MEDOZONS

RUSSIAN ASSOCIATION OF OZONE THERAPY

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SECTION I. OZONE THERAPY IN EXPERIMENTS

APPLICATION OF OZONE THERAPY IN POLYORGANIC INSUFFICIENCY FOR ENERGY METABOLISM

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The polyorganic insufficiency complicating the course of peritonitis and destructive pancreatitis urgently requires the development of pathogenetically verified therapy of given pathology by taking into account microcirculatory and metabolic disturbances lying in its basis. On experimental models of peritonitis and destructive pancreatitis the complex study of microcirculation, energy exchange, POL processes, hormonal status of the organism was conducted.

It was established that in the basis of metabolic and microcirculatory disturbances there was energy deficiency causing a failure of balance in POL/AOS system and generation of free-radical processes in bodies resulting in the development of their functional insufficiency.

The choice of ozone for elimination of specified frustration was stipulated by its ability to restore infringed redox balance at the expense of the stimulation of enzymatic AOS link.

So, it leads to frustration of selfregulated system such as lipid peroxidation (LP) – antioxidant defense (AOD) and amplification of LP. Ozone therapy restores redox balance by means of activation of enzymes of AOD, utilization of glucose, reduction of LP intensity.

Thus, ozone is the adaptogenic factor, which through increase in energy efficiency of oxidizing process and utilization of energy substrata and oxygen improves metabolism and tissue microcirculation.

NON-SPECIFIC MECHANISMS OF SANOGENIC EFFECT OF OZONE

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Experimental and clinical studies have demonstrated an adaptogenic effect of ozone. Ozone reduces redox potential of organism and thus determines the direction of metabolic processes, hormone-vegetative and immune status of organism. The totality of these changes is the metabolic adaptation that promotes integration of homeostatic reactions of different levels and reduction of disorders of selfregulation of organism.

KINETICS OF MICROORGANISM INACTIVATION UNDER LIMITED AND EXCESSIVE SUPPLY OF OZONE

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During the last years ozone has been widely used in the medicine and biotechnology for sterilization of water and water environments. Therefore the problem of the quantitative description of kinetics of inactivation of microorganisms during their processing by ozone.

The biphasic character of ozone inducing microorganism inactivation was established reflecting time changes in the ozone inactivation with cells.

Depending on the size of a specific flow of ozone two various modes of the inactivation of cells are allocated:

1. The mode of inactivation at limited supply of ozone is practically characterized by the complete absorption of ozone. The rate of inactivation decreases on increasing initial cell concentration and the biphasic kinetics was observed with the first period of slow death and the second period of fast death.

2. The mode of inactivation under excessive supply of ozone, when the cells have time to absorb, only a part of ozone arriving in environment. A dose of oxidizer absorbed by one cell and the kinetics of change of relative concentration of viable cells N / N0 do not depend on their initial concentration. Another character of inactivation curve was obtained - after the first period of fast

death the rate of inactivation decreased 3-5 fold. The kinetic model describing biphasic death of cells under ozone treatment was proposed.

OZONE AS AN INSTRUMENT OF INCREASING IN PHARMACOLOGICAL POTENTIAL OF CELLS

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It is shown that at certain regimes of ozonation it is feasible to provide a drastic increase in accumulation of several biologically active substances (phosphorylated nucleotides, regulatory peptides, vitamins and amino acids) by microbic cells. New possibilities on elevation of pharmacological potential of cells as well as strategy and tactics in the development of efficient technologies for therapeutical and preventive drugs are discussed.

CELL TARGETS AND THE MECHANISMS OF THE STIMULATION OF PHYSIOLOGICAL ACTIVITY IN YEAST CELLS UNDER OZONE TREATMENT

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At low doses - 1-5 x 108 molecules O3/cell - a stimulation of reproductive activity, respiration and energy - dependent translocation of protons was observed. It was shown that the main targets for stimulating action of ozone were biological membranes. Stimulation of proton H+-AT Phase in the range of doses corresponded to a phase of reduction in microviscosity of bilayer and annular lipids. Inhibition effects corresponded to inversion of microviscosity change (increase in microviscosity) and developed at higher ozone doses.

Cell targets and the mechanisms of the ozone stimulating action are discussed.

DRASTIC DECREASE IN THE RESISTANCE OF CELL LIPIDS TO OZONE UPON THE ISOLATION OF MEMBRANE PREPARATIONS

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The significant differences between development of ozonolysis of lipids in membrane preparations and in intact cells of the yeast were revealed.

Firstly, unlike isolated membranes in which lipid oxidation could be initiated by low ozone doses (less than 0,2 mkmole O3/mg protein) and developed proportionally the treatment dose, in the intact yeast cells even the most ozone sensitive sterols and nitrogen-containing phospholipids (phosphatidylcholine and phosphatidylethanolamine) did not undergo oxidative destruction at up to 6,0 mkmole O3/mg protein.

The second peculiarity of ozone-initiated modification of lipids as a component of the intact cell was that various classes of lipids possessed different sensitivity to ozone. With an increase of ozone dose the neutral lipids (sterols and triglycerides) and nitrogen-containing phospholipids (phosphatidylcholine, phosphatidylethanolamine, sphingomyelin) were oxydated in a greater extent.

It is suggested that these differences are related both to function of antioxidative enzymes (catalase, superoxyddismutase, peroxydase etc.) and to nonidentity of structural states in isolated membranes and in those of the intact cells.

BIOCHEMICAL PRINCIPLES OF OZONE THERAPY EFFICIENCY

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The evaluation of biochemical data, received in experiments on animals and in clinical conditions, has allowed to allocate the following effects of ozone therapy. As a result of free oxygen radical

decomposition ozone obtains fag properties and detoxicant activity similar to that of microsomal. SOD and catalase are increased. The activation of oxygen dependent on erythrocyte reactions promotes restoration of enzyme and non-enzyme antioxidant systems, lipid peroxidation normalization, increase of erythrocyte deformability and better oxygen supply of tissues. The similar processes in immune cells and in the platelets are observed in immunomodulation, lipid and protein metabolism, activation of Krebs's cycle and oxydated processes in mitochondrias are observed in the cells of different organs. The obtained NADN2 formula is used as proton donor for restoration of non-enzyme antioxidant systems.

THE EFFECT OF OZONIZED SALINE ON UNSATURATED PLASMA INDEX

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The present study was done in experiment in vitro on human blood. The saline was bubbled with ozone-oxygen mixture at ozone concentration of 800 mcg/l, plasma being mixed with saline in the following proportions: 50:4; 50:8; 50:l2. The content of double connections was assessed in dynamics. Fatty acid plasma spectrum was measured by gas-liquid chromatography.

In the initial state the double-connections content in human plasma was 2,4 x 10-2 mol/l. Having been exposed to ozone this value decreased to 2,2 x 10-2 mol/l in 5 minute's period and had a double fold decrease in 40 minutes. The 2-3 fold increase of ozonized saline resulted in 2-fold decrease of double-connections content in 5 minute's period, and by the end of experiment the index gradually reached the value of 1,1 x 10-2 mol/l.

The change in double-connections content caused the 2-3 fold decrease of unsaturated fatty acids: 20:4; 20:3; 18:3 in fatty acid spectrum with simultaneous increase of saturated ones: 14:0; 15:0; 16:0.

COMPARATIVE STUDY OF BACTERICIDAL PROPERTIES OF DIFFERENT OZONATED SOLUTIONS

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A study on conservation duration of antibacterial activity of 5 ozonated solutions (saline, Derrow solution, 0,7% potassium chloride solution, 0,5% calcium chloride solution, 5% glucose solution, distilled water) on microorganisms, the most frequently selected from wounds in burn disease (Staphylococcus aureus, Streptococcus pyogenes, Streptococcus faecalis, Escherichia coli, Proteus mirabilis, Pseudomonas aeruginosa and Candida albicans) was carried out.

The concentration of dissolved ozone in these solutions was from 3 mg/l up to 9 mg/l.

It was established that from listed solutions the heaviest saturation in a time unit occurs in Derrow solution. It saves antibacterial activity, which is marked even through 24 hours after ozonation of liquid more durably. The shortest period of bactericidal effect - during several minutes after ozonation - is marked for distilled water and weak action on microorganisms is found out.

The other solutions on stability of bactericidal action can be arranged in the following order: saline, 0,7% potassium chloride solution, 0,5% calcium chloride solution. The use of 5% glucose solution strengthened the antibacterial activity inherent to it.

The received data are the basis for study hereinafter a gear of the influence of ozone on antibacterial activity of various substances, used in clinical practice with medical purpose.

THE FUNCTIONAL ACTIVITY STATE OF NEUTROPHIL LEUKOCYTES IN WOUND DISCHARGE ON THE OZONE THERAPY BACKGROUND

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With the purpose of study of a functional condition of neutrophil leukocytes in conditions of a purulent wound during its treatment with application of ozonized antiseptics there were conducted 40 experiments on dogs and 150 immunological experiments in clinic during the treatment of patients with purulent surgical diseases of tissues.

Wound tests separated, picked up at patients of one age - specific group of the same type of pathology during surgical processing of wound and further during bandages on the 1, 3, 5 and 7 days from the beginning of local treatment with application of ozonized antiseptics were subjected.

During the experiments the sharp tendency to the increase of quantity of functionally active neutrophil leukocytes in the wound during treatment by ozonized antiseptics, in comparison with control group (in 2-3 times) is revealed.

So, based on received data, it is possible to make the conclusion that ozone has neutrophil stimulating activity that promotes significant reduction of terms of recovery of the purulent wound.

THE RESULTS OF STUDY ON COMPARATIVE BACTERICIDITY OF OZONIZED AND UNOZONIZED ANTISEPTICS

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During the last years an attribute of stability not only to antibiotics, but also to antiseptics has become widespread among pyogenetic microorganisms, on supervision of many researchers. We stated the assumption of strengthening of bactericidal properties of some antiseptics with the help of ozone. During the experimental work 180 microbiological experiments on research of comparative bactericidity of ozonized and unozonized antiseptics were conducted.

On comparison of received results it was found out that the action of ozonized antiseptics appeared to be pernicious for 100% of bacilli already during the first minute.

The ozonized water has displayed its bactericidal properties after 5-minute exposition. Not a single observed unozonized antiseptic has displayed such a bactericidity.

Thus, in our opinion, with the help of the ozonation it is possible to achieve essential strengthening of the bactericidal properties of antiseptics.

PHYSICO-CHEMICAL PROPERTIES OF OZONIZED SOLUTIONS

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The analysis of a physico-chemical condition of water and saline bubbled with ozone, the safety and efficiency of concentration of which is proved by clinical and biochemical methods is given in the present work.

With the help of EPR methods and chemiluminescence it is shown that in water environments ozone disintegrates with the formation of free radicals.

We have obtained the quantity of flashes and maximum amplitude dependent on ozone concentration in ozone-oxygen mixture. Lifetime of free oxygen radicals in distilled water is 2 hours 40 minutes; in ozonized isotonic solution of sodium chloride is only 10 minutes. This fact limits the use of ozonized solution.

Medical effects of ozonized solution on molecular level were concluded to be driven both by ozone and free oxygen radicals.

THE RESULTS OF ANALYSIS OF THE POTENTIALLY POSSIBLE RESPONSES OF OZONE WITH SODIUM CHLORIDE IN WATER

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It is known that ozone is a potential oxidant. In the given work, the ozonization of physiological saline (0,9% NaCl) has been producing during 60 and 120 min in standard 200 ml bottles at the air temperature of 17-20°C by the method of bubbling through the aerial needle. The ultrafiltration and artificial circulation (AC) spectra of the sodium hypochlorite (NaOCl) recently prepared model solutions have been preliminary measured at the same devices.

Investigations of the ozonated sodium chloride aqueous solution AC spectra as well as AC spectra of their concentrates or dry remnants have demonstrated that they are deprived of the even vertiginous amounts of other chlorine-oxygen containing ions.

THE DISSOLUBILITY OF OZONE IN THE PHYSIOLOGICAL SALINE SOLUTION

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The motive of the given study is a discussion around the reports on ozone therapy at the X All-Russian Plenum of the anesthesiologists-resuscitators (N. Novgorod, 1995).

The enhancement of the dissolved ozone concentration in the physiological saline can be achieved by increasing the bubbling duration from 20 min to 60 min at the 10 mg/l ozone concentration in the outlet of apparatus and up to 30 min at the 10 mg/l ozone concentration in the outlet of ozonizer; from 30 min and 40 min to 60 min at all the investigated concentrations in the outlet of apparatus.

DECOMPOSITION OF OZONE IN THE PHYSIOLOGICAL SALINE SOLUTION

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Unlike many ozonetherapeutists that at the intravenous infusion of the ozonated physiological saline perform a constant bubbling of the infusion medium by the ozone/oxygen mixture, we are, in our practice, administering to patients already ozonated physiological saline.

ON THE QUESTION OF OZONE BIOREGULATORY EFFECT

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There have been studied the levels of secondary messengers, c-AMP and c-GMP, on various experimental models. Quick reduction of synthetic and detoxication function can be explained for the liver of animals with experimental Sarcoma-45 and increased levels of ATP and GTP the main changes in brain tissue and their correction were on c-GMP and GTP levels respectively. Elevation of c-GMP leads to activation of c-GMP dependent protein kinase, which, in its turn, phosphorylates a number of proteins of smooth muscle. As a result there starts the relaxation of smooth muscles and dilatation of brain tissue - a common picture in medical practice. Ozone bioregulatory effect is confirmed by the change in lipid spectrum of the studied tissues before and after their exposure to ozone.

INFLUENCE OF OZONE ON STRUCTURE AND FUNCTIONAL PROPERTIES OF BLOOD ERYTHROCYTES IN DOGS

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The main purpose of the present research is to study the influence of ozone on structural and functional condition of dog erythrocytes. The quantity change of erythrocytes, out cells Hg, erythrocyte volumetric index, acid resistance and lipid spectrum of cells and lipid peroxidation was studied.

The dog blood washed erythrocytes were used in our investigations, were studied after action of ozone-oxygen mixture in concentration 1500 mcg/l on the cells during 30 seconds. The alive erythrocytes quantity begins to be changed at first time after ozone action (7,0 x IO^/L in control and 6,0 x 10^{12} /L in experimental group). After 2 hours the quantity of erythrocytes after ozone action decreases up to 4,5 x 10^{12} /L. Through 4 and 6 hours the quantity of cells after ozone action decreases up to 3,8 x 10^{12} /L and 3,1 x 10^{12} /L accordingly. The next day after ozone action the test discovered 50% alive erythrocytes, and in the control - 98,8% alive erythrocytes. After ozone action out cells Hg increase in 4,9 one during a day. The time of 50% acid resistance by ozone action was 3,3 minutes in the test system and 7,6 minutes in control, in lipid structure there are following changes: lisolezitine is increased, holesterine and phosphotidilholine were decreased.

The contents of the molecular products of lipid peroxidation changed: diene conjugate is decreased, and Shift's bases are increased.

DOSE-DEPENDENT OZONE EFFECT ON STRUCTURE AND FUNCTIONAL PROPERTIES OF ERYTHROCYTE MEMBRANES

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The purpose of the submitted work was to study the oxidizing effect of various doses of ozone on structure and functional properties of erythrocyte membranes. Erythrocytes were washed by a physiological solution and were treated by oxygen and ozone with its concentration in a gas mixture 5, 10, 20, 30, 40, 50, 70, 100 mcg/ml accordingly. In each test the contents of molecular products of lipid peroxidation (Shiff's bases), activity of antioxidative enzymes - superoxiddismutasa and catalasa, level of chemiluminescence induction was determined. For measurement of viscosity lipid bilayers of membranes received shadows of erythrocytes, incubated them with a fluorescent probe by piren. In a spectrum of fluorescence piren there are characteristic for membranes of a different degree of viscosity.

The received results have demonstrated a decrease in the viscosity lipid bilayers of membranes for want of low ozone concentration. The increase in the concentration of primary and final products of lipid peroxidation correlated with increase in the activity of catalasa. The received data allow making preliminary conclusions about complex membrane reorganizations in erythrocytes under effect of low ozone concentration.

ACTIVATION OF ALVEOLAR MACROPHAGES IN EXPERIMENTAL TUBERCULOSIS BY USING SOLUTE OZONE

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Bacterial suspensions of polyresistant clinical clone of mycobacterium of tuberculosis (Mt) have being exposed to solute ozone (PO_3) in the concentration of 0,5-4 mg/1 for 30 and 60 min, after that infused to mice (1st group) intravenously, and one therapeutical dose of PO_3 got to blood. All Mt-contaminated mice of control group (without ozone) died within one month. Meanwhile the mice of 1st group have become activated alveolar macrophages (AM), but within 5 months 55% of mice of 1st group died, the others survived. PO_3 had a killing action on polyresistant clone Mt, but only by increasing the contact time. PO_3 leads to the modification of Mt, which is still keeping their ability to reversion and activation of alveolar macrophages that inhibits the development of terminal tuberculosis.

INFLUENCE OF OZONE ON THE MORPHOGENESIS OF EMBRIONS

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The conducted analysis has found that these factors of pre- and postimplantational death in groups were not distinguished from control group, but morphological design of embrions does not discover any deflections of arrangement and construction of internal organs, which points to the absence of influence of ozone on morphogenesis, growth and differentiation of fetus tissues.

STRUCTURAL-FUNCTIONAL CHARACTERISTICS OF MYOCARDIUM BY CORRECTION OF HEMORRHAGE BY MEANS OF OZONIZED PHYSIOLOGICAL SOLUTION

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The results of the influence of ozone on structural-functional characteristics of myocardium of dogs who had hypovolemic hypotension during 60 minutes (an hour) caused by blood loss are described in this work.

Infusion therapy by means of crystalloid solutions saturated with ozone-oxygen mixture in the posthemorrhagic period influences positively on the components of the functional element of myocardium because of eliminated influence of ozone on underoxidated products of meta- and catabolism and intensification of energy production with the following restoration of the structural-functional organization because of activation of compensatory adaption processes on molecular, subcellular, tissue level.

THE INFLUENCE OF OZONE ON THE FUNCTIONAL ELEMENT OF THE LIVER AT THE PROLONGED ARTIFICIAL CIRCULATION

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The influence of ozone at the 3-hours artificial circulation (AC) on the liver parenchyma is investigated.

In comparison with the control animals the number of the electron-dense granules of glycogen and lysosomes increased.

Thus, the perfusate ozonization at the prolonged AC enhances the resistance of the hepatic cell organelle membranes and so prevents the development of irreversible alterations in them.

THE INFLUENCE OF EXTRACORPOREAL OZONIZATION OF BLOOD ON MORPHOFUNCTIONAL CHARACTERISTICS OF MYOCARDIUM

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The results of this work reflect the condition of myocardium in the early period of rehabilitation after filling the blood loss by blood and its continuous extracorporal treatment by ozone-oxygen mixture.

Extracorporal ozonization of blood creates complementary conditions for elimination of consequences of circulatory-hemic hypoxia by optimization of energy consumption for realization of natural reactions of cardio-vascular system and metabolization of underoxidated products, as a result of which is the restoration of myocardium and the improvement of its contractile function.

THE INFLUENCE OF OZONE ON THE MORPHOLOGY OF MEZENTERY LYMPHATIC KNOTS DURING PROLONGED ARTIFICIAL CIRCULATION

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We studied the changes of morphological picture of mesentery lymphatic knots after 3-hours artificial circulation (AC) with oxygenation of blood by ozonized oxygen.

It is possible to say that the use of ozonized oxygen for oxygenation of blood during prolonged AC favorably influences the state of vessel size, reduces the depth of microcirculation disorder and preventing incorrigible alterations in lymphoid cells of mesentery lymphatic knots.

MICROCIRCULATION CORRECTION IN SPLEEN BY MEANS OF OZONE DURING THE PROLONGED ARTIFICIAL CIRCULATION

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The influence of ozone at the 3-hours artificial circulation (AC) on the microcirculatory bed of the spleen is investigated. In comparison with a control series, in the experimental one the blood-filling of the red pulp sinuses were less dilatated, the number of sledges was decreasing in them, the microthrombes were encountered rarely.

