

HYPERBARIC OXYGEN THERAPY.

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Annotation: Hyperbaric oxygen therapy -a method of saturating a patient with oxygen (oxygen therapy) under high pressure for therapeutic purposes, carried out in hyperbaric pressure chambers. It is used in the treatment of decompression sickness or air embolism. The therapeutic principle is associated with a significant increase in the partial pressure of oxygen in biological tissues in comparison with pure oxygen achieved by breathing under normal atmospheric pressure.

Keywords: therapeutic principle, atmospheric pressure, oxygen transport, erythrocyte hemoglobin, clostridial myositis.

The effect is manifested in an increase in the oxygen capacity of the blood: during hyperbaric oxygenation, oxygen transport by plasma increases significantly, while when breathing oxygen under atmospheric pressure, oxygen transport is limited by the binding capacity of erythrocyte hemoglobin, and only a small part of oxygen is transported by plasma, since at atmospheric pressure, erythrocyte hemoglobin is practically saturated with oxygen. to the limit, this way of transporting oxygen to the cells cannot be used beyond the limit.

The American Society for Undersea and Hyperbaric Medical Society (UHMS) recommends a fairly wide application of the method, including for carbon monoxide poisoning complicated by cyanide poisoning, clostridial myositis (gas gangrene), crush syndromes, detachment syndromes and others acute traumatic injuries, high blood loss, intracerebral abscesses, necrotizing soft tissue infections, refractory osteomyelitis, delayed radiation damage, skin plastic surgery, thermal burns, frostbite. Previously, the same organization recommended the use of hyperbaric oxygen therapy for pathologies of the endocrine glands, pathologies of pregnancy and newborns.

In our opinion, the HBO effect can be explained by two possible mechanisms. An unconditional increase in the level of progesterone is associated with a stimulating effect on the central mechanisms of neuroendocrine regulation of the menstrual cycle, which is confirmed by a parallel significant increase in the content of luteinizing hormone. On the other hand, HBO has a beneficial effect on the functional state of the follicular apparatus, in particular the dominant follicle, as evidenced by a significant increase in estradiol secretion and the rate of initiation of the dominant follicle. According to A.G. Zhirikin, in the mechanism of the positive action of oxygen lies its ability to restore respiratory enzymes inhibited as a result of hypoxia at the tissue level, which is especially pronounced in hypothyroidism. The ability of hyperbaric oxygen to improve cell metabolism, increase oxygen delivery, improve organ hemodynamics is one of the main pathogenetic mechanisms of the stimulating effect of HBO. According to I.V. Proshin mechanism of action of HBO on the generative function of the female

In clinical studies, the effectiveness of the method in decompression sickness is unambiguously confirmed. Seven conducted clinical studies have not yet confirmed the positive effect of carbon monoxide poisoning [1]; one study did not clarify the question of the possibility of treating gas gangrene using the method [2]; two studies suggest a possible healing effect in the treatment of traumatic wounds, but more research is needed to be more precise[3]; seven studies have shown that the use of barotherapy reduces the risk of death and coma in brain injuries, but do not answer the question of whether the rehabilitation and subsequent recovery of patients with the

use of barotherapy is better [4]; two studies on the treatment of thermal burns using the method did not reveal a positive effect [5].

There are no high-quality studies on the treatment of necrotizing soft tissue infection with hyperbaric oxygen therapy [6]. There is some evidence for the effectiveness of barotherapy in delayed radiation injury (soft tissue and bone necrosis) [7].

FDA, confirming efficacy in the treatment of decompression sickness, warns of lack of evidence of efficacy and safety in the treatment of HIV, Alzheimer's disease, asthma, facial paralysis, traumatic brain injury, cerebral palsy, depression, myocardial infarction, hepatitis, migraine, multiple sclerosis, parkinsonism, spinal cord injuries, sports injuries, stroke [8]. It is also indicated that the use of a hyperbaric chamber can cause mild unpleasant symptoms: sinus pain, ear pressure, joint pain. Severe consequences are possible in the form of paralysis, air embolism (gas bubbles in the blood that interfere with blood circulation). Research Institute for Emergency Medicine named after Sklifosovsky and SSC Federal Medical Biophysical Center named after N.I. A. I. Burnazyan, the FMBA of Russia in Moscow became the first Russian medical institutions to use an experimental method of treating COVID-19 using hyperbaric oxygenation (HBO).

