Influence of ozone therapy on the dynamics of endogenous intoxication in the acute period after the removal of the malignant neoplasia of brain

S.L. Lebed, G.A. Boyarinov, A. Yu. Smorkalov

603001, Russia, Nighnij Novgorod, N.Volgskaia nab. St., 1/1
Military-Medical Institute FSB RF, Nizhniy Novgorod.

Key-words: ozone therapy, dynamics of endogenous intoxication, neoplasia of brain, removal of the malignant neoplasia

Abstract

Entire complex of vegetative and somatic reactions is developed from the moment of anesthesia recovery of patients, which determine the course of postoperative period and make the subject of the profound researches and efforts of neuroresuscitator.

The successful application of efferent methods of therapy for the purpose of the prevention of postoperative complications was noted by a number of the authors. However, in our view, the ozonized physiological solution (OPS) possesses a wider spectrum of therapeutic action (detoxifying, antioxidant, antimicrobic, immunocorrective) than any other methodic. Besides ozone therapy it is a method notable for its simplicity of use, its high efficiency, tolerance and economy. It can be used as independently, so in combination with other drug and non medicamental therapeutic means and methods, raising to a higher power their action

Purpose of the research is to study the influence of the intravenous infusions of the ozonized physiological solution on the dynamics in the content of the endotoxins of venous erythrocytes and plasma in the early postoperative period after the removal of the malignant neoplasms of brain.

Materials and methods

Material and methods: for this investigation 2 groups of patients were organized:

- *Group 1* - 24 patients, with which the intravenous infusions of the ozonized physiological solution were not produced after the removal of the malignant neoplasm of brain
- *Group 2* - 26 patients, in the complex of postoperative treatment of which were included the intravenous infusions of the ozonized physiological solution. Ozone concentration in the physiological solution was 1, 2-1, 5 mg/l., the total volume of infusion was 200 ml in a 24 hour period. The ozone therapy was applied in 15-18 hours after the end of a surgical treatment and was stopped on the 5th day after the end of a surgical treatment.

The age-range of patients was from 16 to 64 years, patients at the age of 47-56 years formed the majority. Men and women are represented in the groups in the following proportion 42% and 58%.

The morphological classification of tumors was produced in accordance with International Classification of Diseases – X

The results and their discussion.

The results of the research are presented in Table 1.

Endotoxins carrier	Groups under investigation	Treatment period			
		Pre-surgical period	Postsurgical period, days		
			1	3	5
erythrocytes of venous blood	1 group	25,4 (24,0-27,1)	27,2 (25,5-30,8)	27,3 (26,4-33,9)	29,8 (27,9-31,0)
	2 group	23,5 (20,3-25,2)	25,4 (22,1-26,9)	22,2 (21,7-22,7)	24,3 (22,0-25,5)
venous plasma	1 group	12,0 (9,4-13,6)	16,9 (13,9-20,0)	19,9 (18,6-22,2)	11,8 (9,4-14,5)
	2 group	11,2 (10,3-13,0)	15,5 (13,6-17,4)	12,6 (11,3-13,0)	13,7 (12,6-16,3)

Me – median
P_{25}, P_{75} – 25 and 75 percentiles.

Table 1 Changes in the content of endotoxins, connected with the erythrocytes of venous blood, and erythrocytes of venous plasma during the period before and after the removal of the malignant neoplasia of brain. Me (P_{25}-P_{75}).

In **chart 1** here is presented the dynamics in content of endotoxins, connected with the erythrocytes of venous blood, observed among patients with the malignant neoplasia of brain during the perioperative period.