MODIFICATIONS OF PROCESSES OF LIPID PEROXIDATION (POL) AND ANTIRADICAL PROTECTION (AP) DURING SANATIONS OF ABDOMINAL CAVITY WITH OZONE IN EXPERIMENTS

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The processes of free radical oxidation were studied on experimental animals in conditions of acute experimental peritonitis by performing ozone sanation of the abdominal cavity. The analysis of the results showed that the activation of processes of lipid peroxidation occurred by performing ozone sanations of the abdominal cavity on healthy animals irrespective of a technique of sanation, the degree of which development was proportional to concentration of an ozonated solution. By using ozone sanations on animals with acute experimental peritonitis the precise association of dynamics POL and AP from a technique used was marked. By a distinctive singularity of application hydropressed of a stream with an ozonated solution was the availability of authentic dynamics to normalization POL.

EXPERIMENTAL EVIDENCE FOR OZONE AS BRAIN PROTECTOR DURING OPERATIONS ON EXTRACRANIAL CAROTID SECTIONS

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Prophylaxis of neurological deficiency during surgical reconstructions of brachiocephalic system is still remaining the actual problem, particularly in case of contralateral damage and insufficiency of collateral circulation. For the purpose of studying antihypoxic properties of various preparations there was created an original experimental model of brain ischemia in domestic animals. By using ozone in the above-mentioned experimental conditions there was registered a reliable antihypoxic effect. Brain tolerance to temporary ischemia was significantly increased. On the basis of experimental data there was developed clinical method of brain hypoxia protection during operations on brachiocephalic arteria. The use of this method of brain protection in clinical practice able to improve the results of treatment of patients with this pathology.

THE EFFECT OF OZONATED PHYSIOLOGICAL SOLUTION ON FUNCTIONAL STATE OF NORMAL AND HYPOXIC BRAIN IN RATS

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At present time a possibility of application of ozone therapy in the problem of prevention and correction of hypoxic changes is being largely recognized. On the Wistar rats used in normality and on acute hypobaric hypoxia model were appeared an especiales of variations in energy metabolism in brain cells, lipid peroxidation state and enzymes of antioxidant system, ECoG and the behavior of the rats after parenteral treatment with ozonated physiological solution (in therapeutic dose). Ozonated solution induces an increase in metabolism processes rate in brain cells and also some activation of lipid peroxidation and enzyme system of antioxidant protection. In the sequent hypoxic stress was registered the antihypoxic properties of ozonated physiological solution.

THE CARDIOTROPIC EFFECT OF OZONATED PERFUSIONAL SOLUTION

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A model of isolated perfusion of rat heart by Langendorf-Fallen was used to show that the positive inotropic and negative chronotropic ozone effect has a dose-dependent character. In compare with oxygen effects low concentration of ozone in perfusion solution improve myocardial contractility, relaxation processes. Reduction of contractility function, especially myocardial relaxation indices

with reperfusion contracture development were registered by an increase in ozone concentration in perfusate was used. A coronary blood flow variation also depends on ozone dose and has non-linear character. It was noted that high ozone concentrations cause to regression of the coronary flow rate. The use of ozonated Krebs-Henseleit solution (in therapeutic doses) for isolated perfusion in post-ischemic period provides rapid recovery of cardiac functional activity that can be caused by the ozone effect on energy metabolism of cardiomyocytes.

BIOLOGICAL EFFECTS OF OZONE AND RADIATION THERAPY IN MALIGNANT NEOPLASIA: EXPERIMENAL RESEARCH

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The aim of this work was to study the biological effects that produce the ionizing radiation in combination with ozone therapy. The mechanisms of cell injury produced by radiation are connected to processes including development of free-radicals oxidation reactions in cellular membranes. In our opinion, the application of radical therapy, in conjunction with ozone therapy, will result not only in rising selectivity of the ionizing radiations, but also intensifying free-radical environment of tumor. 280 white male rats were used in our experiment. The neoplasia was modeled through lymphosarcoma clone inoculation. The animals were subject to the following actions: monoradial influence, intra-abdominally, intra-and para-tumourally oxygen influence and gamma-irradiation; intra-abdominally, intra-and para-tumourally ozone influence and gamma-irradiation. The radiation dose was 5 gp. Ozonated physiological saline was used with an ozone concentration of 128, 864 and 4800 mcg/L. State of free-radicals and antioxidant processes; glycometabolism; endotoxemia; phagocytosis; erythrocytes electrophoretic motility and erythrocytes aggregation were determined in blood and homogenates of tumor and spleen tissues. Morphological and histological changes of tissues were observed. The results of the biological effects of ozone and radiation therapy are discussed.

ANTITUMOROUS EFFECT OF OZONE IN THE CONDITIONS OF EXPERIMENTAL ONCOGENESIS

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The aim of the present work was to study therapeutic properties of ozone in experimental animals with sarcoma-45.

The work was made on 260 white rats, males. Oncogenesis was modeled through sarcoma-45 clone inoculation. Ozone therapy in experimental animals was carried out daily in the form of subcutaneous injections of an ozonated physiological saline around the tumor as well as directly into the tumor. One treatment cycle lasted from 10 to 30 days depending on the stage of sarcoma. The results of conducted experiments are as follows:

1) application of an ozonated physiological saline led to the intensification of peroxidation processes and decrease in antioxidative activity of sarcoma-45;

2) application of an ozonated physiological saline inhibited the intensity of tumor tissue glycolysis and led to regressive morphologic changes in tumor tissue, namely increase in the volume of necrotic tissue, decrease in the volume density of preserved tissue cells;

3) action of an ozonated physiological saline on sarcoma is associated with repair of prooxidant/antioxidant balance of tumor organism as well as normalization of carbohydrate metabolism and decrease in endogenic intoxication;

4) local application of an ozonated physiological saline helped to prolong life of tumor animals on 27%, and action of an ozonated physiological saline on sarcoma-45 of primary stage led to its disappearance.

EXPERIENCE OF OZONE APPLICATIONS FOR TREATMENT OF MALIGNANT NEWGROWTHS IN DOGS

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20 dogs with newgrowths were admitted for treatment. Ozone therapy was performed in the form of intravenous dropping infusion of ozonated physiological saline (100-200 ml, ozone concentration in gas mixture – 800 mcg/1) and local application: intratumorous injection of ozonated physiological saline as well as around the tumor. One treatment cycle lasted from 5 to 15 days.

The results of our work indicated, that ozone therapy used on animals with malignant newgrowths affected tumor metabolism and stopped its pathologic action on organism, confirmed by the normalization of biochemical indices of blood in treated tumor animals. Free-radical attack caused by local action of ozone led to the intensification of tumor cell respiration, on the one hand, and to suppression of antioxidative defense of newgrowths, on the other hand. Cell death of certain part of tumor population occurred finally, which led to the decrease in blastema sizes and development of necrotic processes. Surgical interference in this case is necessary to cleanse a damaged tissue from necrotic tumor mass.

INFLUENCE OF OZONATED PHYSIOLOGICAL SALINE ON THE FUNCTIONAL STATE OF LLIVER IN INTACT RATS AND RATS-TUMOR CARRIERS WITH SARCOMA 45

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The aim of the present work was to study the influence of an ozonated physiological saline (OPS) on the level of cyclic nucleotides, state of the pro-and antioxidative processes, lipid structure and energy potential in the liver of intact animals and animals with sarcoma 45 in the process of tumor growth and development and intensification of its systemic toxic action on the organism. An OPS was infused intra-abdominally, locally (around the tumor) and directly into the tumor tissue.

After infusion of OPS (10 treatments) the normalization of activity of antioxidative enzymes (SOD, catalase), decrease in the lipid peroxidation products, lysophospholipids as well as restoration of energy substrates - ATP, GTP, free fatty acids and cholesterin ethers, took place in the liver of rats with tumor. The increase in the cAMP can be associated with mechanism of action of ozonated physiological saline on the metabolism of liver cells including participation of secondary messengers of adenilatcyklase system.

The received results testify to the correction of metabolism changes in the liver of animals - tumor carriers with sarcoma 45 by means of ozonated physiological saline.

OZONE APPLICATION IN THE TREATMENT OF MALIGNANT NEOPLASIAS IN DOGS

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Dogs with malignant neoplasias were used in this study. Ozone therapy was applied by intravenous infusion of ozonized physiological saline solution (100 - 200 mL, ozone concentration in the gas mixture 800 mcg/L) and by local application: intratumoral and peritumoral injection of ozonized physiological saline solution. A cycle of treatment lasted from 5 to 15 days. The results indicated that, ozone therapy on animals with malignant neoplasias, affected tumor metabolism and stopped its pathologic action on organism, confirmed by the normalization of blood biochemical indices in treated tumor animals. Free-radical attack caused by local action of ozone led to the intensification of tumor cell respiration, on one hand, and to the suppression of the neoplasia antioxidant defense system, on the other hand. Cell death of certain part of tumor population occurred finally, which led to the decrease in the blastoma sizes and the necrotic processes development. Surgical procedure, in this case, is necessary in order to clean the damage tissue of the necrotic tumor mass.

FUNCTIONAL STATE OF RAT BRAIN UNDER THE EFFECT OF OZONATED PHYSIOLOGICAL SOLUTION

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Single intraperitoneal administration of 1 ml of ozonated physiological solution (ozone concentration = 135 mcg/L) to Wistar rats doesn't cause any visible changes in the neurological status and behavior of animals. At the same time an intraperitoneal administration of ozonated physiological solution, at the same concentration, to anesthetized animals, induces deeper narcosis for 60 min, with development of typical picture of a deep narcotic sleep by EcoG data. In contrast, with the use of non-ozonated physiological solution the prevalence of slow waves at the (- and (-ranges as well as the decrease of waves at the (-and (-range is observed in EcoG spectrum. At the same time the paining reflex is decreased but corneal reflex and independent respiration is saved. Single intraperitoneal administration of ozonated physiological solution to rats doesn't cause significant changes in brain adenyl and guanyl nucleotides spectrum, increases the piruvate level as well as a small decrease of piruvate dehydrogenase activity and good function of brain cells aerobic respiration is noted. The administration of ozonated solution at the background of nembutal anesthesia potentiates the narcosis effect, however it doesn't cause hypoxic changes of brain metabolism while deeper anesthesia becomes. Single administration of ozonated physiological solution activates lipid peroxidation processes on 18 %, in brain tissue, 60 min after administration of solution and decrease of superoxide dismutase activity at 64 %.

NEUROPHYSIOLOGICAL AND BIOCHEMICAL EFFECTS OF OZONIZED SOLUTIONS APPLICATION IN EXPERIMENTS WITH CATS

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In the mechanism of the biological action of ozone there are many obscure questions concerning its immediate influence on the nervous tissue. The aim of this research is to study, in experimental conditions, the influence of an ozonized solution containing middle therapeutic concentration of ozone in the somatosensory caused potential (SP), in the enzyme activity of the aerobic metabolism and in the contents of peroxidation lipid products in a somatosensory zone of the cortex in cats brain. The registration of the caused potential was made on an open brain of 13 adult cats, which received intraperitoneal nembutalo-chlorosoli narcosis. With this purpose an electrical boring rendered branches of the radial nerve in the area of the wished joint. Consecutive application of non-ozonized and ozonized solution was carried out. In subsequent, the site of the brain was exposed to biochemical researches. The ozonized solution causes a peak latence decrease of a negative phase in caused potentials to 85%, from an initial level, in combination with a convertible short-term (10 min) augmentation of the positive phase amplitude in caused potential (26%). Simultaneously, insignificant raises of the initial peroxidation lipid products were obtained in the researched site of the brain. The enzymes activity of the respiratory chain does not change simultaneously with the appreciable intensifying of oxidoreductases, activity such as: lactate-dehydrogenases, piruvatdehydrogenases, succinatedehydrogenases. The ozonized solution stimulates the aerobic glycolysis, raises functional neurons activity of the top cortical layers, not rendering any toxic effect on the excitability and conduction of the nervous tissue.

DOSE-DEPENDENT OZONE EFFECT ON THE ACTIVITY OF THE PROTEOLYSIS SYSTEM

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A dose dependent impact of ozone upon the proteolysis system was studied. We assessed trypsin, chymotrypsin and elastase activities. In experiments on rats, the levels of proteolytic activity in plasma, pancreatic and intestinal homogenates were evaluated. Infusions of ozonated and oxygenated saline solutions (1,0 ml) were applied intraperitoneally (after barbotage for 15 minutes, with an oxygen rate delivery of 1L/min). Ozone concentration were 40; 80; 400; 1 200 and 5 000 mcg/L. Experiments with oxygenated saline infusion were followed by sharply defined activity with a 14-fold increase in trypsin activity in comparison with control. Elastase has its maximum activity (1,6 fold increase) within 48 hours after infusion. Chymotrysin activity was 4,1 times greater than the control. Experiments with ozonated saline infusions, at 40 and 80 mcg/L ozone concentrations, a minor rise in trypsin activity were registrated within 24 hours after infusion. By contrast, chymotrypsin activation was observed within 2 hours (80 mcg/L) and 24 hours (40 mcg/L). Elastase activity was most pronounced within 48 hours. A 400-mcg/L-ozone concentration became

maximum for elastase and chymotrypsin (a 3,86 increase in activity). At ozone concentration of 1 200 mcg/L activation of trypsin (9,3 times) was noted. At a 5000-mcg/L-ozone concentration, proteinases activity did not change. So, we have demonstrated the dependence of proteolytic enzymes levels on concentration and exposure to oxidizing action: activity has its maximum at 400 and 1 200 mcg/L ozone concentration.

THE INFLUENCE OF DIFFERENT OZONE DOSES ON THE ULTRASTRUCTURE OF AIR-BLOOD BARRIER

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The influence of various ozone doses (group I-control; groups II, III, IV intraperitoneal administration of ozonized physiological solution with ozone doses of 1,5; 7,2 and 30 mcg respectively) on the ultrastructure of air-blood barrier (ABB) in rats (n = 12) were studied, in chronic experiment (12 days). In group II, in comparison with control, basal membrane is slightly thicken and the amount of ribosomes increased in endothelial cells of pulmonary capillars. In group III appeared locuses of collagen fibers that enlarged the ABB thickness. In the interstitium of the interalveolar septa the amount of fibroblasts and collagen fibers is increased. In groups II and III, active alveolar macrophages are revealed. Ozone administration in a dose of 30 mcg leads to the alteration of ABB: in the endothelium of the pulmonary capillars the lysis of luminal membrane, edema, single lipid incorporations and membranous formations in the capillary lumens have been detected. In the capillary lumen, echinocis, reticulocytes, active eosinophils, lymphocytes and platelets were observed. The capillary lumens were narrowed due to the dilatation of the basal membrane, in which the collagen fibers and edema were marked. A significant amount of fibroblasts is revealed in the interstitium. In the alveolar lumens there was a significant content of active macrophages, fibrin clots and cells detritus.

CHANGES IN THE BLOOD STASIS INDICES UNDER THE INFLUENCE OF OZONE THERAPY IN CARDIAC ANGINA DISEASE

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The purpose of this investigation was to study the hemocoagulation changes of the cardiac angina disease under the influence of ozone therapy. Ozone therapy, indicated to such disease, revealed a number of changes in blood stasis system. The lowering of hypercoagulation as well as the progress of the functional characteristics of thrombocytes were mentioned. The treatment consisted of 7 - 10 sessions, one a day, of intravenous infusion of the ozonized saline solution. At the end of the treatment an increase in the thromboplastin formation time, at an average of 13%, in comparison with the initial condition, was achieved. The level of fibrinogen (in 86%) lowered at an average from 5,3 to 4,1 g/L against a considerable increase of the fibrinolitic activity. The decrease in ADP-induced aggregation of thrombocytes at an average of 16%, after ozone therapy, is pointing out the influence of ozone upon the membrane structures of blood laminae. We can conclude that ozone has an antithrombogenic effect. Consequently, ozone therapy, in the cardiac angina disease, may be regarded as a remedy for lowering hypercoagulation blood stasis.

INFLUENCE OF OZONATED EXTRACORPOREAL CIRCULATION ON LIVER FUNCTION IN THE POSTOPERATIVE PERIOD

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Two groups of patients were taken for investigation: control group (perfusion oxygenation by 100% oxygen), experimental group (ozonated extracorporeal circulation).

Within operations with extracorporeal circulation the damage of liver parenchyma took place, which led further to the development of liver insufficiency of different severity grade. Ozonated

extracorporeal circulation helps to reduce the damage grade of liver and leads to a faster restoration of liver function.

THE INFLUENCE OF OZONE AND OZONIZED SOLUTIONS ON THE PATHOGENIC MICROFLORA OF PURULENT WOUNDS

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The influence of the NaCI 0,89% ozonized solution on the pathogenic microflora, more frequently sowed from the purulent wound surface, has been studied in experiment. We have been using the St.aureus, St.epidermalis, St.haemolyticus, E.coli, Enterobacter cloacae, Proteus mirabilis, vulgaris, nonfermentating Gram-negative flora, Pseudomonas aeruginosa during investigation (in vitro).

The cultures of experimental series were washed by 4 ml of the ex tempore prepared ozonized NaCI solution 0,89% and also placed into a thermostat at the 37°C temperature for 24 hours. The solution for treatment of experimental series has been prepared by means of constant injection of ozone with the ultimate concentration of 5 mg/l into the vessel with 400 ml of the NaCI solution 0,89% within an hour.

The assessment of results was quantitatively performed according to the number of colonies. In the control series, the entire growth of microflora took place over all the field that did not yield to calculation. In the experimental series, the germination of the separate groups of colonies took place.

In view of this fact, the daily cultures of stimulators, in the experimental series, after treatment by the ozonized NaCI solution 0,89% were placed into the plastic hermetic chambers and influenced by the gaseous ozone. The ozone has been permanently injected into the chamber with the ultimate concentration of 5 mg/1 during 15-20 min by means of the "Ozone M-5" device. After that, the dishes were placed in the thermostat at the 37°C temperature for 24 hours.

The assessment of results has revealed the fact, that in the control series, the entire growth of microflora over all the field that did not yield to calculation took place. The total lack of the colony growth was observed in the experimental series.

FUNCTIONAL STATUS OF LIVER AFTER EXTRACORPOREAL OZONE TREATMENT OF BLOOD IN ANIMALS IN THE EARLY REPARATIVE PERIOD

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With the aim of studying the efficiency of therapeutical action of ozone in hemorrhagic shock in animal experiments (59 dogs) we evaluated the morphofunctional status of liver on the model of hypovolemic hypotension. In the early reparative period (for 60 minutes) there was performed extracorporeal ozone/oxygen treatment of blood by means of oxygenerator connected to arterio-venous shunt.

The performed ozone therapy session resulted in the correction of metabolic liver disturbances and activation of biochemical detoxication processes, as to evidence: increase in glucose-b-phosphate level and decrease in liver tissue glucose, significant intensification of catalytic oxidation of carbohydrates, at the same time - decrease in lactate and pyruvat levels, that testified to intensification of gluconeogenesis and restoration of detoxication mechanisms. Extracorporeal ozonization of blood led to decrease in dien conjugates (on 27,5%) and MDA (on 31,9%), activation of SOD (on 2,12 times) what spoke to normalization of lipid peroxidation processes and activation of antioxidative protective system.

Morphologically registered alterations of liver tissue in experimental animals treated with ozone in the early reparative period were of reversible kind.

OZONE THERAPY AND QUANTUM HEMOCORRECTION IN THE EXPERIMENTAL PNEUMONIA TREATMENT

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In the experiment on 10 not pedigree dogs there was evaluated the therapeutical effectiveness of the blood extracorporal ultra-violet irradiation plus ozone therapy (BELM+OT) complex on the course of the experimental pneumonia. Pneumonia was modeled by 5% nitrate silver solution injection into the right pleural cavity. The treatment was started in 2 days: the ozonized (0,9%) chlorine sodium solution (ozone concentration 1 mg/l) was injected intravenously (quantity – 10 ml/kg), immediately after that the (BEUVI+OT) complex was done (3 mg of irradiated blood / kg). The treatment was repeated five times in ten days. The animals of the control group received the infusions of the physiological solution at the same time and in the same quantity as those under the experiment.

