REPORT: METABOLIC INTOXICATION AND ITS CORRECTION IN PATIENTS WITH ALCOHOLIC LIVER DISEASE

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Most of the authors associate endotoxemia and metabolic intoxication in patients with alcoholic liver disease (ALD) with the lipid peroxidation (LPO)disorders as well as accumulation of their products.[2,3,4] LPO disorder violates tissue respiration and is a potent inhibitor of oxidative phosphorylation, which leads to ATP synthesis violation. At the same time, increase in concentration and activity of lipid peroxidation products leads to damage of the phospholipid layer of cell membranes[5] Therefore, the study of formation mechanisms of metabolic intoxication and correction methods of the related disorders is an important task of medical science.

Enterosgel is able to bind and excrete toxic products and endotoxins from the intestinal contents and blood (through the intestinal wall). Therefore, it is promising to study its efficiency in the treatment of patients with ALD.

Objectives

Study of the clinical efficacy of intestinal detoxification therapy (enterosorption) in patients with ALD for the decrease of metabolic intoxication manifestations in the acute stage of the disease.

Materials and methods

132 patients with ALD at the age from 25 to 65 years, of which 105 - men (57.7%) and 77 - women (42.3%). All patients were admitted to the hospitals in the acute stage of the disease. ALD diagnosis was confirmed by the information about the long-term (at least 2 years) regular alcohol consume.

In the acute period all the patients were prescribed basic therapy aimed at detoxification and correction of disorders of the basic homeostasis parameters.

The experimental group consisted of 82 patients taking intestinal adsorbent (enterosorbent) Enterosgel together with basic therapy 15 g 3-4 times a day (45 g/day) orally or, when necessary, through a nasogastric tube. The course of treatment was 14 days.

The control group (comparison) consisted of 50 patients with ALD, matching the experimental group of patients by age and sex, which applies only basic therapy.

The group of healthy volunteers consisted of 40 people for comparison with the content of lipid peroxidation in patients with APP.

In all the patients the study of LPO products and functional activity of phagocytic cells by nitro blue tetrazolium test was determined – both spontaneous and stimulated with lipopolysaccharide (LPS), as well as the number of apoptosis of neutrophil granulocytes (NG) determined by morphological method.[1,5,6] All the studies were carried out on days 1, 6-7 and 10-15 from the date of admission.

Results and discussion

The study has shown that on day 1 after admission in patients of experimental group, high levels of LPO products - E_{220} and E_{400} were found (Table. 1).

Table 1

Study values	**Units**	**Study duration, days**			**Values of healthy patients**
		1	6-7	10-15	

					(n=40)
E_{220} (diene conjugates)	equivalent units	3,22±0,45*	2,67±0,57 *	1,71±0,25*	0,80±0,10
E_{400} (Schiff's bases)	equivalent units	0,07±0,03*	0,05±0,09*	0,03±0,04*	0,01±0,003

Note: * - significant value differences relative to the values of healthy individuals ($p < 0.05$).

These figures were much higher than the values of healthy individuals ($p < 0.05$). By day 6-7 they tended to decrease with respect to the original values ($p < 0.05$), but they remained much higher than those of the healthy subjects ($p < 0.05$). On days 10-15 a significant reduction in lipid peroxidation products was found in relation to original values ($p < 0.05$), but these figures were 2.1 times higher than the values of healthy individuals ($p < 0.05$).
When studying LPO level in the peripheral blood of patients in the control group, a significant increase in these parameters was found during all study periods, with a slight decrease on days 10-15 (Table. 2).

Table 2

Values of LPO products in patients of the control group

(M±m, n=50)

Study values	Units	Study duration, days			Values of healthy patients
		1	6-7	10-15	
E_{220} (diene conjugates)	equivalent units	3,34±0,67*	3,05±0,43*	2,89±0,56*	0,80±0,10
E_{400} (Schiff's bases)	equivalent units	0,07±0,05*	0,07±0,07*	0,05±0,08	0,01±0,003

Note: * - significant value differences relative to the values of healthy individuals ($p < 0.05$).

NBT-test showed that in patients with ALD significant phagocyte function decompensation was determined from the moment of admission (Table. 3).

Table 3

Values of functional capability and the number of NG apoptoses

In patients of experimental group (M±m, n=82)

Study values	Units	Study duration, days			Values of healthy patients (n=20)
		1	6-7	10-15	
Neutrophil granulocytes					
Spontaneous NBT-test	%	22,67±1,56*	20,45±2,07*	15,78±0,97	11,57±0,34
Induced NBT-test	%	7,22±0,45*	8,45±0,74*	9,07±034*	12,33±0,47
Stimulation coefficient	units	-15,45	-12,00	-6,71	0,76
Apoptosis number	%	15,22±0,54*	10,27±0,39*	7,22±0,41*	0

Note: * - significant differences with respect to the performance of healthy individuals ($p < 0.05$).

As a result of treatment of patients in the experimental group, an uptrend of LPS-sensitive NG established on days 10-15 with respect to baseline values, but these figures were reduced in relation to the group of healthy individuals ($p < 0.05$). An increase in the stimulation index, and

reduction of NG apoptosis by 2.1 times in comparison with the original values ($p < 0.05$) was also noted.
Patients in the control group experienced toxic suppression of phagocyte function in all stages of research. At the same time throughout the study, stimulation index remained consistently low, slightly higher than the original values, and there was a significant content of NG with apoptotic changes (tab. 4).

Table 4

Values of functional capabilities and number of NG apoptosis in patients oft he control group (M±m, n=50)

Study values	Units	Study duration, days			Values of healthy patients (n=40)
		1	6-7	10-15	
Neutrophil granulocytes					
Spontaneous NBT-test	%	22,69±1,45*	20,45±3,15*	19,02±1,45	11,57±0,34
Induced NBT-test	%	7,34±0,22*	7,56±0,67*	7,22±0,56*	12,33±0,47
Stimulation coefficient	ед.	-15,35	-12,89	-11,8	0,76
Apoptosis number	%	15,56±0,67*	15,47±0,62*	14,78±0,74*	0

Note: * - significant differences with respect to the performance of healthy individuals ($p < 0.05$).

Conclusions

1. It has been found that in ALD patients metabolic intoxication is connected with increased activity of lipid peroxidation and accumulation of its products in the peripheral blood. The consequence of these processes is the decrease in the functional activity of neutrophils and their inability to form an adequate response to microbial antigens.
2. Functional failure and high levels of apoptotic-modified neutrophil granulocytes is one of the reasons for the development of auto-aggressive reactions.
3. Application of intestinal adsorbent (enterosorbent) Enterosgel in patients with ALD helps to reduce LPO products - one of the main substrates of metabolic intoxication, which contributes to preservation of the natural functioning of cellular detoxification systems and antimicrobial resistance on subcompensated level and reduces the risk of auto-aggressive reactions.

References

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