According to scientists from Tel Aviv University, hyperbaric oxygen therapy increases the length of telomeres and reduces the immune aging of isolated blood cells. They found that in elderly people, when pure oxygen is received in a hyperbaric pressure chamber, the length of telomeres increases by 20%, which, in their opinion, can be used as a way to combat aging. [9] However, this assumption does not stand up to criticism, since these data can be interpreted in another way: "... as a protective reaction to powerful oxidative (oxygen) stress, the body ejected relatively young lymphocytes from the bone marrow depot" due to the activation of hematopoiesis. active precursor cells. They have longer telomeres because they divide less. When blood is analyzed, a misleading impression is created that telomeres have lengthened. In fact, there was a massive death of old cells and the release of previously unused "sleeping cells" into the blood in response to stress.[10] The result of such "rejuvenation" is deplorable - the pool of reserve hematopoietic precursor cells is reduced, and hence the body's ability to resist aging in the future. [

Among the many reasons that contribute to the formation of the pathology of the reproductive system, a significant place is occupied by the pathology of the thyroid gland (N.I. Fadeeva, 2000). Hypothyroidism has an adverse effect on the reproductive process, especially its erased forms, in which miscarriage, stillbirth and the birth of defective offspring are observed. Explicit or subclinical forms of hypothyroidism are observed, with a targeted examination, in 10-50% of women with recurrent miscarriage. Pathogenetic mechanisms of the formation of miscarriage in hypofunction of the thyroid gland are diverse. With overt or subclinical hypothyroidism, an ovarian insufficiency syndrome is formed, mainly manifested by insufficiency of the luteal phase of the menstrual cycle or anovulation (A. Esedova, T. Khashaeva, 1999).

The immunological relationships that are established between the mother and the fetus, due to the fact that the syncytiotrophoblast and the basal decidua are in direct contact, and also due to the fact that there is a constant supply of fetal cells into the bloodstream to the mother, create protection for the fetus from the mother's immune mechanisms triggered by paternal antigens (T.A. Starostina, 2002). With hypofunction of the thyroid gland, these immunological mechanisms are severely impaired and can cause severe complications leading to developmental disorders and fetal death. It has been proven that miscarriage and thyroid pathology cause a number of associated shifts in the immune and endocrine systems of the body, manifested by insufficiency of the luteal

phase of the menstrual cycle, inhibition of cellular and humoral immunity, and an imbalance of immunoregulatory cells (M.E. Zeltser, 1999). The state of the pituitary-ovarian system and thyroid status were studied in 105 women with diffuse enlargement of the thyroid gland and a history of miscarriage. The functional state of the thyroid gland was assessed by the content of thyroxine (TD triiodothyronia (T3) and thyroid-stimulating hormone (TSH) in the blood serum. In order to study the state of the pituitary-ovarian system, the concentration of follicle-stimulating hormone (FSH), luteinizing hormone (LH), prolactin (Prl), estradiol (Eg), progesterone (P) on the twenty-first day of the menstrual cycle.

Endocrinological studies were carried out in the laboratory of radioimmunoassay of the Research Institute of Endocrinology of the Academy of Sciences of the Republic of Uzbekistan. We used standard kits for the immunoradiometric determination of hormones from the Czech company.

Based on the anamnesis data, patient complaints (weakness, drowsiness, tendency to constipation, sweating, menstrual irregularities, bradycardia, anemia) and the results of determining the content of thyroid hormones and TSH, consulting an endocrinologist in 56 women, the functional state of the thyroid gland was regarded as hypothyroid and 49 as euthyroid. The immune status was studied in 21 patients with insufficiency of the luteal phase of the menstrual cycle against the background of hypofunction of the thyroid gland in the dynamics of treatment with hyperbaric oxygen and in 69 pregnant women with hypofunction of the thyroid gland who were admitted to the hospital with clinical manifestations of threatened spontaneous miscarriage at a gestational age of 5 to 12 weeks. Of these, 23 pregnant women in the dynamics of treatment with hyperbaric oxygen, 22 in the dynamics of treatment with dufaston and 24 with a combination of hyperbaric oxygen and dufaston. There was a threat of miscarriage before 12 weeks of gestation (30.6%) of the ongoing pregnancies. The main quota in the structure of miscarriage was spontaneous miscarriages of early terms (64.6%). The effectiveness of hyperbaric oxygenation in the treatment of luteal phase deficiency in women with hypothyroidism. The effect of hyperbaric oxygenation was assessed by the dynamics of clinical, immune and endocrine parameters in patients with luteal phase deficiency and hypothyroidism. The course of treatment with hyperbaric oxygen therapy consists of 6-8 sessions, once a day, in the mode of 1.2-1.5 ata, saturation for 30 minutes. The content of hormones and immune parameters were determined two weeks after one course of hyperbaric oxygen therapy.