As the result of the treatment among the animals of the experimental group one could observe the quicker normalization of the clinical-laboratory indices (for 3-5 days), survival was 100% (in the control group - 60%). Autopsy, made at the end of the experiment showed that the dogs, which were treated by the (BEUVI+OT) complex had the pneumonia healing much faster and more complete than the dogs, which received only the physiological solution infusions. The process of pneumonia in the control group dogs was long and had the strong tendency to sclerosis.

Thus, the received results testify to the sufficient effectiveness of the monotherapeutical apply of the (BEUVI+OT) complex in the pneumonia treatment. It is perspective with the help of the complex to widen the traditional schemes of treatment the patients with the inflammatory illnesses of lungs.

BLOOD-STOPPING PROPERTIES OF GASEOUS OZONE

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Moscow

We have made studies into the blood-stopping characteristics of gaseous ozone using the model of parenchymatous (from a wound in the liver) bleeding in rats. We have discovered that a gas/ozone mixture offers distinct haemostatic properties when the intensity of the stream is 1 l/min and the density of the stream is 2 mg/ml. Thus, if a wound in the liver is treated with a flow of air or pure oxygen it takes 244,5 + 11,3 sec and 209,4 + 10,8 sec, respectively, to stop the bleeding. If the same wound is treated with a stream of gaseous ozone the time it takes for stopping the hemorrhage is 45.0 + 3,8 seconds. It has been observed that haemostatic properties of the method are connected with forming of a fibrin membrane.

THE SIGNIFICANCE OF SELECTIVE OZONE THERAPY FROM POSTHYPOXIVE LIVER DAMAGE

V.V. Novomlinski
Voronezh

The method of antyhypoxic liver protection has been experimentally grounded with overtightness of duodenal liver ligament. The method consists of the interportal injection of ozonized physiological solution The method gives the possibility to prevent the development of liver insufficiency and to achieve the high percent of animal survival during the long period excluding liver of blood circulation.

BLOOD-STOPPING OF ARTERIOLOVENULAR EXPERIMENTAL BLEEDING WITH GAS/OZONE STREAM

Yu.P. Kashpersky, A.A. Adamyan, V.A. Zhukov
Moscow

We have made studies into the blood-stopping characteristics of gaseous ozone using the model of arteriolovenular (from a stump of the tail) bleeding in rats. We have discovered that a gas/ozone mixture offers distinct haemostatic properties when the intensity of the stream is 1 l/min and the

density of the stream is 2 mg/ml. The spontaneous hemostasis in a stump of a rat's tail occurred in a matter of 710.5 + 15,4 sec and hemostasis in a stream of ozone took 40.1 + 3,8 sec. It has been observed that the hemostasis, which comes about from the action of ozone, is conditioned by a fibrin membrane formed on the surface of a bloodstream and high constricting vessels in rich collagen tissues of a rat-tail.

CORRECTION OF DEFENSE MECHANISMS IN PERITONITIS

I.T. Vasil'ev, O.Ye. Kolesova, R.B. Mumladze, I.N. Markov, S.M. Chudnykh
Moscow

Metabolic disturbance in peritonitis is caused by quickly developing hypoxia of complex polypathogenetic nature that leads to diminishing of organism adaptive-compensative potential maintained by equilibrium of oxidation-reduction processes. Accelerating hypoxia and intoxication prohibits adaptation change of homeostatic reactions, as a result of insufficient energetic processes mobilization and increasing energy deficiency.

Our experiments have revealed the leading role of antioxidant system in metabolic correction of energetic substrata redistribution.

Correction of metabolic processes and, in the first turn, correction of antioxidant defense in complex with adequate surgical measures and antibacterial therapy is necessary for the patients with widespread forms of peritonitis.

To solve this problem such methods as infusion of UV-irradiated blood components, low-intensive laser radiation, ozonized 0.9% sodium chloride solution, synthetic antioxidant in low concentration (mexidol) and inhibitors of prostaglandin synthesis (indometacin, aspirin) have been successfully used.

Thus, pathogenetic cause of metabolic disturbance in peritonitis is the disturbance of oxidation-reduction equilibrium. That demands inclusion of measures for intracellular metabolism recovering as one of the complex therapy elements.

THE USE OF OZONIZED PERFUSION IN RESTORATION OF MYOCARDIUM FUNCTION IN RATS AFTER CLINICAL DEATH

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Experiments were conducted on isolated heart taken at the time of clinical death. The heart was perfused by ozonized Krebs-Henseleit solution. In 60 minutes there were noticed the intensification of Carbon and lipid exchange, H+-ATPH-ase activation and accumulation of ATPH and creatinphosphat in myocardium tissue. The restoration of antioxidant system and normalization of Lipid Peroxidation processes were shown. Due to lipid exchange modification and the presence of ATPH transport Na+-K+-ATPH-, Ca2+-ATPH-pumps responsible for the myocardium excitation and contraction functions.

STIMULANT EFFECT OF OZONE ON INSULIN SECRETION

O.E. Kolesova, T.M. Frolova, T.J. Uchanova
Moscow

Experimental studies have shown an increase in concentrations of immunoreactive insulin and C-peptide during ozone infusion. The adrenaline test allowed indicating a decrease by ozone inhibitory effect of cotacholamines on B-cells. Administration of ozone caused a change in redox potential that also controls secretory activity of B-cells.

FUNCTIONAL AND MORPHOMETABOLIC CHANGES OF MYOCARDIUM IN CORRECTION OF HYPOXIC BREACHS BY OXIDANT

N.V. Zhemarina, V.P. Smirnov, S.P. Peretyagin, O.V. Mashkovtsev
Nizhny Novgorod

Functional and morphometabolic changes of myocardium in dogs in model of hypovolemic hypothensia with extracorporal ozonization of blood were studied.

The use of ozonized blood led to improvement of cardiohemodynamics, common peripheral resistance and differential perfusion pressure. It created the additional conditions for elimination of consequences of circulatory-hemic hypoxia at the expense of oxidation semioxydate products and decrease energical expenditures for securing of function of vasculocardiac system.

PATHOMORPHOLOGICAL CHANGES IN FUNCTIONAL ELEMENT OF MYOCARDIUM ON OZONE THERAPY OF HAEMORRHAGIC SHOCK

N.U. Zhemarina, V.P. Smirnov, L.B. Snopova
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Morphohystochemical characteristics of functional element of myocardium in dogs with its correction by ozonized saline and extracorporal ozonized blood of hemorrhagic shock were studied. Extracorporal ozonization of blood in posthemorrhagic period makes a positive effect on functional element of myocardium because ozone eliminates semioxydate products of meta and catabolism and reconstructs structural and functional organization. It becomes possible because ozone activates adaptional mechanisms on molecular, subcellular, cellular and tissue levels.

PROTECTIVE EFFECT OF PARENTERAL OZONE THERAPY AT EXPERIMENTAL LUNGS' PATHOLOGY

E.I. Jakovleva
Nizhny Novgorod

The effect of parenteral ozone therapy was studied in the submitted work. Ozone therapy was used for the treatment of dogs with lung pathology.

After extracorporal processing of blood during 30 minutes with concentration of ozone 48 mcg/l in ozone/oxygen mixture in the animals with respiratory distress-syndrome (RDS) the improvement of pulmonary microcirculation in a kind of desagregation of blood elements, reduction of leukostasis, increase in albumins and globulins in blood was marked.

Thus, the conducted research has shown that at pulmonary insufficiency the efferent ozone therapy improves microcirculation and increases protective function of lung.

ULTRASTRUCTURAL CRITERIA OF DETOXICATING ACTION OF OZONE THERAPY

N.P. Lebkova, V.Ja. Zaitzev, L.N. Zeitlenok
Moscow

A single intraperitoneal injection of ozonized saline solution to rats in complete starvation or in peritonitis reduced destructive alterations in hepatocytes, intensified functional activity of nuclei, regeneration of mitochondria, destruction of lipid inclusions and glycogen formation from them in these areas, raised the contents of catalase and cytochrom P-450 synthesizing cell structures (peroxysomes and endoplasmic reticulum membranes). All this improved detoxicating function of liver and general status of organism.

THE EFFECT OF OZONE ON ENERGY RESERVES LEU

N.P. Lebkova, O.A. Tugushi, I.T. Vasiljev
Moscow

By means of cytachemical methods the effect of parenteral introduced ozone isotonic solution on fatty and glycogen inclusions in the peritonitis was studied. The amount of glycogen inclusions in leukocytes for the effect of ozone was below by comparison without therapy that, probably, was connected with increased glycogenolis.

The fatty inclusions in leucocytes were completely absent for the peritonitis without treatment, while their content gradually increased to normative level after introduction of ozone.

According to our data ozone therapy normalized energy metabolism in leucocytes.

The appearance of fatty inclusions in these cells is favorable prognosis symptom in the course of disease.

CORRECTION OF CHANGES IN LYMPHOID ORGANS ON HEMORRHAGIC SHOCK BY ANTIHYPOXANTS AND OZONE

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The main model of our work was hypovolemic hypertension on Wiggers, which was made on 91 dogs. In 60 minutes hypotension therapy transfusion began, by pure physiological solution, physiological solution with gutimine, Na oxybutirate and ozone. In 120 minutes of hypertension hemotransfusion was made. It was shown with the help of functional and morphological methods that the application of gutimine, NOB and ozone acts positively on the cardio-hemodynamic and the structure of lymphoid organs. So, the application of antihypoxants and ozone prevents irreversible changes in lymphoid organs.

FUNCTIONAL ELEMENT PATHOLOGY OF ISCHEMIC MYOCARDIUM WHEN PERFUSED BY OZONIZED CARDIOPLEGIC SOLUTIONS

V.P. Smirnov, L.B. Snopova, A.N. Monacha, I.Y. Skvortsova, K.E. Yunusova, N.N. Prodanets
Moscow

In experiments with dogs under extracorporal circulation ischemized for 90 minutes myocardium was perfused by ozonized solution (1 series), oxygenated solution (2 series) and "clean" Doring solution (3 series).

The use of ozonized Doring solutions provides maximum approximation of histological picture to normal myocardium including subendocardial areas. Presence of single contractures, PAS-positive substance in cardiomyocytes, absence of interstitial and intracellular edema with activation of microcirculation in profound layers of myocardium, which were mostly subjected to ischemia, were indicative of positive protective influence of ozonized cardioplegic solutions (Doring solutions) on ischemic myocardium.

SECTION II. CLINICAL ASPECTS OF OZONE THERAPY

OZONE THERAPY OF ACUTE SUPPURATIVE INFECTION

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The efficiency of ozone has been studied in the treatment of 146 patients with suppurative pathology. Ozone was used in the gaseous phase and in solutions (physiological and distilled water) enriched by ozone (OPS and OS). After its surgical treatment the suppurative center was washed by the OS and plugged with the OS tampons every day. In 3-4-6 days wounds cleared from purulent necrotic mass, phagocytosis was active and 76% of patients had the microbial contamination of the wounds below the critical level. The duration of treatment decreased by 1,4-1,6 times. The intravenous infusion of the OPS and the washing of the suppurative cavity with the OS were used in the treatment of 68 patients with severe suppurative pathology. After 2-4 procedures the hemodynamics was stabilized, the level of endotoxicosis decreased and the phagocytosis became very active. The death rate decreased by 1,4 times.

THE ROLE OF OZONE THERAPY IN CORRECTION OF HOMEOSTASIS AT PURULENT-SEPTIC PATHOLOGY

S.I. Miroshin, K.N. Kontorshikova, O.B. Moshkovcev, A.S. Miroshin
Nizhny Novgorod

The results of treatment of 72 patients with purulent-septic pathology including phlegmon and abscesses, osteomyelitis, postoperative wounds of soft tissues, burns, sepsis within the complex ozone therapy consisting of local (irrigations by ozone-oxygen mixture in plastic chamber, bandage moistened with ozone-containing antiseptics) and systemic (intravenous, intra-arterial and intraosteal introduction of ozonated physiological solution) are given in the present work.

The absolute majority of patients after 1-2 sessions of complex ozone therapy had only general intoxication and appearances of local inflammation. Wounds became sterile and after 2-3 bandages were completely cleared and executed by high-grade granulation.

Thus, the complex ozone therapy makes it possible to increase the efficiency of treatment of patients with purulent-septic pathology.

OZONE IN XENOHEMOPERFUSION OF PATIENTS WITH SUPPURATIVE SEPTIC PATHOLOGY

A.D. Lelyanov, S.A. Kasumjan, V.S. Starshinova, N.I. Fedotova
Smolensk

The effect of ozone has been studied in the xenohemoperfusion (XHP) of 21 patients with the suppurative septic pathology. The physiological solution enriched by ozone (OPS) was put into the perfusion system before the xenospleen. The OPS was also used for bathing of the xenospleen and for giving the blood left in the xenospleen to the patient. The inclusion of the OPS into the system of the biohemosorption made the postperfusion allergic reactions 2 times less, despite the prolongation of the procedure. An obvious increase in the detoxicating and immunomodulating effects of the XHP has also been noted. The positive effect was obviously caused by improving the conditions of the spleenocytes functioning and by the antiallergic impact of ozone.

OZONE THERAPY OF DIFFUSE PERITONITIS

O.E. Kolesova, L.M. Alexeeva, I.T. Vasiljev, N.B. Volchovskaya, A.I. Lazarenco, V.I. Zaitsev
Moscow

The use of ozonated 0,9% solution of sodium chloride for irrigations of abdominal cavity and intravenous infusions stimulates pentouse shunt and promotes the adaptability of

glutathionreductase system. The stimulation of antioxidant system activates detoxication and reparation processes, improves tissue microcirculation and gives an immunological effect.

PREVENTION OF POSTOPERATIVE WOUND SUPPURATION

I.T. Vasilyev, R.B. Mumladze, I.N. Lebedinsky, V.I. Yakushin, T.A. Vasina
Moscow

The main factor of wound suppuration is the degree of dissimilation during the operation and antibiotic resistance of microflora.

Ozonated 0,9% solution of sodium chloride with 2-10 mg/l ozone concentration completely suppresses the growth of staphylococcuses, proteus, colon and blue pus bacilli at 103 KOE/ml. At higher concentration only partial inactivation of some types of microorganisms has been observed. The suppressing action of ozonated solution has been revealed for all investigated concentrations of microorganisms.

The bacteriological tests have revealed that the parenteral use of ozonated solutions diminishes bacterial dissemination and quantitative composition of microflora in wound exudates at 1-2 orders of magnitude ($p<0,05$).

THE RESULTS OF CLINICAL APPLICATION OF OZONIZED ANTISEPTICS IN THE TREATMENT OF PURULENT WOUNDS

S.I. Miroshin
Nizhny Novgorod

The conducted microbiological experiments and the treatment of models of purulent wounds in the animals with the use of ozonized antiseptics have shown their high efficacy.

The concentration of ozone in ozone/oxygen gas mixtures ranges from 2000 mcg/L up to 8000 mcg/L. 108 wounded and patients were included into the control group. Non-ozonized antiseptics were used for the local treatment of wounds in this group.

In the main group after 2-3 bandages wounds separated became sterile, the wounds for 4-5 days before were cleared from purulent-necrotic mass and began to be executed by granulations with simultaneous disappearance of the attributes of local inflammation and general intoxication.

Thus, the use of ozonized antiseptics for the local treatment of purulent wounds has appeared rather effective. The average terms of treatment of stationary patients of the main group were reduced in comparison with control group by 6-7 days.

OZONE THERAPY OF SEPTIC COMPLICATIONS IN PATIENTS WITH SPINAL CORD TRAUMAS

A.L. Kladovshikov, A.A. Gluhov, I.P. Moshurov, U.M. Sorokoletov, V.M. Lanetskaja
Voronezh

In order to improve the results of complex treatment of patients with spinal cord traumas with combining of uroseptic complications the new method of infection sanitation was elaborated on the base of local and parenteral application of ozonized solution according to the elaborated plan.

18 patients in age group from 17 till 56 years with closed spinal traumas in intermediate and late periods of its current were observed.

All patients had attributes of acute or chronic infectious cystitis. In 9 patients urological sepsis was advanced.

The dynamic control of treatment efficiency was performed by means of clinical, laboratory, immunological and bacteriological methods of research.

A favorable effect included a rapid elimination of infection stimulation of the local immunity and common resistance of the organism.

The received results allowed considering the use of ozone therapy in the complex treatment of patients with septic complications to be expedient.

THE USE OF OZONIZED SOLUTIONS IN THE COMPLEX TREATMENT OF PERITONITIS

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Moscow

By taking into consideration the bactericidal activity, detoxicant and biostimulating effects of ozone we applied ozone in the complex treatment of 15 patients with widespread forms of peritonitis. The ozone-containing preparations used included ozonized physiological solution at concentration of 800 mcg/L for the parenteral introduction and at concentration of 4000-6000 mcg/L for the introduction into the abdominal cavity through drainages with exposition of 30 min and subsequent passive removal of liquid from the abdominal cavity. The ozonization of solutions was performed by means of ozone generator directly before the application. The efficiency of ozonized preparations in the complex treatment of peritonitis was evaluated in comparison with the control group of 20 patients, where the treatment of widespread peritonitis was carried out without application of ozone preparations. It was established that in patients of the main group the clear positive effect was more expressed and came earlier than in patients of the control group.

Thus, the received data have shown the efficiency of ozone-containing preparations to be used in the complex treatment of widespread forms of peritonitis.

THE FIRST EXPERIENCE OF CHRONIC ABSCESSES AND PLEURA EMPHYEMAS TREATMENT BY METHOD OF OZONIZATION

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The purpose of conducted research is to verify the applicability of ozone for the sanation of purulent lung and pleura cavities, particularly in patients with anaerobic microflora and expressed purulent intoxication. The first experiment of chronic lung abscess and pleura emphyema treatment by the method of irrigation of purulent cavities with ozonated 0,9% sodium chloride solution at concentration of 500 mcg/L allowed achieving favorable results.

The clinical, bacteriological and immunological parameters of blood were normalized considerably faster than in control group treated with the traditional methods.

The number of postoperative complications and the time of inpatient presence decreased.

OZONE THERAPY IN THE COMPLEX TREATMENT OF EMPHYEMA

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The purulent-inflammatory diseases of pleura are associated with hypoxia, bacteriemia and increase in endogenic intoxication. Ozone therapy has been used for stimulation of protective and compensatory systems of organism. The anti-inflammatory, bactericidal effects of ozone therapy in the complex of remedial measures have been revealed for the patients with emphyema and pyopneumothorax.

Ozone therapy included intravenous infusions and pleural cavity lavage by means of ozonated physiological saline solution (OPSS) with ozone concentration of 4000-6000 mcg/L.

The efficiency of ozone therapy was proved by bacteriological tests (inoculation pleural exudate on medium antibiotic sensivity).

The results have indicated that ozone therapy diminishes bacteriemy, activates detoxication processes and organism defense reaction, stimulates reparative processes, diminishes duration of inpatient treatment and lethality rates.

THE USE OF SOLUTE OZONE FOR TREATMENT OF PROGRESSIVE TUBERCULOSIS ASSOCIATED WITH DIABETES MELLITUS AND LIVER DAMAGES

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98 experiments were conducted in vitro and in vivo to prove that solute ozone (PO_3) in the concentration of 1-4 mcg/ml develops a bacteriostatic and bactericidal action on different clones of mycobacterium of tuberculosis (MBT). 147 patients with acute progressive tuberculosis received in addition to chemotherapy ozone therapy by infusing PO_3 (1-4 mcg/ml) intravenously every 6-8 days. This therapy program resulted in the stopping of massive bacteriosecretion and stabilization of process in 64,7% of patients after 8 weeks of treatment, in 77,2% of patients - after 12 weeks of treatment as compared with 18,8% of patients, which received only chemotherapy. The application of haemocarboperfusion with solute ozone increased the percentage (%) of such patients up to 81,8% and reduced the abacilling time up to 3-4 weeks. The administration of PO_3 produced also a hepatotropic and diabetes stabilizing effect increasing the efficiency of tuberculosis treatment.

OZONE THERAPY OF FESTERING LUNG AND PLEURA DISEASES

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The solution of furacilini treated with ozone/oxygen mixture (4 mg/L) directly before application was used in 27 patients with abscesses and empyema of the pleura in the complex of medical procedures. The solution was injected through a drain into the pleural cavity with the exposure of 50-60 minutes and by subsequent passive removal.