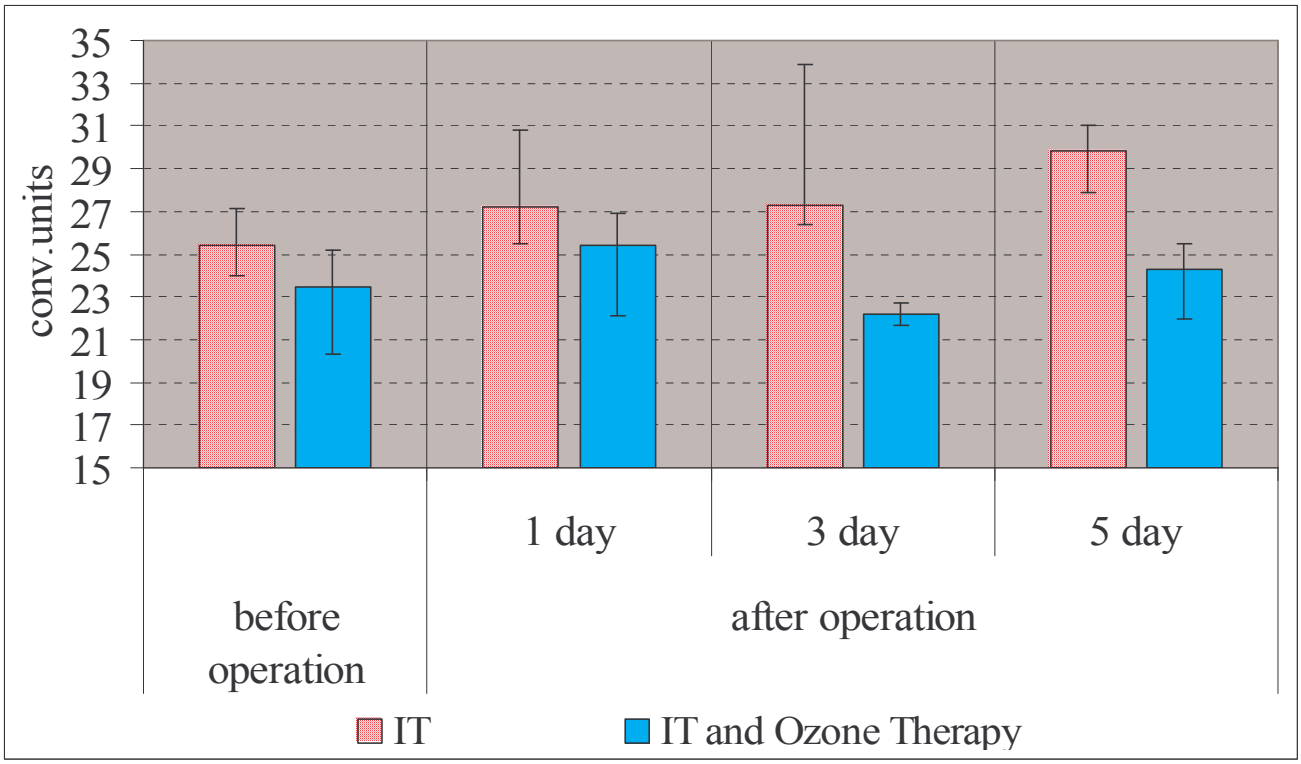

Chart 1. Dynamics in content of endotoxins, connected with the erythrocytes of venous blood, observed among patients with the malignant neoplasia of brain during the pre and post-surgical period. Me (P_{25}-P_{75})

IT – intensive therapy (group 1);

IT and Ozone therapy — intensive and ozone therapy (group 2).

On the 5th day after the surgical treatment among the patients of the group it we fixed an increase in the level of the content of substances of the low and average molecular weight connected with venous erythrocytes, in comparison with the preoperational level. The toxic indices of venous erythrocytes for the patients of this group on the 1st and the 3rd days neither have not significant differences ni from the preoperative level of indices, neither from the level of indices, obtained on the 5th days.

After the inclusion of the ozonized physiological solution into the complex of the therapy on the 3rd day after the removal of malignant neoplasia of brain, we observed reliable differences between the groups' indices. The level of toxicity of venous erythrocytes among the patients of the group 2 was lower than the same level in the group 1. On the 5th day the toxicity of venous erythrocytes among the patients in the group 2 was not differed reliably from preoperative level, and from the level of the first 24 hrs, nevertheless, this index continued to be reliably lower, than analogous one in the group 1 of patients who weren't submitted under the influence of the ozone therapy.

The analysis of the obtained results showed that the course of intravenous infusions of the ozonized physiological solution applied after the removal of the malignant neoplasia of brain allows reducing the content of endogenous toxins of plasma.

In **chart 2** here is presented the dynamics in content of endotoxins in venous plasma, observed among patients with the malignant neoplasia of brain during the perioperative period.