The dynamics of the parameters of the pituitary-ovarian system and the thyroid status were studied before and after the treatment with hyperbaric oxygenation. The examined women with insufficiency of the luteal phase of the menstrual cycle and hypofunction of the thyroid gland were divided into 2 groups. The initial (before treatment) state of the thyroid gland was regarded as euthyroid in 20 and as hypothyroid in 21. When prescribing hyperbaric oxygenation, thyroid hormone replacement therapy was not carried out, which made it possible to judge the therapeutic effect of hyperbaric oxygenation and the effect of hyperbaric oxygen on the secretion and excretion of sex and thyroid hormones, gonadotropins. Immunological studies were carried out in the immunomorphology group of the laboratory of gene diagnostics of the Institute of Immunology of the Academy of Sciences of the Republic of Uzbekistan, head. lab. PhD YES. Musakhodjaev.

The study of the subpopulation composition of lymphocytes was carried out using monoclonal antibodies to differentiation antigens manufactured by CJSC MedBioSpektr (RF) using the method of indirect rosette formation. Indicator test systems were prepared by loading stabilized erythrocytes with monoclonal antibodies. studied lymphocytes with receptors for monoclonal antibodies CD3+ (T-lymphocytes), CD4+ (T-helpers/inductors), CD8+ (T-suppressors/inducers),

CD20+ (B-lymphocytes). CD16+ (NK-natural killers). Immunoglobulins of class A, M, and G were determined by the method of radial immunodiffusion according to G. Mancini, using monospecific sera of the Russian production of the Moscow Institute. Gamaleya. The content of immunoglobulins was expressed in mg/%. The phagocytic activity of neutrophils was studied by the ability of neutrophils to absorb latex particles. We used melamipo-formaldehyde latex (1.5 microns) produced by the Russian Research Institute of Biological Instrumentation according to the Kudryavtseva method.

Ultrasound examination was performed on the apparatus of the company Aloka SSD 260 in the Obstetric complex No. 1. hyperbaric oxygen therapy was carried out on the basis of the Obstetric Complex No. 1 of the city of Tashkent (6-8 sessions in the mode of 1.2-1.5 ata, saturation 30 minutes). Statistical data processing was carried out on an IBM Pentium computer using the STATGRAPHICS application package. Clinical data were processed according to the principle of normal distribution using Student's t-test, calculating the arithmetic mean and its standard error. At the first stage of the research, we conducted a retrospective analysis of the birth histories for 1998 in the Obstetric Complex No. 1 of the Sergeli district of Tashkent. In 1998, 2009 births took place in the obstetric complex. The frequency of miscarriage in relation to the total number of births was 17.6%. As for the structure of miscarriage, the frequency of spontaneous miscarriages in early terms was 64.6% (228 people), late terms 13.6% (48 people) and preterm birth was noted in 77 women, which amounted to 21.8%. 232 (65.8%) had one miscarriage, 83 (23.5%) had two miscarriages, and 38 (10.8%) had three or more miscarriages. Most often, spontaneous abortion occurred at the age of 26-30 years (43.3%) and 21-25 years (27.7%), in the vast majority of cases, the second pregnancy ended in spontaneous abortion, in 140 women (39.7%). The results of the analysis of the possible causes of miscarriage indicate an extremely aggravated premorbid background. There is a high incidence of anemia (88.7%), mostly mild to moderate, and diffuse enlargement of the thyroid gland (84.7%). The average age of menarche in women suffering from miscarriage was 13.9 ± 1.1 years. The study of the gynecological history revealed that before the onset of pregnancy in 68 (19.3%) infertility was noted in women and 26 (8.31%) had inflammatory diseases of the genitals.

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