A positive effect was observed sooner than in control group (10 patients), where the treatment was conducted without ozonized solutions. On the 2^{nd}-3^{rd} day from the beginning of ozone administration concordant condition got better: it comes to normalization of appetite, sleep, body temperature, stabilization of the indices of hemodynamics. The elimination of fungal signs and phenomena intoxication occurred in the earlier decrease in the index of leukocyte, decrease in mean molecules in the sera, the normalization of the indices of bilirubin, of urea, of creatinin.

The immediate direct bactericidal effect of ozonized solution of furacilini occurred by expressed decreasing of microbic bodies in punctate. This positive effect was observed in 24 patients (80%). There were no complications and adverse reactions due to the administration of ozonized solutions.

THE USE OF OZONE IN THE POSTOPERATIVE COMPLICATIONS

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We have used the physiological solution with ozone at concentration of 3 mg/L in 5 patients with generalized peritonitis. The patients got this solution 3 times daily: intravenously - 500 ml, by intraperitoneal route -1000 ml. Peritonitis was eliminated in 10-12 days. The physiological solution with ozone was used also in 4 patients with pleura empyema after extraction of lung. The solution was infused into the cavity and intravenously 3 times every day. The postoperative hearth was cleaning during 14-16 days of the treatment. The bronchial fistula was closed thanks to the same treatment. There was one positive result in the group of 2 patients. The intravenous treatment of postoperative pneumonia was completed during 7-10 days. There were 10 patients who received this treatment.

THE TREATMENT OF INTESTINAL INSUFFICIENCY SYNDROME IN PATIENTS WITH PERITONITIS BY USING METHODS OF OZONE THERAPY

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It is determined that medical ozone along with its high bactericidal activity produces a complex of therapeutic effects: normalizing the lipid peroxidation and antioxidant defense, stimulating the repair and immunological defense, detoxication effect. The all above-mentioned provided a basis for treatment of 68 patients with generalized peritonitis, which received ozone therapy. The control group consisted of 80 patients, which received the conventional treatment of peritonitis. The patients were suffering from generalized peritonitis of different stage: reactive phase - in 52 (32%), toxic - in 84 (58%), terminal - in 12 (7%). The patients of main group received ozone therapy in

addition to conventional treatment of peritonitis. The following methods of ozone therapy were used:

1. Intravenous infusions of ozonated physiological saline (400 ml) every two days, ozone concentration - 800 mcg/L, 4-10 procedures per one cycle of treatment.

2. Intra-operative abdominal lavage by ozonated physiological saline (up to 3000 ml), ozone concentration of 5000 mcg/L, ozone saturation of saline was carried out through barbotage directly in abdomen for 10-15 min.

3. Peritoneal lavage (1200 ml, ozone concentration of 5000 mcg/L, exposure - 30 min, once/twice a day for 3-4 days).

4. Enteral lavage by ozonated physiological saline (400 ml) through a nasogastrointestinal probe daily once/twice a day within 3-4 days, ozone concentration -1000 mcg/L.

5. Reflex ozone puncture (ROP) (ozone concentration - 1000 mcg/L, ozone dose - 0,3-0,5 ml per one acupuncture point, on the 2^{nd}-3^{rd} day of treatment twice a day at the same time as intravenous infusion of ozonated physiological saline (400 ml, ozone concentration - 800 mcg/L).

The restoration of intestinal motility took place in patients of main group (with ozone therapy) 1-2 days earlier as compared with control group (according to the data of ultrasound and phonoenterography). The restoration of intestinal motility was associated with a decrease in the endotoxicosis data (decrease in the leukocytes, in the leukocyte index of intoxication, in the "middle molecules", in the hematological index of intoxication).

Thus, the use of different methods of ozone therapy in case of peritonitis contributes to normalize the homeostatic data, to decrease the endotoxicosis symptoms as well as to repair the intestinal motility 1 -2 day earlier as compared with conventional methods of treatment.

THE USE OF OZONE FOR TREATING SUPPURATIVE CHOLANGITIS

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The clinical and laboratory evaluation of ozone therapy curing effect in the complex therapy of 79 patients with suppurative cholangitis has been carried out.

Intra-abdominal and enteral lavage with ozonized solutions (OS) was performed during the operation and in the postoperative period. For local treatment of suppurative cholangitis OS was infused into hepatic ducts. In severe endotoxicosis and immunodepression intravenous infusions of OS and xenosplenohaemoperfusion were performed. The use of these methods reduced hepatic insufficiency syndrome duration. Endotoxicosis indices level decreased by 1,6-2 times quicker, suppurative complications rate was reduced by 30% and postoperative lethality by 1,4 times.

THE USE OF OZONE THERAPY AND VIDEOLAPAROSCOPY IN THE COMPLEX TREATMENT OF PERITONITIS

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There were treated approximately 138 patients with different forms of peritonitis including 28 patients with shouted peritonitis by applying the methods of ozone therapy. There were used the authors' strategies of ozone therapy with ozonated 0,9% isotonic saline: intravenous infusion, intra-operative irrigation of the abdominal cavity, peritoneal and intestinal lavage, reflex ozone puncture.

The authors have offered a new method - prolonged videolaparoscopy and irrigation of the abdominal cavity by using ozone, which realized through 12, 24, 48 hours after operations.

The authors have worked out the treatment tactics of ozone therapy in different forms of peritonitis.

The use of the methods of ozone therapy in the complex treatment of peritonitis has allowed reducing the death rate with 20% before 14,2%.

OZONE THERAPY IN THE TREATMENT OF SYNDROME OF INTESTINAL INSUFFICIENCY IN CASE OF PERITONITIS

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Syndrome of intestinal insufficiency was treated in 138 patients with different forms of peritonitis by applying the methods of ozone therapy. The authors have motivated the clinical using of ozone therapy in the treatment of functional intestinal insufficiency in case of peritonitis.

The authors have used their own strategies of ozone therapy with ozonated 0,9% isotonic saline: intravenous infusion, intra-operative irrigation of the abdominal cavity, peritoneal and intestinal lavage, reflex ozone puncture.

Swept away reconstruction an motor, rechecking and suction intestine functions under the influence of ozone therapy on 1 -2 days earlier than when using the traditional methods of treatment for given pathology.

OZONE APPLICATIONS IN THE TREATMENT OF INTESTINAL AND HEPATIC INSUFFICIENCY

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The authors conducted the study of efficiency of the intra-intestinal ozone dialysis and intra-portal ozone therapy in the complex treatment of peritonitis. Safety and high efficiency of the developed methods were confirmed through realization of experimental followings. The clinical approbation of the intestinal dialysis with ozone and intra-portal ozone therapy has confirmed the most possibilities of indicated methods in liquidation of syndromes of intestinal and hepatic insufficiency.

EXPERIENCE OF OZONE APPLICATIONS IN SANATIONS OF THE ABDOMINAL CAVITY

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To improve the treatment of patients with acute peritonitis the various techniques of sanation of the abdominal cavity with ozone are developed. According to the conducted experimental investigations the most effective are the sanations of the abdominal cavity with a hydropressed-dispersed stream of ozonated solution obtained with the help of the original devices «Jet scalpel» or «UGOR-1». The application of ozone sanations in the clinical treatment of 112 patients with acute generalized peritonitis has allowed to reduce the mortality rate from 62,07% to 32,17%.

THE USE OF COMPLEX OXIDATIVE DETOXICATION IN GENERALIZED PURULENT PERITONITIS

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42 patients (incl. 24 children) with generalized peritonitis were admitted for treatment with ozone in combination with sodium hypochlorite.

Ozonated physiological saline (ozone concentration - 2000 mcg/L, ozone dose - 8-10 ml/kg) was used in the pre-operative period.

Intra-operative abdominal lavage was performed by means of sodium hypochlorite solution.

To eliminate toxinemia and hypoxinemia as well as to stimulate intestinal motility beginning from the 2^{nd} day after operation rectal-sigmoid insufflations of ozone/oxygen gas mixture (ozone concentration - 5 mg/l, volume - 600-700 cm^3) was carried out daily.

Ozonated physiological saline was infused daily by intravenous dropping route (ozone dose - 15-16 ml/kg). The application of ozone in combination with sodium hypochlorite reduced the lethality rate by 8-9%, decreased the use of antibiotics by 35-40%, of antiseptics - 30-35%, bed/day - 20-22%.

THE USE OF OZONE AND OZONIZED SOLUTIONS IN THE TREATMENT OF PURULENT WOUNDS

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We have used the gaseous ozone and the ozone-bubbled NaCl solution 0,89%, the aqueous solution of boric acid 5%, the levomycol ointment and the sea-buckthorn oil in the treatment of purulent wounds of different localization and origin. The method of treatment consisted in the following: at the first stage, we have been conducting the wound surface ozonization in a gas chamber during 20 minutes for the purulent wound pathogenic microflora suppression with the subsequent 3-5 min treatment of the wound surface by the solutions of boric acid 5% and NaCl 0,89%, bubbled by ozone. The procedure terminated with application of a water dressing on a wound with a similar solution.

During the treatment of purulent wounds according to the given method it was observed that on the first three days a severe decrease in the bacterial dissemination level took place up to its full abolition. In the experimental group of patients there was a clearance of wounds from the pyo-necrotic tissues on the 4^{th}-5^{th} day and the tender granulation tissue appeared. In the control group, the bacterial dissemination level decrease took place only on the 11^{th}-12^{th} day and microgranular edematic granulations appeared in the wounds. At the second stage of treatment, the salve dressings (levomycol, levosin, the sea-buckthom oil) were used in the control group of patients after the granulation tissue appearance. The similar ointments, that have only undergone the bubbling by ozone during an hour, were used in the experimental group.

THE USE OF MEDICAL OZONE FOR ACTIVE CONTROL OF THE INJURY PROCESS

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We have used the complex method of ozone therapy in 112 patients including 64 children. Wound was treated by ozone/oxygen mixture by means of shellform bag in press-vacuum regime (combination of low and high pressure). On the first 2-3 days wound was covered with sorbent treated by ozonated solution 10% sodium hypochlorite. Ozonated antiseptic solutions were used for wound sanation. In case of pus hearth in bone tissues or open fracture ozonated physiological saline was infused intraosteally. On suspicion of sepsis or not spore-forming anaerobic infection rectal ozone insufflations and major hemoozonetherapy were performed additionally. The patients received ozonated physiological saline intravenously daily.

The above-mentioned method of treatment helped to reduce treatment terms by 20-22% as the use of antibacterial preparations.

THE TREATMENT WITH OZONE IN PURULENT SURGERY

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There were treated 58 patients with different purulent pathologies of arms and legs. The number of procedures ranged from 2 to 20, the exposition - from 30 to 50 minutes daily. Erysipelas erythematosis and hemorrhagic forms controlled an attack after 2-5 procedures, blebs forms - after 8-10 procedures. In one patient this method was of alternative at cancer of mamma and allergic dermatitis contraindications for intake of antibiotics. In obliterating vascular disease of the lower limbs, which complicated impaired trophicity of skin, supervised purged ulcers from purulent infection and beginning epithelization of wound. Pain was removed after 2-5 procedures. In patients with diabetic angiopathy wounds were purged including the beginning of epithelization after 8-12 procedures.

In case of chronic venous circulatory insufficiency this method is a symptomatic treatment, pain was removed, but this pathology needs to repeat the treatment.

THE USE OF OZONATED PHYSIOLOGICAL SALINE FOR TREATMENT OF ENDOTOXICOSIS IN PATIENTS WITH MALIGNANT LYMPHOMAS

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The severity grade of endotoxicosis in patients with malignant lymphomas affects oncotherapy tolerance. For the purpose of detoxication medical ozone in the form of intravenous infusion of ozonated physiological saline was used in complex with radiotherapy and oncochemotherapy. The main group consisted of patients with lymphogranulomatosis and lymphosarcoma of III stage.

The use of detoxication properties of ozone, based on the conversion of fat-soluble endotoxins to water-soluble and their further elimination, makes possible to decrease the grade of endotoxicosis in oncopatients.

THE USE OF OZONE FOR TREATMENT OF SURGICAL PATIENTS WITH BLADDER CANCER

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Today, surgical operation is one of the main methods of treatment in case of sick bladder cancer. However, the rate of infectious-inflammatory operation-associated complications is sufficiently high. On the example of 163 patients the authors proved the efficiency of infusions of physiological saline NaCl with ozone concentration of 250 - 500 mcg/L by intravenous route, biweekly and into the cavity of bladder during 10-14 days following operations on 400 ml per each treatment session. This has allowed reducing the rate of postoperative complications approximately by 3,5-times, owing to the denominated bactericidal and immunomodulating action of ozone.

OZONE THERAPY AFTER THE ESWL IN PATIENTS WITH NEPHROLITHIASIS AND PYELONEPHRITIS

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The ESWL traumatologically affects the nephrocite membranes that may cause a decrease in the kidney's function. The analysis of the results of ozone therapy used for cell membrane protection after ESWL in patients with nephrolithiasis showed that ozone therapy causes a decrease in the lipids peroxidation activity level, an increase in the antioxidant protection, improves the kidney's functional condition.

OZONE THERAPY IN PATIENTS WITH DIFFERENT FORMS OF DEGENERATIVE-DYSTROPHIC JOINT DAMAGES

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We observed 69 patients with degenerative-dystrophic joint damages (41 patients with knee joint arthroso-arthritis; 19 patients with deformating operation-associated knee joint arthrosis, 5 patients with shoulder-elbow periarthritis, 4 patients with severe deformating fracture-associated arthrosis). One cycle of ozone therapy consisted of 5 intra-articular injections in combination with Arteparon (1 ml) in case of arthroso-arthritis or Zeel-T (2 ml) in case of deformating arthrosis. After 2-3 injections all the patients reported a decrease in joint pains and an increase in joint moving volume.

The use of ozone therapy for prophylaxis and treatment of degenerative-dystrophic joint damages can be considered as a supporting therapy of the given pathology.

OZONE THERAPY IN THE COMPLEX SURGICAL TREATMENT OF PATIENTS WITH INFECTED TIBIAL FRACTURES AND SOFT TISSUE DEFECTS.

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Open tibial fractures are real surgical challenge because of the risk of infection in bone and devitalized soft tissues. The most severe consequence of open tibial fractures is osteomyelitis,

which can usually be prevented by prompt surgical intervention within six hours after injury. Complex surgical treatment includes multiple procedures: debridement of wounds; fasciotomy for compartment syndrome; external fixation and wounds irrigation. In order to prevent infectious complications, especially osteomyelitis, ozone therapy is included in the complex of measures. In such situations intramedullary injection of ozonated saline solution at ozone concentration of 1,0-1,5 mg/L and volume of 100-150 ml was used. Between 1997 and 1999, 18 patients with infected tibial fractures (14 patients with soft tissue defects) received complex surgical treatment combined with ozone therapy. The use of this method allowed us to achieve good results. Infectious complications were not found in the sample. In the control group made up of 11 patients, ozone therapy was not carried out, only the conventional treatment was used. In two of them deep wound infection was developed with an osteomyelitis outcome.

OSSEOUS RESIDUAL TREATMENT IN PATIENTS WITH CHRONIC OSTEOMYELITIS OF LONG TUBULAR BONES USING OZONE

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We have treated 63 patients with chronic osteomyelitis of long tubular bones. The purulent process was located on tibia - in 34 patients, on hip - in 29 patients. Posttraumatic osteomyelitis was diagnosed in 44 patients, haematogenous - in 14, gunshot - in 1, purulent complicated total hip joint arthroplasty - in 4. The surgical strategy consists of sequestra and implants removal, osteonecrosis resection, irrigation and external fixation by Ilizarov device or plaster bandage. Immediately after the patient awakened, suction drainage of residual osseous and soft tissues cavity by saline solution with ozone concentration of 2,0 - 3,0 mg/L was started. On the 2nd–3rd day the perfusate was cleared of blood, on the 7th day fibrin was not seen. By the end of the second week the solution and the perfusate did not differ visually. Average terms of drainage tube removal in control group (39 patients) were 24 days, in the sample - 17 days. Thus, using this procedure, in patients with purulent complications of lower limbs allowed reducing the time of postoperative wound lavage and complete debridement by putting a suture. Local inflammatory reaction to drainage tube long-term stay in soft tissues was never found.

OZONE THERAPY AND THE NEUROLOGIC BEHAVIOUR OF BACKBONE OSTEOCHONDROSIS

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The aim of this research is to study the efficiency of ozone therapy and the neurological behavior in patients with backbone osteochondrosis. 107 patients with musculotonic, neurodystrophic and radicular syndromes of backbone osteochondrosis (cervical and lumbar localization) were investigated. The average age of patients was 43,8 years, the average duration of the disease was about 6,5 years. In the treatment of the basic group (81 patients, all men) was used ozone therapy by introduction of ozone-oxygen mixture (OOM) into the paravertebral zones and into the biologically active points, and also local autohaemotherapy (LAHT). The control group included 26 patients (all men) where the introduction of oxygen (as a placebo) was combined with LAHT with not ozonized blood. At the end of the treatment, the patients marked essential improvement of health state expressed in a decrease of pain, disappearance of hyperpathic component, time intervals without pain, narrowing of irradiation zone. Simultaneously, the backbones mobility was enlarged, the night sleep was improved. The angle of rise, in Lasseg test, in patients with lumbar ischialgia was enlarged by 31% and in patients with radiculopathy by 24 % that exceeded positive shifts with respect to the control group ($p < 0,05$). The dynamics of spatial-functional mutual relations of biokinematic chain "backbone-lower extremities" was shown in substantial growth of movements in cervical and lumbar backbone (according to 37 and 51%). The expression of radicular syndrome was decreased from $1,63 \pm 0,21$ to $1,17 \pm 0,13$ ($p < 0,05$). Positive metabolic influence of OOM in the dystrophic degeneration centers, the rising of pain receptors sensitivity threshold decreased the morbidity of neurodystrophic sites at palpation. On the radiothermometry data, a decrease in the disorder of temperature in juxtaspinal points and the equalization of a "temperature asymmetry sign" was marked. A decrease in the motor potentials amplitude, an

increase in the nervous conducting velocity, a decrease in the H-reflex latent period revealed on the electromyography and electroneuromyography data, testified an improvement of the blood supply in the segments of the spinal cord and spinal roots during ozone therapy.

OZONE INFLUENCE ON THE LEVEL OF ENDOTOXICOSIS IN GENERAL HYPERTHERMIA CONDITION OF ONCOLOGIC PATIENTS

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At present time the general hyperthermia is more frequently used as a chemotherapy modification for oncologic disease treatment. The sessions include intravenous infusions of chemopreparations at the temperature of 40,5-41^0 C, general anesthesia and craniocerebral hypothermia. This method is used in inoperable and low sensitive to radiation and chemotherapy patients. 27 patients with cancer of different localization were divided into two groups: control - 15 patients and with ozone therapy - 12 patients. All patients had II-III stage of endotoxicosis. For detoxication, the patients of the investigated group received ozone therapy before the general hyperthermia in the form of intravenous infusion of ozonated physiological solution at ozone concentration of 3 mg/L. After ozone therapy a significant decrease in endotoxicosis was observed. Besides, the general health state was improved. After the general hyperthermia, endotoxicosis degree and general health state were determined in the both groups. Thus, using the ozone therapy as a method of oxidative detoxication is possible to significantly decrease the degree of endotoxicosis in oncologic patients at general hyperthermia conduction.

LIPID PEROXIDATION IN ONCOLOGIC PATIENTS TREATED WITH OZONE THERAPY

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In the last years, radiation therapy of malignant tumors undergoes large changes searching methods of selective radio sensitiveness, in order to increase the therapeutic interval between tumoral and normal tissues. With the purpose of intensifying the action of ionizing radiations, intravenous ozonized saline solution, before radiation, were applied in patients suffering from malignant diseases. 26 female patients with the diagnosis of malignant tumors, stage III and IV (uterus and ovary cancer and hysterocarcinoma) were studied. The treatment for the patients of the first group included the use of a fractionated gamma therapy (radiation dose for operated patients - 40 gp and for not operated - 70 gp). To the second group, 3 sessions of ozone therapy, before the gamma therapy was applied. An increase in the peroxidation processes and a decrease in the antioxidant defense system was found, after the sessions of radiation therapy, in the first group, in comparison with the second group, using ozonized saline solution.