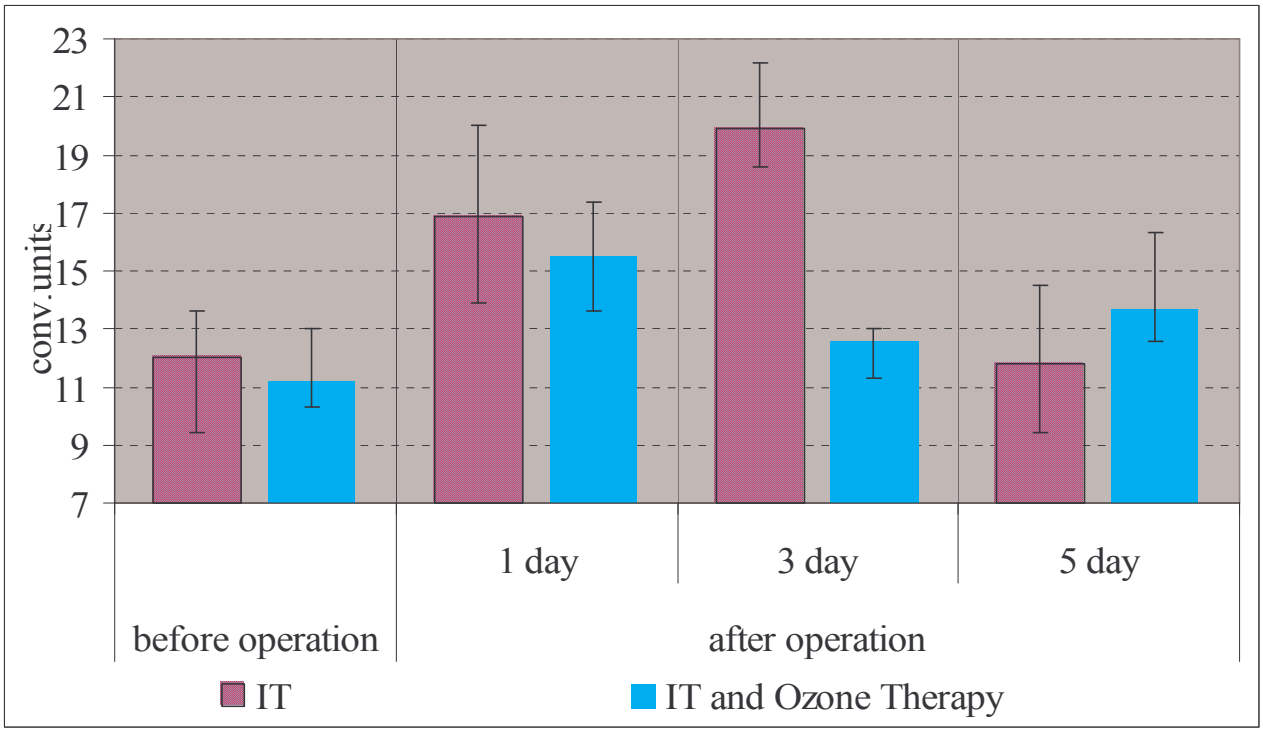

Chart 2. Dynamics in content of endotoxins in venous plasma, observed among patients with the malignant neoplasia of brain during the pre and post-surgical period. Me (P_{25}-P_{75})
IT – intensive therapy (group 1);
IT and Ozone therapy — intensive and ozone therapy (group 2).

In the group of the patients who were operated on the removal of malignant tumor and who were not infused by ozonized physiological solution during the early postoperative period, a reliable increase in the level of the endotoxins of venous plasma in comparison with the preoperational period was noted from 1 to 3 days. On the 5th day after the removal of malignant neoplasia was noted a reduction of the content of substances of the low and average molecular weight in venous plasma to the preoperative level.

The inclusion of ozone therapy in the complex of the treatment during the early postoperative period after the removal of malignant neoplasia changed the dynamics of indices: the increase in the content of endotoxins in venous plasma was observed on the 1st day after the removal of neoplasia; later on the 3rd day there was observed a decrease in the content of substances of the low and average molecular weight in venous plasma. On the 5th day of postoperative period there weren't noted any significant differences from the indices of the previous days research. The reliable differences in the content of endotoxins in the venous plasma among the patients were noticed only during the 3rd day of the postsurgical treatment. At that period the content of substances of the low and average molecular weight in venous plasma among the patients of the group 2 was reliably lower than such index of the patients of the group 1.

Analyzing the results of a study it is possible to assume, that:
The inclusion of ozonized therapy into the treatment complex for the patients during the postsurgical period after the removal of the malignant neoplasia of brain allows reducing considerably the content of endogenous toxins of plasma in the earlier stage of the intensive therapy.

Thus, the consequence of the inclusion of the course of intravenous infusions by ozonized physiological solution into the postoperative treatment complex among the patients after the removal of the malignant neoplasia of brain was a decrease in the content of endotoxins in venous blood. In this connection we consider that the application of the ozone therapy during the early postsurgical period is very prospective