 ± 0,5	102,2 ± 0,4	103,2 ± 0,3	99,9 ± 0,4	88,1 ± 0,4	89,0 ± 0,4	90,0 ± 0,3	91,2 ± 0,5	93,2 ± 0,5	94,8 ± 0,4	94,8 ± 0,4	96,6 ± 0,3	97,0 ± 0,3	97,6 ± 0,4	97,9 ± 0,3	99,9 ± 0,5	96,9 ± 0,02
	П. 52*	86,4 ± 0,7	86,4 ± 0,7	88,8 ± 0,5	92,0 ± 0,5	96,6 ± 0,5	99,6 ± 0,5	100,9 ± 0,4	98,8 ± 0,5	98,6 ± 0,3	94,0 ± 0,4	79,6 ± 0,4	77,6 ± 0,5	78,0 ± 0,3	79,3 ± 0,4	83,6 ± 0,4	83,6 ± 0,4	92,6 ± 0,4	85,6 ± 0,4	89,0 ± 0,5	93,8 ± 0,3	94,9 ± 0,3	89,5 ± 0,03
Melancholic	П. 50*	113,6 ± 0,4	113,6 ± 0,4	114,7 ± 0,3	115,7 ± 0,4	121,2 ± 0,6	121,2 ± 0,3	129,5 ± 0,3	133,3 ± 0,6	122,2 ± 0,3	106,3 ± 0,6	98,5 ± 0,3	100,0 ± 0,3	95,7 ± 0,4	96,0 ± 0,4	113,6 ± 0,3	113,8 ± 0,6	115,8 ± 0,6	110,6 ± 0,4	115,6 ± 0,5	116,9 ± 0,6	116,6 ± 0,6	113,2 ± 0,04
		99,4 ± 0,4	99,4 ± 0,3	99,0 ± 0,4	102,0 ± 0,4	99,2 ± 0,5	103,8 ± 0,4	104,8 ± 0,5	104,8 ± 0,4	104,7 ± 0,5	101,6 ± 0,5	84,9 ± 0,4	84,6 ± 0,4	79,9 ± 0,4	88,4 ± 0,5	89,6 ± 0,3	89,6 ± 0,4	91,6 ± 0,5	94,8 ± 0,4	97,8 ± 0,4	101,9 ± 0,5	102,8 ± 0,5	96,4 ± 0,03

increase of aldosterone in the blood in healthy and patients with hypertension individuals Ph and M of temperament (table. 1, 2). The correlation analysis between WN, RF and γ-background of the shops on one side and dosage on the other, showed the presence of mainly opposite, and close correlation with the content of cortisol, and the same, but the direct extent with the content of aldosterone (table. 1, 2). On this basis we can conclude that with the increase of SA and γ-background environment combined development of adaptive reactions, which focus on functional activity of cells of the glomerular and fascicular zones of the adrenal cortex was opposite that of Ch and Sg.

Air temperature and atmospheric pressure. With the environment significantly affects the functional changes in the body, however, between The outdoor and the content of hormones in the blood, Ph and M individuals of the correlation relationship was very weak. However, between Then workplaces and cortisol there is a significant inverse medium and high degree of significance of the correlation relationship, and the contents of the aldosterone – direct and also of high to medium importance. At the same time, between the dynamics of atmospheric pressure and cortisol there is a significant inverse and close to the average (in groups Ph and M patients) and moderate significance (group of healthy Ph and M individuals) of the correlation relationship. Between the dynamics of P and the content of aldosterone statistically significant direct medium and strong degree of significance of correlation relationship. The data obtained allow to conclude that with increase in atmospheric pressure in the body of a healthy parasympathotony Ph and M individuals and patients on the background of AHT were observed adaptive changes in the functional activity of HPAS hypothalamic-pituitary-adrenal system (cortisol) and RAAS the renin-angiotensin-aldosterone system (aldosterone) opposite to those at Ch and Sg With.

Thus, overcoming the body environmental conditions (increase of SA, γ background, C and P) were combined with a reduction in CUOT. Sympathotonics healthy, and With individuals and patients (on the background of AHT) reducing CUOT was accompanied mainly by increasing the functional activity of cells of the beam (cortisol), and the corresponding groups Ph and M – increase of functional activity predominantly glomerular cells (aldosterone) zones of the adrenal cortex. In groups lowanxiety healthy individuals and patients the relationship between heliometeotropic and the content of hormones was the same orientation as the highanxiety of persons of a corresponding temperament, but the degree of correlation in 67% of cases were moderate importance.

CONCLUSION

1. With the increase in solar activity in the wolf numbers and radio flux at wavelength 10.7 cm is closely related to the increase in atmospheric pressure, temperature and γ-background environment (within the rules). 2. With increasing solar activity (h Wolff, the flux of radiation), atmospheric pressure, temperature and γ-background in the shops, is closely related to the increase in the functional activity of cells of the beam (cortisol) and decrease activity of the cells in the glomerular layer (aldosterone) from the adrenal cortex in healthy individuals and patients AH sympathotonics with a predominance of choleric and sanguine temperament. In these conditions, parasympathotony healthy individuals and patients of hypertension with the prevalence of the phlegmatic and the melancholic temperament the functional activity of cells of the beam and the glomerular layer was opposite such choleric and sanguine. 3. Multidirectional adaptive changes in activity of cells of the beam (cortisol) and glomerular (aldosterone) zones of the adrenal cortex in healthy, and With persons and in patients of hypertension, compared with Ph and M, demonstrates the importance of temperament in adapting to changing heliogeophysical (WN and RF, γ is the background environment) and meteorological (P, To C) factors.

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METHODS OF DIAGNOSIS AND TREATMENT

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ROLE OF MRI «TOTAL BODY» IN EARLY DIAGNOSIS OF VARIOUS DISEASES

ABSTRACT

This article dwells on whole-body MRI «Total Body» efficacy as the choice method for whole-body screening for the purpose of early diseases diagnostics. On the basis of whole-body MRI analyses during one and a half year we've got the results allowing speaking about a new precise and reliable method for revealing pathology of minimal dimensions in any organ, including malignant tumors.

Keywords: screening, whole-body MRI, CT, diseases, radiation.

INTRODUCTION

Whole body Magnetic and Resonance Tomography (MRI) allows studying a morphological picture of all organs and tissues with the detailed image that provides diagnose the development of many malconditions at early stages.

Accumulation of the large volume of statistical data obtained as a result of magnetic and resonance tomography methods penetrated into common diagnostic practice leads to the expected number of new methodologically issued standards of protocols of program MRI researches. Some new protocols of the MRI program settings allow conducting complex «blind» trial searching of various malconditions on the background of lack of complaints and, apparently, the complete wellbeing of the patient. These complex researches are united by:

- the larger size of the explored area together with its natural and pathological tissues polymorphism – it investigates whole body or its majority with all organs and systems of organs and tissues of the explored site;
- technologies complexity – in the course of the research, according to prearranged program, MR-tomograph switches on/off various modes of scanning and processing of the received images for identification of pathological changes, different in structure;
- cross-sectional study – whole body testing of the patient or its majority