THE WAYS FOR QUALITY IMPROVEMENT OF TRANSFUSING BLOOD AND ERYTHROCYTE MASS IN BURN PATIENTS

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In the treatment of burn disease haemotransfusion therapy is of great importance, particularly transfusion of erythrocyte mass, blood plasma. Method of oxygenation of contained blood was developed to improve the quality and metabolic properties of contained blood and its components. The results of our clinical investigations indicated a significant increase in pO_2 and SO_2 of contained blood treated by ozone/oxygen mixture, a shift of pH towards alkali, a decrease in the glucose and underoxidated products (lactate, pyruvat), an improvement of the rheological characteristics (a decrease in viscosity, an increase in flow properties).

Along with the improvement of quality and metabolic properties of transfusing contained blood this method helps to prevent such transfusion-associated complications as virus infection transfer

(hepatitis, HIV) and produces a systemic positive effect on oxygen homeostasis of the human body.

THE INFLUENCE OF OZONE THERAPY ON CELLULAR REACTIONS OF THE IMMUNOCOMPETENT SYSTEM IN BURN DISEASE

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We studied changes in lymphocytogram (absolute lymphocytes number, percentage relationship between different subpopulations of blood lymphocytes, shift of immature cellular forms, Gumprecht's bodies, monocytes/lymphocytes ratio) in burn patients with different depths (II to IV degrees) and lesion (32 to 75 % of body surface) over the ozone therapy sessions. The lymphocytograms were evaluated in the beginning of the session, 4 hours later and on the next day. We took into account lymphocytograms of the patients without any other procedures, the day before, that could impact immunoactivity (blood red cells and plasma transfusions, intravenous transfusions of corticosteroids). 4 hours after the ozone infusion a redistribution reaction developed, which manifested in a 2-3 times increase of the monocyte proportion that returns to the initial level on the next day. Simultaneously, though not drastically, growing of neutrophilia was observed coupled with an increase in the stab neutrophils forms number. The next day after the ozone therapy, lymphocytograms showed a rise in the shift of prolymphocytes and lymphoblasts. By this shift the extent of overall proliferative activity in the lymphoid system was judged: after the ozone therapy, lymphocytes proliferation was growing. Besides, the figure of Tuerk's cells increased. A clearly defined shift in the immunoactive cells compartment was achieved (an increase in basophilic immunocytes, the shift of proimmunocytes and immunoblasts).

THE FIRST EXPERIENCE IN USING THE SUBSTANCES CONTAINING ACTIVE OXYGEN FORMS IN THE PRE-HOSPITAL PERIOD

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The early use of modem bactericidal substances directly after the injury is possibly the most effective method of the pyo-septic complication control.

There are two substances containing the active oxygen forms, which produce a powerful antimicrobial effect: sodium hypochlorite and ozone.

Their optimal combination is explained by their different physical state: sodium hypochlorite is solution, ozone - gas.

Sodium hypochlorite and ozone were used in the form of local application and intravenous infusion in ambulance car on the way to hospital.

POTENTIAL OF OZONE FOR TREATMENT OF LIMB INJURIES AND DAMAGES AT THE STAGES OF MEDICAL EVACUATION

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In the accessible literature there is practically no information about the use of ozone therapy technologies including the complex methods (systemic and local) at the stages of medical evacuation by providing medical help for injured patients with military and not-military limb wounds and damages. This problem is the most actual one not only for military, but also civil health care. All this is the aim of the present investigation. The control and experimental group consisted of 183 and 179 patients respectively. To provide medical help to injured patients of experimental group there were used the methods of systemic and local ozone therapy within the complex shock treatment.

In the experimental group the number of purulence in case of gunshot wounds is by 4,67 times less than in the control one (in case of mine-explosion wounds - on average by 3,64 times). The

number of anaerobic wound-associated complications decreased by 100%, osteomyelitis rate in case of gunshot and mine-explosion wounds decreased by 7,3 and 7,46 times respectively.

Besides, in patients of the experimental group there was registered a decrease in the repeated surgical interferences: by 1,73 times in case of gunshot wounds and by 1,55 times in case of mine-explosion traumas and damages.

The use of systemic and local ozone therapy in the injured patients of the experimental group led to a faster decrease in the pain syndrome intensity as compared with the control group. The patients reported a significant improvement of feeling, sleep and appetite. Thus, the clinical data have indicated the high efficiency of ozone therapy technologies used in the patients with limb damages and wounds of military origin.

LOCAL APPLICATION OF OZONIZED ISOTONIC SODIUM CHLORIDE SOLUTION IN THE TREATMENT OF PATIENTS WITH ACUTE AND CHRONIC PURULENT MAXILLARY SINUSITIS

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Ozone is applied in the treatment of patients with purulent maxillary sinusitis. Upper jaw sinusis were washed out with ozonized isotonic sodium chloride solution. The treatment was transferred well. The complications were not observed.

EVALUATION OF THE BACTERICIDAL ACTIVITY OF OZONE/OXYGEN MIXTURE IN THE TREATMENT OF PATIENTS WITH CHRONIC RUNNING MIDDLE EAR (OTITIS)

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Owing to the powerful bactericidal properties of ozone, the application of medical ozone in the treatment of chronic running middle ear is considered a promising therapeutic approach that leads to a faster stable remission of inflammatory process in the middle ear.

The aim of our work was to study the bactericidal activity of ozone in low concentrations directly through tympanic cavity irrigation by an ozone/oxygen mixture as well as indirectly through tympanic cavity bathing with an ozonated physiological saline.

The efficiency of ozone therapy was evaluated on the basis of bacteriological control before and after the treatment. 63 patients were admitted for treatment (average age of 36, average disease duration of 7,5 years). 28 patients received ozone therapy in the form of tympanic cavity bathing with an ozonated physiological saline in concentration of 1200 mcg/l. In 35 patients it was used the method of tympanic cavity mucosa irrigation by an ozone/oxygen mixture in concentration of 600 mcg/l. In both groups one cycle of treatment consisted of daily 5-6 procedures.

The analysis of microscopic flora indicated that the main causative agents in case of chronic running middle ear are the following: Staphylococcus aureus, Staphylococcus epidermidis, Escherichia coli.

The application of ozone by tympanic cavity bathing with an ozonated physiological saline did not result in any substantional change in the microscopic flora of the middle ear that is probably related with the lacking bactericidal activity of the ozonated physiological saline.

In case of tympanic cavity mucosa irrigation by an ozone/oxygen mixture the pathogenic microscopic flora was not found in 88% of patients after the treatment. In other 12% of cases it was observed an increase in the microscopic flora sensitivity to the usually used antibiotics.

The different bactericidal activity of the above-mentioned methods was observed despite of a lower ozone concentration in the ozone/oxygen mixture used as compared with the used ozonated physiological saline. The speed of clinical symptom regression (ear secretions, hyperemia, tympanic cavity mucosa swelling) was different. The tympanic cavity irrigation by an ozone/oxygen mixture led to a faster stable remission.

OZONE THERAPY FOR IMMUNOCORRECTION IN THE TREATMENT OF SLUGGISH PHLEGMONS IN THE MAXILLOFACIAL AREA

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The efficacy of complex ozone therapy is shown in the local and general treatment of sluggish phlegmons in the maxillofacial area. Immunocorrective therapy is necessary in the treatment of such disorders. The use of medical ozone stabilizes the cellular immunity link and thus transforms hypoenergy to norm energy.

The duration of the period of treatment of patients in this case decreases, on the average, by 8,3 days.

OZONE THERAPY IN THE TREATMENT OF PURULENT MAXILLARY SINUSITIS

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We studied the action of local applications of medical ozone on the process of purulent inflammatory maxillary disease.

The received results allow us to speak about a greater efficiency of ozone therapy as compared with the conventional methods of treatment. On the basis of 12-point-scale we evaluated the condition of patients: the primary (before treatment) condition of patients was 9,55-10,2 points, on 5th day of treatment -1,69-2,0 points in main group (with ozone therapy); 4,01-4,29 points in control group (without ozone therapy). The grade of acuity of inflammatory process was evaluated on the basis of biochemical parameters of blood serum. The most convincing was a change in the level of haptoglobulin (initial level - 19,43-20,49 mmol/l, after ozone therapy - 15,62-16,76 mmol/l, after conventional treatment - 17,40-17,71 mmol/l), change in the level of molecules of middle mass (initially - 0,31 units, after ozone therapy - 0,27 units, after conventional treatment - 0,28 units).

The conducted investigations of aminotransferases and blood serum urea did not indicate any harmful action of local ozone applications on human body. Cytomorphological investigations of centrifugates of the maxillary cavity irrigation fluids showed that the beginning of local ozone therapy was associated with acuity of inflammatory process of maxillary cavity mucosa (a great number of neutrophiles, signs of non-completed phagocytosis). On 3d-5th day of ozone therapy the transition from the "neutrophile" phase to the "reparative" one took place, which resulted in a decrease in the neutrophiles, microscopic cells containing in the irrigation fluids, as well as in the preserved epitheliocytes. In control group the abovementioned changes occurred 2-4 days later. Keeping in mind, that the prolongation of the neutrophil phase of inflammation can facilitate the chronization of inflammatory process, we can suppose that ozone therapy can be considered as an efficacious method of prophylaxis of chronization and recidivating of purulent inflammations. The investigation results about the influence of ozone therapy on the course of acute purulent maxillary process indicate its high efficiency.

THE FIRST EXPERIENCE OF USING OZONE IN COMMON LARYNGEAL CARCINOMA AFTER LARYNGECTOMY EXTENSION

I.V.Eliseev, S.A.Rudelev
Ryasan

The apparatus with the regulated 0,1-10 l/min oxygen-ozone mixture feeding with ozone concentration, respectively, was constructed.

The method of treatment for purulent wounds in oncological patients in the post-operative period after the laryngectomy extension was suggested for use. The flow-rate (5 l/min) of oxygen-ozone mixture was directed at distance of 1-2 cm from the purulent wound, the waste product being simultaneously sucked by the electroexhauster where excessive ozone changed to oxygen. The lysis of necrotic tissues with the destruction of the pathogenic media took place because of the blowing and caused a rapid healing of the wound.

The study of the oxygen-ozone mixture influence on the purulent wound is continuing.

OZONE THERAPY IN THE TREATMENT OF MAXILLOFACIAL INFLAMMATORY DISEASES

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The successful use of ozone (O3) in the treatment of the diseases of different organs and systems has given us an opportunity to use ozone therapy in maxillofacial surgery and stomatology. Groups of patients suffering from odontogenic inflammatory maxillofacial diseases, such as periostitis, jaw osteomyelitis, perimaxillary phlegmons and abscesses, maxillary sinusitis were studied. Special attention was paid to the patients with putrefactive necrotic processes caused by anaerobic infection. The principal method of treatment in this case was ozone therapy.

Mobilization resources of organism reserve power, increase of local immunologic reactions of the oral cavity and influence upon pathogenic organism are studied.

Ozone (O3) was used locally in gaseous phase and as a solution with ozone concentration at the outlet of ozone generator from 1500 mcg/l and higher, and parenterally.

The control was carried out through the follow-up clinical examination of pathological process, bacteriological, immunological, biochemical blood and oral fluid examination. The successful clinical findings lead us to be optimistic about continuing our research work.

THE CLINIC AND LABORATORY FOUNDATION OF OZONE APPLICATION IN THE COMPLEX TREATMENT OF PHLEGMON OF NECK AND FACE

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The received results of investigation definitely prove the high clinical efficiency of ozone application in the complex treatment of 59 patients with phlegmon of the neck and face, it resulting in a decrease in terms of pyo-inflammatory process control of the maxillofacial and the neck area by 4,25+0,22 days in patients with milder course (1 group) and by 6,54±1,04 days in patients with diffuse and progressive pyo-inflammatory process (2 group). In comparison with the conventional treatment the application of ozone in the complex treatment of phlegmon on the neck and face decreases the degree of the marked endogenous intoxication much greater, it also produces the immunocorrective effect on the humoral chain of immunity, restores non-specific resistance of oral cavity. The normalization of lipid peroxidation processes on account of activation of antioxidant defense system is a safe basis for the use of the given method. All the above-mentioned things allow us to speak about the reasons for ozone therapy as an etiopathogenic component in the complex treatment of phlegmon of neck and face.

THE STATE OF ORAL CAVITY ANTIOXIDATIVE SYSTEM IN PATIENTS WITH MAXILLARY PERITONITIS IN CASE OF OZONE APPLICATION

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When compared with the initial level, the gradual increase in the antioxidant activity of oral fluid by 1,5-2 times has been found out in the investigation of oral cavity in 20 patients with maxillary periostitis that contributing to the inhibition of lipid peroxidation processes. The conventionally used antiseptics (such as furacillin, chlorhexidin) on the first day of treatment also resulted the index that is probably connected with stimulation of salivation and increase in oral antioxidant volume. However, the absence of own antioxidant synthesis (while ozone gives an opportunity to trigger these processes on account of activation of enzymatic oxygen dependent reactions) cannot maintain the activity and the necessary high level and on the 3d day of treatment the decrease in the studied criterion was found out.

Thus, the application of ozone in the post-operative period in patients with maxillary periostitis contributes to the antioxidative defense system activation in oral cavity and proves the efficiency of its application in the given pathology therapy.

THE USE OF MEDICAL OZONE FOR TREATMENT OF LARYNGEAL CARCINOMA

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In the clinic of otorhinolaryngology of the State medical academy it was began to study the action of the medical ozone on tumor tissue through its intratumorous injection.

Ozone therapy was used on patients, which had undergone the widened laryngectomy with neck lymphonodulectomy in case of laryngeal carcinoma with metastasis in the regional lymph nodes, if in spite of it the tumor growth was tested on the basis of microscopic state.

An ozone/oxygen gas mixture was injected into the exophytic growing tumor tissue. The number of procedures and the dose of ozone to be injected depended on tumor size, on tissue reaction to ozone.

The used intratumorous ozone therapy resulted in the limitation of exophytic tumor growth and decrease in tumor tissue volume. Along with associated pyonecrotic process around the tumor it was observed rapid pus wound cleansing, beginning of epidermization. On the basis of tumor regression general clinical examination showed a significant improvement of general patients' condition.

Preliminary investigations do not allow the researches to speak about a direct cytostatic action of ozone. However, the received results testified to importance for studying the action of the medical ozone on the dynamics of tumor process.

OZONE THERAPY IN THE CLINICAL PRACTICE

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The ozone therapy results of 1600 patients for a three-year period are presented. Positive results were received in 95% of patients with ischemic heart disease, in 92% - with discirculatory encephalopathy, in 89% - with chronic gastritis, in 80% - with ulcer disease, in 88% - with obliterating atherosclerosis of the lower extremities.

ASSESSMENT OF THERAPEUTIC EFFECT OF OZONE AND TRENTAL IN PATIENTS WITH NEUROCIRCULATORY DYSTONIA ASSOCIATED BY SYNDROME OF VENOUS HYPERTENSION

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The aim of this work was to investigate the efficiency of ozone and Trental in patients with neurocirculatory dystonia associated by syndrome of venous hypertension. The investigation included 3 groups of patients. The patients of I-control group (n = 14) were treated with traditional medicines. The patients of II-main group (n = 27) received Trental in different doses, and the patients of III-main group (n=20) intravenous infusions of ozonated saline solution (0,9 % physiological NaCl solution) with an ozone concentration of 1600 mcg/L. The results obtained in the three groups showed the absolute therapeutical advantage of Trental and ozonated saline infusions in the treatment of the syndrome of venous hypertension. In the main groups, a significant decrease in the venous pressure was achieved mainly because of the normalization in the erythrocyte deformability values (the best value using ozone). The total microcirculation index was decreased, as well as the vascular index. The clearance Xe133 had a tendency to improve. Blood viscosity and hematokrit were decreased too. The results obtained demonstrate the advantages in the flow properties of blood, microcirculation and peripheral blood flow in patients with venous hypertension, using Trental or ozone, in comparison with traditional treatments.

OZONE IN THE TREATMENT OF PERIPHERAL CIRCULATION DISORDERS OF THE LOWER EXTREMITIES

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Atherosclerotic vessels disorders of the lower extremities are the most common pathology in advanced age groups of patients. It is considered to be one of the manifestations that lead to non-healing trophic ulcers and even to gangrene that can cause invalidism and in some cases result in fatal outcomes. The common treatment to prevent atherosclerotic disorders as well as the use of vasodilatators haven't proved to be effective. Surgical interventions into the vegetative nervous system provide a rare steady clinical effect either. We have observed 17 patients, all of them being war invalids with IV grade of peripheral disorder in the lower extremities. The patients received 8 intra-arterial injections of ozonated solution of reopolyglucini in the dosage of 400 ml combined with subcutaneous injections of gaseous ozone in the lymphatic zone. Patients with trophic ulcers were administered external ozonization in plastic bags. By the end of the treatment all the patients noted significant improvement of their well-being with clinical evidence of the lack of pains or cramps in calf muscles and warming of the extremities. There were registered temperature and tissue PO2 and its blood volume. Intra-arterial application of ozonated solution of reopolyglucini is characterized by high treatment efficiency that allows to considerably reducing the duration of the treatment, quantity of necrotomies and emergency amputations.

CHANGES IN THE FUNCTIONAL RESERVES OF THE CARDIO-VASCULAR SYSTEM OF STENOCARDIAC PATIENTS TREATED WITH OZONE IN THE COMPLEX OF SPA THERAPY

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The aim of the present work was to study the effect of the ozone therapy method, under conditions of subtropical climate of the Caucasian Black seacoast, on the degree of mobilization and adaptation of the cardio-vascular system reserves in patients with stenocardia, in the complex of spa therapy. The ozonized physiological solution was prepared using the "Medozons" equipment. The course of ozone therapy included infusion of ozonized physiological solution (200 ml) at ozone concentration of 1,0 to 1,5 mg/L, 2 or 3 times a week, 5 to 9 sessions. 134 patients with cardio-vascular pathology, 80 (the major group) with stenocardiac problems were examinated and treated. All the patients underwent hemodynamic estimation, ECG and veloergometry test. In the analysis of the chest reography, cardiac index, hemodynamics study etc the optimization of the blood circulation process was obtained. Improvement in the heart function was confirmed by the evaluation of ECG: reduction or disappearance of ischemic changes as well as by the veloergometry test. The analysis of the obtained data can confirm the high efficacy of ozone therapy method as a training factor that increases the functional reserves of the cardio-vascular system. Ozone application obviously increases the functional economy of the blood circulation system (reduces the use coefficient of myocardial reserves and the oxygen need of myocardium) and its capacity (increasing organism's tolerance to physical loads, increasing the scope of made work and left ventrical's efficiency index).

DYNAMICS OF OXYGEN METABOLISM KINETIC INDICES IN STENOCARDIAC PATIENTS THROUGH APPLICATION OF OZONE THERAPY IN BALNEOLOGY

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In clinical sanatorium, 80 persons with ischemic heart disease: stable stenocardia of tension 1-11-111 received ozone therapy. The patients' age was 38 to 78 years. In the group under examination there were men (64,4 %) and women (35,6 %). All the patients received traditional spa treatment: climate therapy, dietetic therapy, hydrotherapy, balneotherapy, kinetotherapy, physiotherapy and pharmacological therapy if required, in combination with ozone therapy in the form of intravenous infusions of ozonized physiological solution. The aim of this work was to study the dynamics of oxygen metabolism kinetic indices in the course of ozone therapy by using a method of transcutaneous polarography (role of oxygen consumption processes, state of microcirculation, oxygen balance in intercellular space, functional energy reserves of cells and the ratio aerobic and anaerobic processes). All the patients were subdivided according to the initial state of tissue respiration into three groups: the first group - patients with inhibition of tissue respiration processes; the second group - patients with initially normal tissue respiration processes and the third group - patients with stimulation of tissue respiration processes. The results have shown that

ozone therapy for patients with initially inhibited (the biggest group, typical for patients with cardio-vascular pathology) and normal tissue respiration processes contributed in the correction of transport process pathology and utilization of oxygen by tissue as well as in the normalization of the cell energy reserves. No reliable difference in the treatment of patients with initially stimulated tissue respiration processes was observed. The analysis of the indices of oxygen metabolism kinetics showed reliable efficacy of application of ozone therapy in the treatment of patients with cardio-vascular pathology in the spa treatment complex in humid subtropical climate.

