ENDOGENOUS INTOXICATION AND ADAPTIVE ABILITIES OF PATIENTS SUFFERING FROM OBESITY

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Introduction

Endogenous intoxication (EI) can either conduct various types of diseases or be an independent syndrome[7], thus aggravate clinical course of concurrent diseases. Obesity is a widespread metabolic imbalance and a serious social problem in economically developed countries[5,11]. In the base of obesity lies an energetic disbalance that is often combined with risk factor of cardiovascular pathology – hypertension, hypertriglyceridemia, insulinic resistance and other metabolic disorders[1]. Thus studying common nonspecific adaptive reactions of persons with obesity aimed for development of complex program of rehabilitation measures is practically significant.

The Work Objective is a complex study of endogenous intoxication signs of persons with obesity and of the adaptive condition of organism reactions.

Methods and Materials

100 patients with different obesity intensity at the age of 20-64 have been examined ("Centre of health", Maykop). Average age is 41+-8,8 years; 18 men, 84 women. The control group consisted of 50 healthy people aged 22-55 years, 21 men, 29 women. Ketle index was calculated in order to estimate the accumulation of body fat mass[10]. Chlesterol and its fractions, concentration of antibodies, adaptive abilities of patients according to Garkavi L. were determined by biochemical methods[2,3,8,9].

According to clinical blood test a characteristic of morphofunctional condition of peripheral link of lymphocyte system was studied[6]. In order to do that a lymphocyte index which is a criterion of functional condition of lymphocyte system and an index of organism responsiveness was defined (LI) (lymphocytes/neutrophils, %) as well as a leukocytic index of intoxication (LII), suggested by J. Kalph-Kaliph[4] which allows us to judge indirectly on intoxication degree. LII is calculated by formula: LII = (2St + S) : ((L + MON) * (E + 1)), while St is stab neutrophils; S is segmentated neutrophils; L is lymphocytes; MON is monocytes; E is eosinophil cells. The results were processed by statistic parameter method with t-Student criterion; the results were considered reliable while $p<0,05$.

Results and Discussion

Our attention attracts the fact that women with obesity had a high intoxication index from 2,06 to 5,7 and showed a tendency of reduction in absolute number of lymphocytes to 1459 +- 4,9. The terminal number of erythrocytes is $5,4 * 10^{12}$ /L; of leucocytes - $14,9\ 10^{9}$/л; of eosinophil cells - 15%, S neutrophyls - 80%; monocytes – 7%; lymphocytes – 53%; II – 5,7 while physiological oscillation <= 1,5; LMI – 1,8; absolute number of lymphocytes is 4590.

High II from 2,098 to 7,0 was registered as well as a considerable tendency of decrease in absolute number of lymphocytes to 1520 +- 4,7 when studying the men.

For the men with AG a critical number of erythrocytes is $5,3.10^{12}$/l; of lymphocytes - $10,3\ 10^{9}$/l; of eosinophil cells - 10%; S neutriphils – 73%; of monocytes – 13%; of lymphocytes – 52 %; II – 7 while physiological oscillation <= 1,5; LMI – 0,9; an absolute number of lymphocytes - 2952.

Thus, initial high II of men and women is a criterion, that shows abnormalities of adaptive system, that require monitoring while performing endo-ecological rehabilitation.

While analysing clinic signs of patients with obesity (n = 100) the most informative signs were: increase of body mass (100%), memory impairment (94%), overall weakness (85%), short breath (76%), headache (66%), sleep disturbance (65%), bowels disfunction (58%), and appetite disturbance (40%).

These criterions must be considered while performing complex endo-ecological rehabilitation for persons with overweight.

While analyzing patients major classes of immune system signs of disimmunoglobulinemea were found within both men and women (table 1 and 2). Study of humoral immunity of AG patients has not only diagnosis but also a prognosis significance.

Table 1. Immunological index of women with obesity (M±m)

Index	Examined groups		
	Control, (n = 45)	Obesity, (n = 22)	Reliability
Ig G, g/l	12,62 ±0,42	12,98± 0,32	< 0,1
Ig M, g/l	1,68 ±0,11	2,06±0,10	< 0,05
Ig A, g/l	2,48±0,10	3,95±0,11	< 0,05

Table 2. Immunological index of men with obesity (M±m)

Index	Examined groups		Reliability
	Control (n = 45)	Obesity (n = 20)	
Ig G, g/l	12,62± 0,42	10,4 ± 1,81	< 0,001
Lg M, g/l	1,68 ±0,1 1	1,94±0,16	< 0.001
Ig A g/l	2,48 ± 0,10	1, 66 ± 0.32	< 0.05

Problems of diagnosis of complex combination of carbohydrate, lipid, and other types of metabolism disfunction draw significant scientific and practical interest in recent years as well as the discussion of their role in obesity pathogeny.

