# Medical Ozone for Prophylaxis and Treatment of Complications associated by Chemotherapy of Ovary Cancer

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## Abstract

We observed 55 women which received adjuvant chemotherapy after non-radical surgery for ovary cancer, 35 of them underwent ozonetherapy in the form of rectal insufflations of an ozone-oxygen mixture with assistance of the equipments and accessories of Medozons-Company according to a specially developed method.

The present investigation resulted in the following:
- ozonetherapy caused an improvement in patients' state, in their sleep and appetite, a decrease in nausea and vomiting;
- ozonetherapy produced an immunomodulating effect, mainly on the humoral immunity;
- ozonetherapy improved the indices of lipid peroxidation without exogenous antioxidants.

Based on the above mentioned, we can draw a preliminary conclusion about the clinical efficiency and pathogenetic verification of ozonetherapy in the correction of complications associated by chemotherapy of ovary cancer.

## Introduction

Systemic non-specific side effects of chemotherapeutics are frequently considered a limiting factor of further treatment and their efficient correction is the most important measure which is equal in its importance to determination of an adequate course of cytostatic treatment. In order to prevent chemotherapy complications it is necessary to carry out a complex of therapeutic measures of different action, in particular, metabolic treatment with medicines containing antidiabetic biguanides, hypolipidemics, deagregants, adaptogens, anticoagulants, bioprotectors, antioxidants (3). This method has some disadvantages, most of all – polypragmasy, which is double dangerous on the background of strong cytostatics used. (1).

In this regard, our attention should be drawn to non-medicinal methods of treatment which show high efficiency and cause minimum side effects. As the most promising we consider the

use of numerous therapeutical, incl. immunomodulating properties of medical ozone (2,4,5) i.e. a strictly dosed gas mixture of purest ozone and purest medical oxygen.

The aim of an investigation is to study the efficiency of ozonetherapy in the correction of complications associated by chemotherapy of ovary cancer and to verify it pathogenetically.

## Materials and Methods

We observed 15 patients with ovary cancer after non-radical surgery which underwent a first course and 20 patients - a second course of adjuvant chemotherapy (cisplatinum 75 mg/m2 i.v. + taxol 135 mg/m2 i.v. or cyclophosphane 500 mg/m2 i.v. + doxorubicine 50 mg/m2 i.v. + cisplatinum 50 mg/m2 i.v.). All the patients received ozonetherapy in the form of rectal insufflations, the clinical efficiency of ozonetherapy was compared with the results of metabolic treatment provided to 20 patients with an equal pathology according to recommendations (3).

Ozonetherapy was performed according to the following method: 0,5–1 L of an ozone-oxygen mixture with ozone concentration 1000 to 2000 mcg/L were insufflated into the rectum (after its preliminary cleaning) daily within 2-3 days before and 3-5 days after administration of chemotherapeutics for 5-8 days (one treatment session).

All patients were observed according to the induced chemiluminescence indices. As activators 0,05 mM ferrum sulfate solution and 2% hydrogen peroxide solution were used. The intensity of luminescence was evaluated within 30 seconds by means of the biochemiluminometer BChL-06 according to indices Imax (mV/s), S (mV/s), tg $-2\alpha$. As the process of lipid peroxidation took place in lipid fraction, the received results correlated with the level of total lipids. The method of chemiluminescence was considered a screening method for preliminary assessment of lipid peroxidation. In order to get detailed information about the particular links of lipid peroxidation process we used a quantative evaluation of lipid peroxidation molecular products. One of the essential criteria for free-radical oxidation is the formation of conjugated double links in polyunsaturated fatty acids and, accordingly, primary molecular products of lipid peroxidation with two links – diene conjugates (DC) and with three links – triene conjugates (TC). The level of DC was determined in methanol-hexane lipid fraction (5:1) at absorption wave $\lambda$ = 233 nm, TC - in the same fraction at $\lambda$ = 275 nm. The received results were expressed as units of optical density per mg of total lipids.

The quantity of lipid peroxidation end products – polymeric fluorescence Schiff's bases were investigated by means of the fluorimeter at exitation wave $\lambda$ = 365 nm and emission wave $\lambda$ = 420 nm. The received results were expressed as relative units of fluorescence per mg of total lipids.

The level of total lipids in blood serum was determined with assistance of the diagnostic sets Lachema. The received results were processed by methods of variation statistics with assistance of Microsoft Exel Processor on PC Intel Celeron 466.

## Results and Measurements

Overall results of ozonetherapy used in the complex treatment of patients with ovary cancer (along with a basic method of treatment – chemotherapy) showed its high clinical efficiency in regard to the most important complications of chemotherapy – nausea and vomiting decreased, the indices of red and white blood cells were more stable. The above effect was not observed among the patients which received metabolic treatment (vitamins B, C, methionine, folic and lipoic acid) in addition to chemotherapy.

Our investigation into the lipid peroxidation processes in patients treated with ozonetherapy showed the following results: the indices S, tg $2\alpha$ and I/S reflecting the activity of total antioxidative defense system (AODS) of blood serum pointed to a credible increase in total pool by 25% that resulted in a decrease in DC by 40%; TC – by 53% and SB – by 65%, the last result was particularly important.

In case ozonetherapy was used, the following medicines were absolutely excluded from the treatment complex: immunomodulators, vitamins, remedies for metabolic correction, plasma substitutes, the use of antiemetics, tranquilizers was decreased or absolutely refused. There was no one case when chemotherapy was stopped due to side effects of cytostatics. In 40% of the patients which received the traditional essential treatment without ozone, owing to chemotherapy complications it was necessary to break off the treatment with cytostatics that as is well known will unfavourably influence a prognosis of disease.

## Discussion

The method of ozonetherapy selected for our work has a number of advantages. The way of introducing ozone into the rectum ensures its fast penetration (resorption) into blood thanks to well developed here vascular network that is important for systemic action of ozone on human body. Knowing concentration of ozone in gas mixture, which is constant, it is possible to dose ozonetherapy quite exactly. The ozone concentration range 1000-2000 mcg/L of gas mixture optimally affects the indices of LP and AODS metabolism without irritating rectum mucosa. The duration of one treatment session for 5-8 days is enough to improve considerably the indices of LP and AODS of blood plasma. The AODS increased after ozone teatment definitely protects the organism from possible intensification of the prooxidative systems and allows to tolerate chemotherapy easier. The increased Imax allows us to suppose an increase in free radicals and their participation in the inactivation of tumor endotoxins and exotoxins produced through chemotherapy.

Based on the above mentioned, we can draw a conclusion about high clinical efficiency of ozonetherapy used in the complex treatment of ovary cancer i.e. a pathology associated with maximum metabolic disturbances due to cytostatic therapy. Providing a correction of the metabolic disturbances, ozonetherapy used in the complex treatment of ovary cancer reduces complications of the basic treatment (chemotherapy) which often limite its continuation. Thanks to the well expressed positive effect of ozone on the metabolism and particularly lipid peroxidation processes it is possible to reduce or even refuse the use of vitamins, protein preparations, sedative remedies, antiemetics, antioxidants, solutions for infusion-transfusion therapy. Ozonetherapy should be not applied on days of chemotherapy in order to avoid interaction between chemotherapeutics and ozonides. As the anti-aggregation effect of ozone is well known, abundant bleeding is considered a contraindication for ozonetherapy. In case

of blood secretions or disposition to hemorrhage ozone should be used only under throrough monitoring of blood coagulation system.

## References


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