THE INFLUENCE OF OZONE THERAPY ON HEMODYNAMICS IN PATIENTS WITH ISCHEMIC INSULT

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The potential of such a treatment in patients with ischemic insult depends on the condition of the cerebral and central hemodynamics. The interaction of these factors was studied in patients treated with intravenous ozonized normal saline solution (ONS) at ozone concentration of 300 mcg/L. 85 patients with ischemic insult have shown that positive ultrasonic dopplerography dynamics was marked in 79% of cases, in the acute period, and in 63% of cases in the restoration period of ischemic insult. It was shown a decrease in the intercerebral blood circulation asymmetry and in the circulatory resistance as well as an increase in the cerebral circulation reactivity and a functional restoration of forward and backward connecting arteries in the Willis circle. In this case linear blood velocity did not varied. The ONS infusions also promoted maintenance of the effective heart work. The stroke volume by the end of the treatment course has grown by 29% and the minute volume by 24%. The general peripheral circulatory resistance has decreased by 31%. As a whole, eukinetic type of circulation is by 1,5 times more often after ozone therapy. Ozone therapy vascular effects provide an increase in the cerebral circulation stability and appreciably solve a hemodynamics reserve problem in patients with ischemic insult.

THE INFLUENCE OF OZONE THERAPY ON THE CELLULAR IMMUNITY IN DISSEMINATED SCLEROSIS PATIENTS

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This work represents the results of immunologic status investigations in patients with disseminated sclerosis in response to ozone therapy, by comparison with a control group. The data were estimated by application a monoclonal antibodies (MCA) panel: LT4 (CD4), LT-DR (HLA - DR), LT22 (CD22), LT8 (CD8), LT3 (CD3). The ozone therapy treatment consisted of 5-6 infusions - every other day - of an ozonized isotonic solution with ozone concentration being 290-350 mcg/L of physiological saline solution. Before the treatment of ozone therapy, the patients with disseminated sclerosis had, in difference to healthy persons, increase figures of CD22 in 100 % of cases, increase in CD8 in 60 % (in 40 % the data were in the normal range), decrease of CD4 in 70 %. These changes are inherent characteristics of autoimmune pathology, as disseminated sclerosis is. After the ozone therapy, CD22 increased in 60 % of cases, though in 40 %, CD22 decreased to the normal levels, and this phenomen is due to individual reactions toward ozone therapy. CD8 increased in 100 % of cases, whereas CD4 regained the normal values in 70 % of patients. One month after finished the ozone therapy, all the indices returned to their original levels. Both normalization of CD4 levels and activation of cellular immunity processes proved the validity of the inclusion of ozone therapy into the comprehensive treatment of disseminated sclerosis and, furthermore, the need for repeated courses of ozone therapy.

THE INTRA-ARTERIAL METHOD OF INFUSION OF OZONATED SOLUTIONS IN THE TREATMENT OF PATIENTS WITH DIABETIC ISCHEMIA OF THE LOWER EXTREMITIES

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For treatment of 12 patients with diabetic ischemia of the lower extremities the method of intra-arterial injection of ozonated solution of reopolyglucini was applied.

There were registered PO_2 of skin, temperature of tissues and its blood volume. Intra-arterial application of ozonated solution of reopolyglucini is characterized by high treatment efficiency that allows to considerably reduce the duration of treatment, quantity of necrotomies and emergency amputations.

OZONE THERAPY IN THE COMPLEX TREATMENT OF PATIENTS WITH DIABETIC ANGIOPATHIES OF THE LOWER EXTREMITIES

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There were observed 48 patients with diabetes mellitus of moderate stage of severity complicated with diabetic angiopathy of the lower extremities. In the 1st group (20 patients) there was applied traditional treatment, in the 2nd group (28 patients) - intravenous injection of ozonated 0,9% NaCl solution, additionally. There were registered PO_2 in tissues, their temperature. The application of 0,9% NaCl ozonated solution in the complex therapy of diabetic angiopathy of the lower extremities promotes more significant, in comparison with traditional methods of treatment, increasing of oxygenation of damaged tissues.

OZONE THERAPY USED IN PATIENTS WITH DIABETES MELLITUS SUFFERING FROM INFLAMMATORY DISEASES OF THE LOWER EXTREMITIES

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The methods of intravenous, intra-arterial, intralymphatic and local application of ozonized physiological saline solution in the treatment of inflammatory diseases of the lower extremities in patients with diabetes mellitus have been developed and introduced into the practice in the Clinic of Hospital Surgery of the State Medical Academy of Voronezh. These methods give an opportunity to reduce the number of lower extremities amputations and to reduce the terms of wound healing.

THE METHOD OF LOCAL OZONE-OXYGEN THERAPY IN TROPHIC ULCER OF VENOUS ETIOLOGY

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A group of patients with ulcers of different severity stage and duration time was admitted for treatment in the form of local ozone-oxygen therapy. All the patients had received medicamental and local treatment without any success before.

The normalizing action of ozone-oxygen mixture on the reparative processes was observed in most of the patients with advanced badly healing ulcers.

The simplicity of this kind of therapy, lack of local and systemic side effects, significant decrease in treatment terms characterizes ozone therapy as an effective method of treatment for advanced badly healing ulcers.

THE CORRECTION OF THE HOMEOSTASIS AT THE EARLY STAGES OF CRITICAL BURNS BY OZONE TREATMENT

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Ozone combined with the antioxidant "Bioskan" in the treatment of 41 patients (18 to 63 years) with deep burns (burned surface from 30 to 98 %) were studied. Intravenous infusion of ozone solution

with an ozone concentration of 2000 - 4000 mcg/L and autohemotherapy (with single dose of ozone 500 - 700 mcg) were applied. At the same time the patients received 250 mg of "Bioskan", 2 - 3 times a day. The clinical investigations showed high effectiveness of the combined therapy. In comparison with the results of the control group. We observed a real decrease (by 1,5 - 2 times) of the products of lipid peroxidation, such as dienes and trienes congugates, Shiff`s Basis, leukocyte index of intoxication (by 3 times), level of middle molecule products (by 2 times) and also in the concentration of glucose, creatinin and urine in blood. The results of the acid-basis status and gas concentration in blood were improved too. The examination of the main group of patients showed that at the end of the treatment the contents of total albumin had increased 22 % (in the control group, 18 %) and a tendency in the normalization of the albumin fraction level is obtained. An increase in the number of total lymphocytes in peripheral blood, as well as a positive change of the correlation of immunoregulating subpopulations (increase in the level of T-helpers and decrease in the level of T-suppressers) were achieved. The use of ozone offers the possibility to reduce significantly the number of complications owing to critical burns.

EXPERIENCE OF OZONE APPLICATIONS IN THE TREATMENT OF ISCHEMIC HEART DISEASE

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The therapeutic problem of ischemic heart disease (IHD) is the actual one by increasing the disease rate. The medical ozone is used to normalize oxygen supply of tissues. By changing the lipid membrane structure ozone increases the deformability of the erythrocytes, thus improves the rheological properties of blood. Ozone develops a vasodilating action, improves oxygen release by oxidized hemoglobin what contributes to produce NAD-H.

In the railway hospital 20 patients with stable pressure stenocardia of II-III functional stage at the age of 60-65 were admitted for treatment. The patients received ozone therapy by infusing an ozonated physiological saline by intravenous dropping route (ozone concentration in the ozone/oxygen mixture - 800 mcg/l) every two days (the number of procedures - 10), at the same time as using nitrates, calcium antagonists. The indices of electrocardiography, echocardioscopy, veloergometry, blood serum lipid spectrum and lipid peroxidation were brought under control before and after treatment.

Positive results were received: decrease in the frequency of pain attacks, increase in the tolerance to exercise stress. In the course of treatment in the most cases it was observed the decrease in the lipid peroxidation processes and the intensity of antioxidant defense (according to the biochemiluminescence data), the increase in the total blood cholesterin due to alfacholesterin and the decrease in the atherogenic coefficient, the decrease in the blood coagulability, which was increased before treatment, the improvement of the rheological properties of blood.
Thus, ozone therapy is considered a promising method of treatment in case of ischemic heart disease.

ALTERATION OF SOME BIOCHEMICAL FIGURES IN PATIENTS WITH DIFFERENT VARIATIONS OF STENOCARDIA BY OZONE THERAPY

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Ozone therapy reduces the levels of cholesterin, very low-density lipoprotein, triglycerides, galactosa, mannosa of blood serum, stimulation of antioxydative response, rise of level cholesterin high-density lipoprotein in patients with coronary arteries sclerosis.

Ozone therapy in patients with angina and normal coronary arteriograms reduces the levels of cholesterin, very low-density lipoprotein, triglycerides. The figures of antioxidant response lipid peroxidation products and sugars (fructosa, mannosa, galactosa, glucosa) of blood serum do not reliably change. The nitrates therapy in control group patients with coronary arteries sclerosis causes the tendency to decrease high-density lipoprotein and increase low-density lipoprotein. The rest parameters do not change. The insulin of blood senim does not change in ozone therapy.

THE INFLUENCE OF OZONIZED PERFUSATE ON THE BLOOD OXYGEN-TRANSPORT FUNCTION DURING ARTIFICIAL BLOOD CIRCULATION

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At the prosthetics of heart valves in conditions of artificial blood circulation (AB) in control group (100 patients) the perfusate was oxygenated, and in investigated (150 patients) group ozone (0,08-0,15 mg/l) was added to the perfusate.

The comparative analysis of results of blood transport function research has shown that during ozonized AB, more ATPH utilizes in erythrocytes and more 2,3 DPHG forms, the number of their pathologically changed and destructive forms, of aggregating cells decreases and the use of oxygen by the organism of patients grows, the consequence of that is the reduction of lactate level in blood. Thus, ozone does not activate LP processes, but on the contrary, stimulates activity of antioxidant system.

THE USE OF OZONE IN THE COMPLEX INTENSIVE THERAPY OF PATIENTS WITH INFECTIOUS ENDOCARDITIS

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The treatment of endocarditis is one of the most difficult problems of modern cardiosurgery. The role of the surgical method grows in the decision of it.

From 1987 till 1994 in occasion 236 patients were operated for endocarditis, 21 from them died. Hospital mortality was 9%. In the clinic oxygen-ozonized solutions are widely used during the operations and in the postoperative period. The perfection of methods of treatment for infectious endocarditis has allowed to lower hospital mortality from 25% (1978-1987) to 4,8% (1988-1994). During the last 80 operations in occasion of infectious endocarditis there were no lethal outcomes.

INFLUENCE OF OZONIZED CARDIOPLEGIC SOLUTION TO THE CARDIODYNAMICS AT PROSTHETICS OF VALVES OF HEART

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The study of cardiodynamics in the postischemic period after prosthetics of heart valves in patients with infectional endocarditis in control group was conducted where during ischemia coronary channel was injected with common cardioplegic solution (CCS), and in the studied group the patients were injected with ozonized CCS.

The comparative analysis of investigation results has shown that ozonization of CCS provides fast and effective restoration of bioelectric and reducing function of heart, increases cordial index, improves delivery of oxygen to tissues, reduces the dose and duration of inotropic stimulation of cardiac muscle in the postoperative period.

APPLICATION OF VARIOUS METHODS OF OZONE THERAPY IN CHILDREN'S SURGERY

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We used medical ozone in a gaseous phase, in a kind of ozone saturated solutions and oleo ozone. The application of medical ozone in more than 300 patients at age from newborn till 14 years has shown its efficiency as a powerful antiseptic, immunomodulator, component of a detoxicational therapy, regulator of oxygen dependent processes, aid donor of molecular oxygen. The intrapleural, intra-abdominal introduction, hypodermic, intravenous, intra-osteal injections of

ozone and ozone-saturated solutions were used. Any complications due to application of ozone in therapeutic doses were not observed.

TREATMENT BY OZONE OF ARTHRITISES AND ARTHROSISES

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Arthritis and arthrosis are the most frequent diseases.

The pathology of joints arises in various periods of life from early children age up to a senile period. Under our supervision there were 42 persons.

13 patients of them had a sharp posttraumatic arthritis and 29 had deformations by arthrosis.

For treatment of posttraumatic arthritis we apply a daily irrigation of joint cavity (lumen) by an ozone-saturated solution of sodium chloride with the subsequent introduction of gaseous ozone, depending on the size of joint, in the doze from 1 to 40 ml.

At deforming arthrosis up to 14-16 injections resorted to the introduction only gaseous ozone into the joint cavity (lumen) in a day.

After 3-4 introductions of ozone pain in rest and at movement (traffic) abated, volume of movement (traffic) in joints increased. The remission after the treatment by ozone lasted from 3 till 6-7 months.

NEW POSSIBILITIES IN THE TREATMENT OF HIGHLY CONTAMINATED WOUNDS

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The authors have been using a new originally developed method of treatment of contaminated burn wounds of IIIa, IIIb-IV degrees. The method is based on the bactericidal effect of ozone applied locally in combination with the treatment in an air therapeutic apparatus with a bacterial medium.

The optimal parameters of local ozone therapy have been developed: concentration, exposition, frequency of procedures. The method may be used for the treatment of trophic ulcers and purulent wounds of different etiology.

The results of treatment of 79 patients with burn wounds of different size and depth have been analyzed. The received results have been compared with the results of the control group of patients having similar burn wounds (47 patients).

The received results have been analyzed and high efficacy of the new method of treatment of patients with purulent burn wounds of different depth have been shown.

SYNDROME OF LIPID PEROXIDATION IN TOXICAL MYELODEPRESSION IN ONCOLOGICAL PATIENTS

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In the present work the data on the condition of lipid peroxidation in 11 oncological patients with bone cerebral complications of antitumorous therapy are submitted. The treatment including ozone therapy has allowed improving the state of patients.

Classical methods of the laboratory control - the picture of blood, the level of albumin etc. - permitted to register the shifts of homeostasis not earlier than through 3-6 days after conducted treatment. The braking of pathologic lipid peroxidation was observed much earlier

Already on the 1st day the MDA level has decreased by 65% on the 3rd day the DK quantity has authentically decreased.

Thus, the changes of POL processes in oncological patients have primary character in relation to the other shifts of homeostasis and their valuation is more informative, in comparison with traditional laboratory methods.

OZONIZATION IN THE TREATMENT OF CHRONIC LIVER DISEASES

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The method of ozone therapy has been used for treatment of chronic liver diseases since 1993 and based on the bactericidal action of ozone, its properties to stimulate oxidoreduction processes, to normalize lipid peroxidation and antioxidative protective system.

Ozone therapy in the form of intravenous dropping infusion of ozonated isotonic solution 0,5% was used in 70 patients with hepatitis "B","C".

Through ozone therapy the positive dynamics of clinical disease picture, of biochemical and immunological indices of blood occurred in all cases.

Ozone therapy is considered as a promising method for treatment of hepatitis of virus etiology, helps to reduce the use of expensive drugs, can be used as a monotherapy with good clinical effect.

THE USE OF MEDICAL OZONE IN THE COMPLEX TREATMENT OF CHRONIC VIRAL HEPATITIS

A.V. Zmyzgova, N.P. Isaeva, E.A. Kulikova, P.A. Mukhin, L.N. Zemskova

70 patients with chronic viral hepatitis were taken for observation. All the patients received complex treatment including intravenous infusion of ozonated physiological saline or major autohemoozonetherapy. Ozone concentration - 4-7 mcg/ml. The number of treatments ranged from 10 to 18 1-2 times weekly, in case of active viral cirrhosis - up to 30 treatments. The complex of treatment included various individually selected immunomodulators and other pathogenetic agents as well as interferon preparations. Ozone therapy developed positive action on clinical-laboratory indices. Thus, ozone therapy in the complex treatment of chronic viral hepatitis resulted in a faster decrease in intoxication, virus elimination. Remission duration should be studied in different terms after the treatment.

OZONE THERAPY OF DUODENAL ULCER

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Ozone has been applied in the treatment of 290 patients with duodenal ulcer. High efficiency of the given method on attitudes Helicobacter pylori is shown. Significant decrease in the quantity of relapses in current of three years after the treatment is marked. Any complications were not observed.

INFLUENCE OF OZONE THERAPY ON THE DYNAMICS OF PSYCHO-PHYSIOLOGICAL FUNCTIONS OF PATIENTS WITH PEPTIC ULCER

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73 patients suffering from peptic ulcer (aged from 18 to 60; 41 men and 23 women) were taken for observation.

Psycho-physiological functions of 12 practically healthy persons were taken under control too. In the course of treatment, when pain disappeared, and at the end of treatment, particularly, it was found statistically true that the amplitude of skin-galvanic reaction diminished too; in spite of the fact that the period of time for latent reaction was not radically changed you can see a decrease in the so-called "indicators incoherence" of reaction time; the indices of attention improved statistically true; the amplitude of tremor decreased; insignificant increase of critical frequency of light gleams merging (in 3-4 cycle per second) though it was not statistically proved, together with other indicators confirmed the improvement of psycho-physiological parameters of patients suffering from peptic ulcer.

THE BOWEL FUNCTIONAL AND CHRONIC DISEASES TREATMENT BY IRRIGATIONS

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In the complex treatment of the patients with the bowel illnesses there was used the method of irrigation with the later adsorbent injection in the bowel cavity and taking biological preparations. The patients group consisted of 52 people. The diagnosis of the illness was based on the results of the common instrumental inspection including FGDS, rectoromanoscopy, colonoscopy, irrigoscopy.

All the patients were divided into three groups: a) with the functional bowel illnesses (syndrome of the irritated intestine -18 (34,6%), b) with the inflammation bowel illnesses (chronic catarrh proctitis -8 (15,4%/ chronic catarrh proctosigmoidit -20 (38,5%), c) with the anomaly of the bowel development (dolichosygma –6 (11,5%).

With the bowel illness one could observe:

- the pain syndrome 88,4% (46) cases
- constipation 55,7% (29)
- meteorism 52,0% (27)
- rumbling in the bowels 42,3% (22)
- diarrhea19,2%(10)
- constipation and diarrhea 23% (12)
- palpate bowel pain 73,0% (38)
- common weakness 36,5% (19).

The bowel irrigation was done 5 days each day, by gradual injection in the bowel till the spleen angle a special probe with the simultaneous giving and getting through it (in portions of 1,5 liter) herbal broth (chamomile, St. Johns wort, mint) up to 30 liter. With the later adsorbent polyphepan injection through the probe. The biological preparations such as: colybacterini, lactobacterini, bifidum bacterini were used through mouth. The period of treatment consisted of 12+/-1,5 days. To the moment of the discharge the pain syndrome disappeared in 87% (40 patients), constipation 89% (26 patients), meteorism 78,3% (18 patients), rumbling in the bowels 76,4% (19 patients), diarrhea 80% (8 patients), common weakness 94% (18 patients), constipation and diarrhea 83,4% (10 patients), palpate bowel pain 89,4% (34 patients). During the bowel irrigation there were not observed any cases of complication. The method was effective: 88,9% (16 people) - the 1st group patients; 85,8% (24 people) - the 2nd group patients; 83,4% (5 people) - the 3d group patients. The use of the bowel irrigation with the herbal broth and adsorbent injections in the complex treatment allowed: 1. To cut off the pathological symptoms of the bowel illnesses in 85,7% cases. 2. To achieve the positive effect in the treatment of patients with the bowel illnesses in 12+/-1,5 days.

OZONE THERAPY OF GASTRIC AND DUODENAL ULCER

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Smolensk

The effectiveness of ozone therapy has been studied in the complex treatment of 52 patients with gastric and duodenal ulcer. The mixture of ozone and oxygen (OOM) and distilled water enriched by ozone (O3) were used in their treatment. The intragastric method of injecting of OOM was used during 3-5 days, at first every day, then in 1-2 days till the formation of the cicatrice. The patients were also given the O3. In 3-5 days of the treatment the aches abated. In 6-8 days the contamination of helicobacter in the gastric mucous considerably decreased, morphologically there was a sharp decrease in neutrophile degenerative changes in the bioptates of the ulcer and the proliferation of the fibroblasts increased. The ozone therapy was contributed to the shortening of the treatment course of the ulcer disease.