Obesity, regardless of its nature is always followed be typical alterations: an increase in triglyceride formation, hypertrophy of fat cells, increase of lipolysis in fat tissue, and an inflow of unisterified fatty acids into the liver that leads to increase in synthesis of triglycerides and very little density lipoprotein (LDL), the overall cholesterol (CH) grows.

As our research has determined, a significant increase in CH (6,77±0,3 millimole/l, P<0,001) and triglycerides (2,32±0,13 millimole/l, P<0,01) levels takes place within the women with obesity, and CH-LDL, CH-VLDL, CH-HDL stayed within physiological oscillations and were 1,4±0,02 millimole/l (P>0,05), 0,57±0,02 millimole/l (P>0,05), 0,59±0,024 millimole/l (P>0,05) as follows. The obtained results allow us to suggest, that those indexes show us an integrity of adaptive mechanisms at the whole organism level and they can be the criterions of adaptive stage of obesity.

Alterations in the lipid spectrum of blood that are an increase in cholesterol (7,02±0,12 millimole/l, P<0,001) and triglycerides (2,06±0,08 millimole/l, P<0,01) levels with insignificant increase of CH-LDL, CH-VLDL и CH-HLDL (1,86±0,017 millimole/l, P>0,05; 0,77±0,02 millimole/l, P>0,05; 1,29±0,024 millimole/l, P>0,05 as follows) were detected within the men. The detected shifts of lipid exchange could, no doubt, significantly affect the adaptive abilities of these patients.

A leading role in adaptive self-organization of different functions of belongs to its various vital and, in the first place, metabolic needs. Four adaptive reactions are well-known nowadays: stress, hyperactivation, calm activity, and reaction of training [3]. The detected within the patients with obesity initial adaptive reactions are shown in table 3.

Table 3. Adaptive reactions of persons with increased IMT

№№	Type of reaction	Number (n = 90)	%
1.	Reaction of training	24	26,7%
2.	Reaction of calm activation	23	25,6%
3.	Reaction of heightened activation	18	20%
4.	Chronic stress	18	20%
5.	Reaction of hyperactivation	7	7,8%

As table 3 shows different adaptive reactions take place within persons with obesity. Reaction of training was detected within 24 patients (26,7%), that is common unspecific adaptive reaction and germinates as a respond for various weak irritants. This reaction is characterized by definite index of form element in white blood: an average number of lymphocytes is 23,6; a number of S neutrophils is 67; l/Sn is 0,35; II is 2,84. A high level of responsiveness was detected within 8 patients (28,6 %), an average level – within 6 patients (21,4%), and a high level (high floor) was detected within 14 examined persons (50%).

The reaction of calm activation was detected within 23 patients (25,6%); the of number of lymphocytes is 30; Sn — 57; coefficient of l/Sn is 0,53; II is 2,84 for this group. A high responsiveness level was detected within 16,7% of patients, an average level – within 29,2%, a low level – within 54,2%.

The reaction on heightened activation (18 persons, 20%) is characterized by the number of lymphocytes that is 41; Sn — 56; coefficient of l/Sn - 0,73; II – 1,37. A high responsiveness level was detected within 16,7% of patients, an average level – within 37,5%, a low level – within 33,3%.

For the chronic stress group (18 patients, 20%) a high responsiveness level was detected within 35% of patients, an average level – within 50%, a low level – within 15%.

Conclusion

Patients with obesity have inadequate adaptive reactions at the period of prerehabilitation as well as the syndrome of endogenous intoxication. It was marked, that only one third within all the groups has a high level of organism resistance, while in sum an average and low level of resistance was more than 80%, which is a validate criterion for complex rehabilitation measures.

Resume

Patients of different sexes suffering from obesity were studied. It has been determined that an obesity syndrome is followed by expressed signs of endotoxicosis, that is germinate on the basis of disimmunoglobulinemea and cholesterol fractions synthesis disfunction. Authors suggest that an endotoxicosis presence disturbs adaptive reactions of an organism, that was proved by their objective appraisal. Signs of chronic stress were detected within 20% of patients. Detected abnormalities require correction while performing rehabilitation measures within this patient group.

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