OZONE IN THE TREATMENT OF DUODENAL ULCER

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Moscow

The method of ozone therapy (OT) was used in the treatment of ulcerous disease of duodenum in 95 people. Ozone therapy was used as intravenous infusions of ozonized solution isotonic NaCl three times a day with the doses of ozone 3 mg/l and administration of ozonized water (200 ml) once a day with the dose of ozone 7 mg/l. During the treatment we have seen the processes of reparation, which were manifested by increasing of the height of epithelial cells of gastric and duodenal mucous, by decreasing of infiltration of gastric and duodenal mucous, by neutrophile granulocyte and plasmocytes. The combination of ozone therapy and bismuth preparations leads to the stimulation of reparative processes and antihelycobacter effect, which appeared in 87% and 89% of cases. But the use of denol and bismofalk without OT results in its disappearance in 35-40% of cases. And therefore the use of OT is effective in the treatment of ulcerous disease of duodenum. It is necessary to study the influence of different methods of OT in ulcerous disease.

THE TREATMENT OF PATIENTS WITH CHRONIC GASTRITIS AND ULCEROUS DISEASE WITH OZONE THERAPY

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There were treated 30 patients (10 men and 20 women) at the age from 20 to 71 years 13 persons of which had chronic gastritis of B type, antral form, 10 persons with diffuse chronic gastritis of B type and 7 persons with ulcerous disease; the duration of disease ranged from 2 to 30 years. The treatment consisted of daily intake of ozonized water and ozonized oil, intravenous injection of ozonized physiological solution and procedures of minor autohaemotherapy by ozonized blood.

By the end of 3-4-weeks of treatment the improvement in all patients was marked. The clinical improvement was confirmed by dynamic endoscopic and cytomorphological investigation.

Thus, the first results of ozone application have shown that it is a rather effective method of treatment of patients with chronic gastritis and ulcerous disease.

THE INFLUENCE OF OZONE THERAPY ON THE LIVER FUNCTIONAL STATE

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Under our observation were 135 patients: 48 with chronic active hepatitis, 32 with chronic persistent hepatitis, 30 with non-specific reactive hepatitis and 25 with liver cirrhosis. The levels of lipid peroxidation, antioxidative defense, thrombocyte aggregation, intrahepatical microcirculation, liver-specific enzymes were determined before and after the course of therapy. Treatment revealed positive dynamics of all indices: decrease in lipid peroxidation, correction of antioxidative defense, improvement of intrahepatic hemodynamycs, liver functional tests.

EFFICIENCY OF OZONE/OXYGEN THERAPY IN THE COMPLEX TREATMENT OF DIABETES MELLITUS

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The study of new methods of treatment for diabetes mellitus is one of the most actual problems of a modern medicine. The purpose of this work was to study the efficiency of ozone therapy in the complex treatment of patients with diabetes mellitus.

To solve the problems stipulated in our work the complex of clinical-laboratory methods of investigation was used, carried out in dynamics with patients of diabetes mellitus.

84 patients with diabetes mellitus of 1 and 2 type have been examined.

Ozone therapy was performed by two methods:

1) Intravenous dropping infusion of ozonated physiological saline;

2) Rectal application of ozone/oxygen mixture.

The course of ozone therapy consisted of 7-15 procedures.

After the course of ozone therapy the following results have been achieved: decrease or disappearance of complaints in the majority of patients, glucose level of blood was lowered up to

26%, of glucosylated hemoglobin up to the norm, of lipoproteids HD up to 14,8%, of triglycerides up to 12,4%. The treatment helped 30% of patients of lower dose of the insulin injected up to 16%, as well as 26% patients with diabetes mellitus 2 type to lower the dose of sugar reduced preparations up to 32%.

THE SYSTEMIC THERAPEUTIC ACTION OF OZONE BY MEANS OF CONTINUOUS-FLOW RECTAL INSUFFLATIONS

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The developed method of systemic ozone therapy in the form of continuous-flow rectal insufflations of ozone/oxygen mixture in combination with other methods of ozone application (per oral application of ozonized water, acupuncture ozone therapy, minor ozonated autoheamotherapy) was used as a basic treatment on 32 patients with diseases of circulatory system: ischemic heart disease, obliterating atherosclerosis of the low extremities; diseases of nervous system: vegetovascular dystonia; diseases of digestive system: peptic ulcer and chronic gastritis. 16 patients of control group received only conventional medicamental treatment.

The received results indicated clinical efficiency of the above-mentioned methods of ozone therapy.

The experimental-functional data testified to a decrease in the lipid peroxidation products, an increase in the activity of antioxidative protective system, a normalization of the indices of lipid metabolism, an improvement of the rheological properties of blood as well as the parameters of coagulation system. It is important to know the total dose of ozone used to keep the pro- and antioxidant systems under express dynamical control.

OZONE THERAPY OF PERIPHERAL NERVOUS SYSTEM PATHOLOGIES

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The work presents the results of the treatment of 162 patients with peripheral nervous system pathologies followed at the Ozonetherapy Department of Nizhny Novgorod of Regional Medical Diagnostic Center.

The treatment of patients with ischemic neuropathies and diabetic polyneuropathies consisted of intravenous infusions of ozonized physiological saline and/or rectal insufflations of ozone-oxygen mixture. In the patients with neurological displays of backbone osteochondrosis in the course of treatment there were included paravertebral injections of ozone-oxygen mixture.

95% patients had positive clinical effect. The improvement of function of peripheral nerves was confirmed by means of electroneuromiography. Thermographic picture normalization and pulsatile blood flow intensification have been observed. Moderate hypocoagulation changes took place in haemostatic system after the ozone therapy course.

Apparently the efficiency of ozone therapy on peripheral nervous system pathologies is caused by improvement of blood circulation and also analgesic and anti-inflammatory effects of ozone.

THE USE OF OZONE THERAPY FOR TREATMENT OF ANGIOPATHIES OF NERVOUS SYSTEM

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The studied pathogenetic mechanisms of therapeutical action of ozone to increase the oxygenation of tissues indicated that the application of ozone has perspectives for correction of macro- and microcirculation in case of angiopathies of nervous system.

Experimental and clinical investigations showed that parenteral infusion of an ozonated physiological saline induced the distinct restoration of peripheral circulation and improvement of microflow. The attention was drawn to the stabilization of arterial pressure, increase in the perfusion pressure gradient, significant increase in the peripheral body temperature. It was observed the improvement of microflow properties of blood cell membranes. The optimization of

microflow was confirmed at the morphological level by positive repair dynamics of tissue functional elements. At the Department of Ozonetherapy of the Regional Medical Diagnostic Center 44 patients with dyscirculatory encephalopathy of atherosclerotic genesis at the age from 60 to 84 were admitted for treatment. Ozone therapy was performed by infusing an ozonated physiological saline intravenously and rectal insufflations of an ozone/oxygen mixture.

The analysis of clinical results confirmed the efficiency of ozone therapy in the given pathology: the decrease in the intensity of headache and head noise, the normalization of night sleep, the improvement of workability.

Thus, ozone therapy can be considered a pathogenetic remedy in the treatment of diseases of nervous system, in the genesis of which blood supply insufficiency and nervous tissue ischemia are of great importance. Ozone therapy develops a positive effect also in case of compression ischemic neuropathies and diabetic polyneuropathies.

OZONE THERAPY OF NEUROLOGIC CONDITIONS OF SPINE OSTEOCHONDROSIS

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There were treated 84 patients with different syndromes of spine ostechondrosis: 46 patients with vertebrogenic lumboischalgia and 38 patients with discogenic radiculopathy, which received ozone therapy by combining minor ozonated autohaemotherapy (5000 mcg/l) and paravertebral infusion of ozone/oxygen mixture (20 ml; 5000 mcg/l) which is proved to be the most effective treatment. One cycle of ozone therapy consisted of 8-10 treatment sessions daily. This approach was used in combination with medicamental therapy and physiotherapy.

Most of the patients of main group already after 3-4 procedures reported a decrease in pain feeling that allowed to reduce the dose used or to refuse using analgetics. At the end of cycle of ozone therapy the intensity of pain syndrome decreased more than doubly.

The efficiency of ozone therapy in patients with vertebrogenic pain syndromes is to be related with direct oxidation of algopeptides, elimination of root ischemia, prostaglandin synthesis.

THE STATE OF CEREBRAL HAEMODYNAMICS IN PATIENTS WITH MIGRAINE WITHIN THE CYCLE OF OZONE THERAPY

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We observed 34 patients with migraine: in 9 cases - with aura, in 25 cases - without aura, which underwent ozone therapy by infusing an ozonated physiological saline intravenously. One cycle of ozone therapy consisted of 8-10 treatment sessions. The ozone concentration used was 1200 mcg/l. This type of therapy was performed on the basis of complex treatment.

In patients suffering from migraine with aura ozone therapy resulted in a reliable decrease in the lineal blood flow velocity as compared with control group, a significant increase in the blood flow asymmetry, particularly in middle brain artery; the "music tones" disappeared in patients suffering from migraine without aura, the blood flow asymmetry did not exceed 5%. A decrease in venous dyscirculation occurred in all the patients.

The normalization of cerebral haemodynamics was correlated with a decrease in the headache intensity, a decrease in the reactive anxiety (Speelberg-Test), and restoration of vegetal homeostasis.

OZONE IN DERMATOLOGY: MYTH OR REALITY

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Ozone has been using in the medicine for more than 80 years. Its application and biological action is so broad that some people are not sure in this reality. Summarizing our personal experience of OT use in dermatological practice for eight years we can report that it is high enough efficient in the most of treated dermatoses - herpes, acne, eczema, pyoderma, alopecia, ulcus cruris venosum, lichen ruber planus, neurodermatitis, localized scleroderma, psoriasis etc - more than 500 patients

in all: clinical recovery and considerable improvement from 40% to 100% of all cases. Best therapeutic results are registering when OT is prescribing at the beginning of dermatose's acute stage or form. Adding that it is easy in use, inexpensive, safe, providing stable enough follow-ups we consider that it's almost an ideal therapeutic approach for outpatient dermatological practice and, we believe, is worthy to be wider used.

MINOR AUTOHAEMOTHERAPY WITH OZONE IN THE COMPLEX TREATMENT OF WOMEN SUFFERING FROM CHRONIC GONORRHEA

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21 women (aged from 15 to 44 years) with chronic gonorrhea were taken for observation. Ozonated autoblood was injected by an intramuscular route daily or every two days (4 injections pro one treatment cycle). At the same time all the patients received local medicamental treatment of the damaged areas. On the next day after the 2nd injection of ozonated autoblood the patients received antibiotic therapy, the duration of antibiotic therapy ranged from 7 to 10 days. The indices of spontaneous biochemiluminescence in therapy dynamics testified to positive action of the performed treatment on reactivity of the peripheral blood neutrophiles. This kind of therapy did not develop any negative effect on the natural resistance of organism and immunity state confirmed by proteinogramm, lysozyme activity and serum blood immunoglobulins A, M, G.

Thus, the results indicated that minor autohemoozonetherapy in combination with other methods can be successfully used for treatment of chronic gonorrhea in women.

THE USE OF MEDICAL OZONE IN THE COMPLEX TREATMENT OF CHLAMYDEOUS INFECTION

A.N. Zmyzgova, N.P. Isaeva, E.A. Kulikova, L.N. Zemskova, P.A. Muhkin, E.I. Ivanova, V.Ya. Zaitsev

We observed 128 patients with chronic chlamydeous infection with disease duration from 1 to 6 years. Chlamydeous infection associated with other urogenital infections (herpes, cytomegalovirus, mycoplasma, ureaplasma etc.) was registered in 83,6%, chlamydiosis associated with other virus infections (virus hepatitis, Epstein-Barr virus) - in 20,3%.

All the patients received complex ozone therapy in the form of major ozonated autohemotherapy. The number of treatment procedures ranged from 10 to 15 1-2 times weekly depending on associated pathology. Besides, the exactly dosed ozone/oxygen gas mixture was applied in the form of rectal insufflations, instillations and subconjunctive injections.

The treatment complex included various immunomodulators, antioxidants and other pathogenetic agents. Antibiotics were prescribed only in case of positive dynamics of immunological indices and improvement of microbiogenesis for a short time, in combination with immunomodulators.

The complex ozone therapy in patients with associated chronic urogenital infection led to improvement of immunity indices, restoration of functional activity of immunocompetent cells, normalization of biocynosis that resulted in liquidation of acute or chronic (in the phase of episode) inflammatory urogenital processes and elimination of causative agent.

EXPERIENCE WITH LOW OZONE CONCENTRATIONS IN THE DERMATOLOGY

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The efficiency of low ozone concentrations using on patients (53 men) with different dermatitis was studied. The ozone/oxygen (or ozone/air) mixtures were used for treatment of sores in the sealed polymer chamber. The ozone concentration was 10-50 mg/m^3; the procedure duration was 10 min for the ozone/oxygen mixture and 30 min for the ozone/air mixture. It was enough to make 3-8 procedures for the visible effect of ozone. The obtained results allow considering ozone therapy as the perspective method for dermatology.

THE INFLUENCE OF OZONE THERAPY ON THE PRO- AND ANTIOXIDANT SYSTEMS IN PATIENTS WITH LUPUS ERYTHEMATOSUS

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Lupus erythematosus is the most dangerous diffuse disease of connective tissue with insufficiently studied pathogenesis. The use of ozone in this case is based on the "erythrocyte" mechanism of its action. The use of ozone/oxygen mixture in the complex treatment of integumentary forms of lupus erythematosus resulted in disappearance of clinical symptoms in 50% of patients, significant improvement - in 45%, improvement - in 5%. To evaluate the effect of ozone therapy we have studied the pro- and antioxidant systems, which directly participated in the process of lipid peroxidation. The conducted investigations indicated that the complex determination of primary (diene conjugates) and final (Shiff's bases) products of lipid peroxidation and antioxidant activity of blood is considered a high-informative method of laboratory control of ozone therapy in case of lupus erythematosus.

THE USE OF OZONE FOR TREATMENT OF DISEASES OF PARODONTIUM

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There was a clinical observation of two groups of patients with diagnosis of generalized parodontitis of medium and high degree.

In the main group (56 persons) for treatment of parodontitis we used medical ozone before and after the operation.

The second group (49 persons) was treated traditionally.

The speeding up of epithelization was observed while using ozone locally.

It lets take out the stitches on the 5^{th} day in the main group and on the $7\text{-}8^{th}$ day in the test group.

The clinical observation showed that the use of medical ozone gives an economic effect due to the reduction of the period of treatment and the exclusion of antibiotics and expensive equipment from the complex therapy of parodontitis.

OZONE IN THE TREATMENT OF CHRONIC URETHRITIS

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The experience of treatment of 16 patients with chronic non-ghonoreal urethritis is given in the submitted work. The increased effectiveness of treatment was obtained due to ozone irrigation of urethra.

The objective data were proved by endoscopic and laboratory investigation. Any side effects were not observed.

THE POTENTIAL USE OF SODIUM HYPOCHLORITE IN ACUTE EXOGENOUS POISONING

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Moscow

Sodium hypochlorite (SH) (0,03% and 0,06% solution) was used in 170 patients with acute poisoning. A positive effect was noted in toxicogenic stage in alcohol and methemoglobin-inducing agents intoxications. And the combination of SH with hemosorption was associated with intensification of "middle molecules" (MM) sorption and with the significant improvement of arterial and capillary blood oxygenation. In the somatogenic stage the decrease of MM level in blood and similar changes of blood acid-alkali state were observed. Besides, the major decrease of intoxication leukocyte index and neutrophil index shift were noted. Blood rheology improved. The

use of SH in complex detoxication therapy allowed reducing mortality, decreasing a risk and duration of pneumonia.

APPLICATION OF OZONIZED CRYSTALLOIDS IN THE TREATMENT OF CYSTITIS

O.V. Firsov, B.V. Semenov, E.I. Eremin
Voronezh

The effectiveness of the ozonized 0,9% sodium chloride solution by local application was investigated in the treatment of acute and chronic cystitis. The received results have proved the effectiveness of ozone therapy, particularly in such cases when cystitis is caused by the non-sensetivity of the microorganisms to the majority of antibacterial medicines.

OZONIZED SOLUTIONS OF CRYSTALLOIDS IN THE TREATMENT OF ACUTE PURULENT PYELITIS COMPLICATED BY UROSEPSIS

B.V. Semenov, O.V. Firsov, E.I. Eremin
Voronezh

The intravenous treatment with ozonized 0,9% sodium chloride solutions has been applied within the intensive therapy of obstructive pyelitis patients.

The effectiveness was controlled by general-clinical and immunologic tests. The findings demonstrated the effectiveness of ozone therapy within a group of patients.

THE COMPLEX TREATMENT OF SEVERE FORMS OF PSORIASIS (COMBINATION OF ERYTHRODERMIA AND ARTHROPATHY)

T.K. Loginova, O.A. Mashkov, G.J. Sharapova, H.U. Vasileva, N.I. Kotkov
Moscow

A complex treatment was performed in 38 patients with severe forms of psoriasis (combination of erythrodermia and psoriatic arthropathy): plasmapheresis, cryodestruction of psoriatic plaques, cryotherapy of psoriasis-affected joints, peroral enterosorbent FAS-E, pathogenic therapy.

A positive effect was shown in 31 patients leading to regression of psoriatic skin lesions, disappearance of arthritis signs, improvement of laboratory results.

KINETICS OF THROMBOCYTES AGGREGATION IN ACUTE PANCREATITIS AND ACTION OF AERIONS

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Saransk

In 24 patients with acute pancreatitis the changes in the ADF- and FAT-induced kinetics of aggregation of thrombocytes in comparison with aggregation of thrombocytes in patients (15 persons) of control group were investigated.

The application of complex treatment in patients with acute pancreatitis of aerions renders an expressed stimulating effect at the level of functional activity of thrombocytes. A sharp increase in sizes of aggregation degree, maximum speed and time of aggregation was thereby found out in such a manner that on physiological functions the thrombocytes of patients with acute pancreatitis became comparable with the thrombocytes of healthy people.

OZONE THERAPY IN GYNECOLOGY

V.M. Zuev
Moscow

The scientific data concerning the application of ozone therapy in obstetrics and gynecology are very rare. Such properties of ozone as its antimicrobial, virus lythic, immunomodulating,

desensibilisating and biochemical effects are highly promising for the treatment of gynecologic patients.

We examined and treated 180 patients with the following disorders: acute and chronic inflammations of uterus and uterus appendages of bacterial, virus and mycotic etiology, genital herpes and cytomegalia, infertility and early miscarriages and the patients after the surgery as well.

Ozone therapy has proved to be effective in respect to herpes virus 2 and cytomegalovirus, chlamidia and mycoplasm (82% and 69% respectively), helps to establish the level of cell and humoral immunity, considerably accelerates the reduction of inflammation processes by developing the certain compensatory-adaptive reactions in tissues.

SOME RESULTS AND PERSPECTIVES FOR DEVELOPMENT OF OZONE THERAPY IN OBSTETRICS AND GYNECOLOGY

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The mechanisms of therapeutic action of ozone have been successfully used in the gynecological practice for a long time, particularly in inflammatory diseases of small pelvis, spontaneous abortion, late gestosis, pregnancy anemia. Experiments on animals have provided evidence on ozone safety for both mother and fetus that means: ozone does not affect morphogenesis and differentiation of fetus tissues. Ozone doses used were determined on the basis of experiments in vitro. The results of the conducted experiments were evaluated on the basis of lipid peroxidation and antioxidant protective system status. The received results speak to ozone action on the most important link of pathogenesis, namely prooxidant/antioxidant misbalance. Further clinical investigations on over 500 patients with gestational complications indicated a correction effect of ozone therapy on the immunological, hormonal, metabolic indices of homeostasis. The complex health-improving effect of ozone therapy should be studied regarding possible correction of extragenital pathologies in pregnant women. The most actual is the problem of ozone application in the oncogynecology. The technical aspects include the development of new methods of ozone therapy, new devices intended for intracavitary application of ozone, the improvement of control methods of treatment and methods of exact gas dosage.

THE CLINICAL AND LABORATORIAN ASPECTS OF OZONE APPLICATION AS A COMPONENT OF COMPLEX TREATMENT OF FEMALE GENITAL INFLAMMATORY DISEASES

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The present investigation concerns the study of ozone therapy effect on the course of female genital inflammatory diseases. The method of ozone application presented intravenous infusions of ozonized NaCl saline. 70 patients were treated, control group included 30 patients.

The effectiveness of treatment was evaluated according to the results of clinical observation and the number of laboratory data. The middle course of the disease was noted in the basic group in comparison with the control one.

The laboratory test showed the following: LP activity in the control group was maintained, tendency to decreasing Tr/Ts index and phagocytosis indices (spontaneous chemiluminescence, induced chemiluminescence - SHL, IHL) was marked and the level of the middle molecules remained increased. The basic group showed normalization of LP, optimization of Tr/Ts index, increase of phagocytic activity, decrease in the middle molecule level. The above-mentioned allows drawing a conclusion about the effectiveness of ozone therapy as a component of complex treatment of female genital inflammatory diseases.

THE IMMUNOMODULATING ACTION OF MEDICAL OZONE IN CASE OF INFLAMMATORY DISEASES OF FEMALE GENITAL ORGANS

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In the present work the results of estimation of immunomodulation properties of medical ozone are submitted. Ozone therapy of female genital inflammatory diseases by the method of intravenous infusions of ozonated saline was carried out at a pathology of the top floor and by vaginal flowing processing by an ozone-oxygen mixture at the pathology of the bottom floor.

The evaluation of patients' immune status through intravenous introduction of medical ozone has been conducted by the following parameters: luminol-depended chemiluminiscence of neutrophiles of blood with study of reserve capacity, factors of humoral and cellular immunity. The increase in the functional activity of basic effector of inflammation is marked, adequate dynamics during the treatment of such parameters as circulating immune bodies and immunoregulatory index that at the end has resulted in the optimization of close and remote results in the investigated group. The authentic distinctions are received in comparison with traditional methods of treatment.

The local application of medical ozone was carried out by the method of vaginal flowing processing by an ozone-oxygen mixture by using an intravaginal device. The action of various ozone concentrations (from 2000 mcg/l to 5000 mcg/l) was studied by varying the exposition from 5 to 10 minutes. The control of treatment efficiency was carried out according to the bacteriological and bacterioscopical data and the factors of local immunity of mucous membranes. The death of pathological microorganisms is marked. As to the factors of local immunity, the decrease in vaginal secret of immunoglobulin G concentration, growth of lisocim and MPO parameters results in the stabilization of balance coefficients.

The received results demonstrate immunomodulating effects of medical ozone as at common and its local application, on the basis of that it is possible to make a conclusion about the efficiency of ozone therapy in female genital inflammatory diseases.

OZONE THERAPY IN CASE OF OBSTETRIC TRAUMATISM

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The highest rate of pyo-inflammatory complications in the puerperal period was observed in the group of puerperas with obstetric traumatism of soft tissues of genital tract (the rupture of the cervix uteri and perineum, colporrhexis). The analysis of the spectrum of aerobic and anaerobic microflora in the samples taken from the vaginas of these puerperas showed a 100% contamination with bacteria. The treatment of the vagina by using the method of flowing irrigation with ozone-oxygen mixture allowed reaching the effect of clearance of opportunistic pathogens and pathogenic bacteria.

OZONE THERAPY IN CHRONIC PLACENTAL INSUFFICIENCY

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The method of ozone therapy was used in the treatment of pregnant women with chronic placental insufficiency. The introduction of ozone was carried out via intravenous infusion of the ozonated physiological saline solution. Placental insufficiency was diagnosed by means of dynamic ultrasound survey. The fetus state was examinated by Doppler and cardiotocography methods. 48 pregnant women treated with ozone therapy were examinated at the beginning and at the end of the gestation term from 26 to 37 weeks. Control group was represented by 20 pregnant women that were treated by means of common therapeutic methods. Doppler examination (S/D ratio, PI and RI) was carried out one, two and three weeks post treatment in the uterine, spiral and umbilical (including the end-branches) arteries. The morphological examination of placenta from the women treated with ozone revealed an activation of the compensatory processes, i.e. the increased number of vessels, their remarked plethora; in some cases the development of the villi angeomatosis foci was detected. Thus, the use of ozone therapy at the beginning, at the middle of the third gestation trimester was shown to be an effective tool for the treatment of placental insufficiency. That was approved by the activation of uteroplacental circulation, improvement of the endocrine function (increased production of estradiol, progesterone, placental lactogene and

prolactine). The normalization of placental metabolic processes was observed. The improvement of the PLO indices and disappearance of hypercoagulation were also shown.

OZONE FOR PROPHYLAXIS OF SEPTIC COMPLICATIONS IN OBSTETRICS

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The frequency of operation has a tendency towards an increase in the number of women in our clinics, operated by cesarean is 19,2 %. The increase in the quantity of operation leads to the rise in the number of septic complications after the operations. The purpose of this investigation was to develop an effective, available and inexpensive method of prophylaxis of the septic complications after the cesarean. 110 women, who had delivery through cesarean, were subject to prospective observation. All patients were treated on the 1st, 2nd, 3rd and 4th postoperative day by intravenous ozone solution (2 mg/L ozone in 400 ml 0,9 % NaCl). The results showed that the use of ozone solution could reduce the number of septic complications (endometritis, fever etc.) by 30% in the postoperative period. The prophylactic effect is more expressed among the women with urgent surgical intervention and among the patients from the group with a high risk of infection. Along with the decrease in the total number of complications, the decrease in the most serious complications with high temperature has been observed. No cases of side effects or intolerance have been observed during the use of ozone. Thanks to the simplicity of this therapy, its moderate cost and high efficiency, ozone therapy can be recommended for use in any obstetrical hospital.

OZONE TREATED WOMEN AFTER CESAREAN AND INTERFERON PROFILE

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The incidence of delivery by cesarean is rising across the last years with the resulting rise in the number of postoperative infectious complications. Understanding the immune status and interferon profile of such patients and developing new methods of adjuvant immunomodulating therapy is of great interest in the infection control. The aim of this work is to study the influence of ozone therapy on the interferon status after cesarean and the possible prophylactic effect of intravenous (i.v.) ozone application on the rates of the postoperative infectious complications. 78 consecutive women, who had delivery by cesarean, were treated on the 1st, 2nd, 3rd and 4th postoperative day by i.v. ozone solution (2 mg/L ozone in 400 ml 0,9% NaCl). Interferon was measured in all patients before and after the ozone treatment. Control group did not receive ozone therapy. The immunomodulating action of ozone therapy was shown. The levels of alpha- and gamma-interferon in the ozone treated group were higher than in the control group. The ozone treated group had significantly less infectious complications after the cesarean compared with the traditionally treated group.

THE IMMUNE STATUS DURING OZONE THERAPY FOR THE PROPHYLAXIS OF INFECTIONS AFTER CESAREAN

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The percentage of delivery by cesarean in our clinics averages 17-20%. The postoperative infectious complications are still of great importance in the overall morbidity and mortality of these patients. The aim of this paper is to study the influence that ozone therapy exerts on the immune status after the cesarean and the possible prophylactic effect in the postoperative infectious complications. 80 women, who had delivery by cesarean, were treated on the 1st, 2nd, 3rd and 4th postoperative day by intravenous ozone solution (2 mg/L ozone in 400 ml 0,9% NaCl). All the patients have received before and after the treatment a complete blood count and T and B cell differentiation. Immunoglobulins levels, phagocyte activity were also studied. The control group did

not received ozone therapy, only traditional methods. The ozone treated group had significantly less infectious complications after the cesarean compared to the control group. The immune modulating action of the ozone therapy was shown in the treated group, the mean quantity CD4+cell and phagocyte activity was higher in comparison with the control group.

OZONE EFFECTIVENESS IN THE TREATMENT OF CHRONIC FETAL HYPOXIA

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The aim of this work is to study the clinical value of ozone therapy in the treatment of fetal chronic hypoxia, in obstetrical management and in perinatal outcome. Study design: Number of patients 132, 34 controls. Number of infants 132, 34 controls. Monitoring by ultrasound, Doppler, steroid, cardiotochography, morphological investigation of placenta. Ozone therapy was applied by intravenous administration of ozonized solution of sodium chloride. In the ozone group, normal state of fetus was obtained much earlier and was supported with high intensification of adaptive mechanism, showed in placenta blood circulation. High effectiveness of the ozone treatment in fetal chronic hypoxia was obtained. No complications or any negative reactions to ozone therapy were registered.

THE POSSIBILITY FOR PARENTERAL APPLICATION OF OZONE IN EARLY POSTNATAL PERIOD IN CASE OF INFECTIOUS COMPLICATIONS

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The investigation included 34 patients in which in the early postnatal period (7-10 days) various puerperal diseases were diagnosed: endometritis (n=15), suppuration (n=5), mastitis (n=5), different septic diseases owing to the caesarean section (n=3), thrombophlebitis of the lower extremities (n=3), retained placenta (n=4). At the same time some patients (n=8) showed postpartum psychosis. In 70% of cases the postpartum pathology had a behavior characteristic. The patients of the main group (n=19) received traditional treatment in combination with daily intravenous ozonated saline infusions (8-10 procedures) with an ozone concentration of 1100 - 1200 mcg/L. In control group (n=15) was performed antibacterial, detoxification and desensibilization therapy as well as the use of physical factors. The results demonstrated the efficiency of ozone therapy in combination with traditional treatment in patients with infectious postpartum complications. In this group the values of endogenic intoxication were decreased much faster as well as erythrocyte sedimentation rate, leukocytosis, index of leukocyte intoxication and level of middle molecule peptides. Also the pH-value had a tendency to balance. The lipid peroxidation values confirmed the important action of ozone by increasing the antioxidant defense system. The efficiency of ozone therapy used in combination with traditional treatment was demonstrated by reducing hospital care time by 5 days.

THE USE OF OZONE THERAPY IN THE TREATMENT AND PROPHYLAXIS OF INTRAUTERINE FETUS INFECTION

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102 pregnant women belonging to a risk group of intrauterine infection of fetus and newborn child were examined. According to laboratory data (lipid peroxidation levels and antiradical protection, immune status, presence of infectious agents in amniotic fluid, phagocytic activation) the patients were divided into 2 groups, the 1st group comprising 60 patients with intrauterine infection carriers without inflammation signs, and the 2nd one including 45 patients showing the signs of an inflammatory process. Each group was treated with the traditional methods (including antibiotics and immunomodulators). All the women received an ozonated physiological saline solution, intravenously, daily for 3 - 5 days. 200 ml of the physiological saline solution was ozonized,

bubbling an ozone/oxygen mixture with an ozone concentration of 800 mcg/L at a rate of 1 L/min, during 15 min. This study revealed the maximum positive therapeutic effect in patients of the 1st group. The normalization of the lipid peroxidation and the antioxidative system index were observed in 72 % of women of this group. The normalization of the immune system index was obtained in 42 %. Patients with uteroplacental blood flow disturbances showed a tendency to improve the doppler index (78 %). Besides, no one case of infectious agent transmitted to fetus was revealed in the 1st group. The described effects were not revealed in the 2nd group. Thus, application of ozone has maximum effect when a mother shows the presence of TORCH-infection agents without the signs of inflammatory process activation. This lets us lessen the percentage of intrauterine fetus infection.

OZONE THERAPY IN THE COMPLEX TREATMENT IN FATNESS-ASSOCIATED GESTATIONAL COMPLICATIONS

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It is known that obesity causes a great number of pregnancy complications. Traditional methods of prophylaxis, which are used in the treatment of obese pregnant women, are not highly effective. The aim of our investigation was to increase the efficiency of prophylaxis of fatness-associated gestation complications by including ozone therapy in the complex treatment of this pathology. 118 pregnant women with various stage of obesity were examined. The first group (71 patient) received ozone therapy as a part of a complex treatment in the form of intravenous infusion of ozonated physiological saline solution (ozone concentration in the ozone-oxygen mixture: 400 mcg/L) daily, 5 days. The second group (47 patients) received traditional prophylactic treatment. In the first group there were registered an increase in the activity of the antioxidant enzymes as well as a decrease in the total serum lipids, normalization of blood coagulability in women with hypercoagulation. After comparing the course of pregnancy and labor in the two groups of patients an evident positive clinical effect of ozone therapy was achieved. Ozone treated patients had lower rates of gestosis, premature delivery, prolonged gestation, powerless labor activity. Thus, these results allow us to consider ozone therapy in the complex treatment as a promising method of prophylaxis of fatness-associated gestation pathologies.

OZONE THERAPY IN BACTERIAL VAGINOSES AND COLPITIS

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Traditional medical therapy for the treatment of bacterial vaginoses and recurring non-specific colpitis requires different medications, which may cause allergic reactions and is often ineffective. 40 women with this pathology were treated by an ozone-oxygen mixture using the intravaginal device and the ozone therapy apparatus "Medozons - BM". All patients treated by local application of medical ozone (5-10 procedures) were also admitted to daily rectal insufflation of 1000 ml of ozone-oxygen mixture with an ozone concentration of 3000 mcg/L. Antibiotics were prescribe only in cases of chlamidiosis. No other preparations were used. Control group included 20 patients treated with traditional methods. Results: in 85% of patients a well-manifested sanogenic effect of ozone revealed by microscopy (diminishing of vaginal discharge and improvement of its quality) was observed. The PCR-analysis showed elimination of infectious agents in 55% of cases. A specific antibody titer decreased (was marked in 65% of patients). In 70% of patients normalization and improvement of local vaginal and general immunity indices were observed. All positive effects of ozone therapy were stable and exceeded the results of the traditional treatment. No allergic and side effects were registered. Conclusion: combination of local and systemic application of medical ozone is a highly effective, safe and economical method for the treatment of bacterial vaginoses and non-specific colpitis.

THE EXPERIENCE OF TREATMENT OF ANDEXIS PYOM INFLAMMATION BY LAPAROSCOPY AND OZONE THERAPY

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Inflammatory diseases of appendages of uterus remain the most widespread women diseases.

Ozone therapy and laparoscopy were used for the treatment of 16 patients. The operative laparoscopy with the use of ozone therapy is in a number of cases an alternative to laparotomy at the treatment of purulent diseases of uterus appendages that is especially important in patients of young age. Adequate postoperative management of patients with application of intravenous ozone therapy promotes the success of the operation.

Up to and after the treatment immunologic investigation of patients was made: definition of leukocytes quantity, total number of T-lymphocytes, quantity of T-helpers, T-suppressers and blood examination. In all the examinated patients reduction of absolute number of T-helpers, B-lymphocytes natural killers and high contents of zero cells was marked.

The ozone therapy was conducted in the form of intravenous and local applications. Ozonized physiological solution (concentration 1,5-2 mg/l) was intravenously injected. The local ozone therapy was conducted by ozonides with peroxide number 800. The repeated immunologic investigation was conducted after the treatment: positive dynamics of immunologic status - increase of the general contents of leukocytes and lymphocytes, increase of the number of T-lymphocytes for the account of T-helpers, increase of the contents of B-lymphocytes and natural killers as well as reduction of quantity of zero cells was marked.

OZONE THERAPY IN THE SURGERY OF WIDESPREAD FORMS OF GENITAL ENDOMETRIOSIS

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Endometriosis is one of the most widespread diseases of women. The heaviest clinical displays are characteristic to the widespread forms of genital endometriosis. The conservative treatment at overwhelming number of these patients is inefficiently, and the leading method of treatment is surgical.

Our experience is based on more than 1500 operative laparoscopies of patients with genital endometriosis.

With the purpose of restoration of immunologic balance and local tissue respiration, infringed at patients with endometriosis, ozone therapy in the form of saturation of peritoneal liquid and intravenous infusions was conducted.

Thus, the perfection of technology of laparoscopic operations at surgical treatment of patients with the widespread forms of genital endometriosis with application of ozone therapy during the operations and in the postoperative period permits to considerably improve the rehabilitation of patients and to conduct the preventive maintenance of infectional complications in postoperative period.

OZONE THERAPY OF PUERPERAL ENDOMYOMETRITIS

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Puerperal endomyometritis is the most frequent form of purulent-septic infection.

In the group of patients with the "clean" form of subinvolution of uterus, puerperal and postoperative endomyometritis irrigations of uterus cavity by ozonized solutions were applied. 40 persons formed the main group and there were 20 patients in control group, in which the used solutions were not ozonized.

The data of conducted supervision have found out that the involution of uterus was marked by 2,3 times faster in the main group; cytochemical researches have found out the expressed tendency to the normalization of parameters.

The given study of products also testified to activation of processes in the system of antioxidizing protection of organism. The positive effect of this treatment method was proved by the facts of clinical and laboratory investigations, cytochemistry, peroxidation of lipids and microbiological tests.

THE VALUE OF OZONE THERAPY IN COMPLEX TREATMENT SPONTANEOUS ABORTION

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For the treatment of patients suffering from genital herpes and cytomegalia we used the method of ozone therapy. Investigation and treatment of 68 women was made. Immunological investigation has revealed reduction of immunity parameters, in particular, attributes of insufficiency of antiviral protection.

The ozone therapy was conducted in the form of intravenous infusions of ozonized physiological solution (concentration 1,5-2,5 mg/l), the procedures were conducted in a day. At clinical displays of genital herpes local applications of ozonides with peroxide number 800 were applied. A control virusologic and immunologic investigation was made after the treatment. Positive changes of all immunologic parameters were marked. Thus, ozone therapy is an effective method of treatment of women suffering from spontaneous abortions.

THE CONDITION OF LIPID PEROXIDATION AND ANTIOXIDANT SYSTEMS OF ORGANISM THROUGH OZONE THERAPY IN COMPLEX TREATMENT OF GESTOSIS

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One of the main pathologies in obstetrics is late gestoses of the pregnant. From 11% to 16,6% of the pregnant women suffer from the disease.

The research is dedicated to the study into the influence of ozone therapy on the process of different forms of late gestoses of the pregnant. The method of ozone administration is the intravenous infusion of ozonized 0,9% NaCl. It is stated that the patients who have undergone the above-mentioned treatment suffer much less from gestosis.

The biochemical test has shown that in patients undergoing the treatment the normalization of the index of lipid peroxidation and enzyme antioxidant activation takes place.

THE EFFECT OF OZONE THERAPY ON THE COAGULATION BLOOD SYSTEM IN THE COMPLEX TREATMENT OF GESTOSIS

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The pathogenesis of late toxicosis is connected with the increased aggregation capacity of blood cells and spasm impairments of arteriole. The effect of ozone therapy was studied on different forms of late gestosis in pregnant women.

Tromboelastogramm data of 40 women treated with ozone have shown hypercoagulation returned to normal level in 70% cases. The decrease of coagulation was observed in 37% cases in the group where the patients were not treated with ozone therapy.

OZONE THERAPY OF ANEMIA DURING PREGNANCY

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The frequency of asiderotic anemia ranges from 15 to 99%. One of causes of asiderotic anemia is peroxide destruction of erythrocytes' membranes. We have elaborated and applied the new method of treatment of anemia by utilization of ozone. After the ozone therapy an increase in hemoglobin to 22% was marked, after the traditional therapy hemoglobin increased to 11%. The secretion of placenta after the ozone therapy was normal (87%), after the traditional therapy (42%). The correlation between LP/AOS after the ozone therapy was normal (98%), without ozone (56%). After the ozone therapy the period of the treatment was shortened by 1,67 without damage of therapy effect. Ozone is the active medicine for the treatment of anemia.

THE INFLUENCE OF MEDICAL OZONE ON THE HORMONEPRODUCTIVE FUNCTION OF FETOPLACENTAL COMPLEX IN PATIENTS WITH THREATENED ABORTION

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Ozone therapy was used for the treatment of 90 patients with threatened abortion. Taking into account the positive influence of ozone therapy on the function of placenta, the complex of treatment in the form of intravenous infusions of ozonized saline (course dose of ozone - 200 mcg) was done.

The control over the changes in the number of hormones through ozone therapy has shown that patients receiving ozone therapy had an average week gain of progesterone level by 3,3 times, placental lactogen by 2,4-3,6 times higher than in patients treated with traditional methods.

It may be related to the improvement of blood microcirculation in placenta under the influence of ozone.