

The Therapeutic Plasmapheresis and Ozone Therapy in Patients with Chronic Salpingoophoritis and Infertility before *in Vitro* Fertilization (IVF) Program & Embryo Transfer



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Abbreviations: IVF: *In Vitro* Fertilization; PA: Plasmapheresis; OHS: Ovarian Hyperstimulation Syndrome; PF: Platelet Factor

Opinion

Currently, despite scientific advances in medicine, the reproductive health of the population is progressively deteriorating. The problem of infertile marriage acquires a special social significance in connection with the increase in the level of overall mortality of the population. *In vitro* fertilization (IVF) followed by transfer of the embryo (ET) to the uterus has become firmly established in medical practice as a recognized method of infertility treatment. The most common is infertility due to chronic inflammatory diseases of the internal genital organs. Numerous studies indicate that chronic inflammatory diseases of the genitals not only lead to tubal peritoneal infertility due to the adhesive process, but also cause polysystemic changes in the organism. Thus, a decrease in immunoreactivity, the circulation of pathological autoantibodies, endointoxication has a significant negative effect on the results of the IVF program and the course of pregnancy. A special role is assigned to increasing the coagulation potential of the blood in this contingent of patients, most often occurring as a chronic DIC syndrome. This is of particular importance due to the fact that, firstly, hormonal stimulation of superovulation during the IVF program is the most powerful activating factor in the initiation of the pathological microthrombosis in the conditions of the already existing hypercoagulable shift.

In this regard, it seems necessary to search for methods that will help to eliminate possible causes of ineffective IVF attempts and reduce the risk of complications during the program and the further course of pregnancy. An effective method of

rehabilitation of this group of patients is the use of therapeutic plasmapheresis and ozonotherapy, which, due to detoxification, rheo- and immunocorrecting effects, has a significant effect on all pathogenetic factors that impede the successful implementation of the IVF program, and also allows to significantly reducing the medicinal load in the process of correcting the revealed disorders. The objective of this investigation was to assess the role of the therapeutic plasmapheresis (PA) and ozonotherapy in patients with chronic salpingoophoritis and tubo-peritoneal infertility before *in vitro* fertilization (IVF) program & embryo transfer. The study group consisted of 112 patients selected according to the following criteria: tubal-peritoneal form of infertility due to chronic salpingoophoritis; presence in anamnesis from 1 to 3 ineffective IVF attempts; absence of severe extragenital pathology; age up to 40 years. In 1st (main) group of women (62 patients) in the complex preparation for IVF was included PA and ozonotherapy course consisting of 3 procedures conducted at intervals of 1-3 days.

The PA was carried out on the apparatus «PCS-2» ("Haemonetics» USA). Conduction of PA was carried out with blood flow to the apparatus at a rate of 25-40 ml per minute, depending on the capacity of the catheter and the capacity of the vein. Rotation speed of the centrifuge "PCS2" is 7500 rpm, the plasma was removed at a rate of 15-30 ml min, depending on the rate of blood supply. Simultaneously with blood collection and removal of plasma, plasma substitution was performed with an ozonized physiological solution (400 ml with an ozone concentration of

1.5mg / l) and colloid (solutions of hydroxyethylated starch 6% with a molecular weight of 130/04) solutions in a ratio of 1.2: 1.0 to the volume of exfusion in the automatic mode of the apparatus. To obtain ozonized solutions, the "Medozon" apparatus (Russia) was used. In the 2nd (comparative) group of women (50 women) the preparation for IVF was carried out according to the traditional scheme, including the medical correction of hemostasis (low molecular weight heparin) and autoimmune disorders according to the standard methods.

Patients were examined using clinical and laboratory methods of investigation, including intravital computer phasometry of platelets. In the 1st group of women who after conducting PA and ozone therapy was showed a reduction in platelet aggregation by 30%, revealing of soluble complexes of fibrin monomers decreased by 70%. The level of activity of the protein C increased by 25%. Elimination of lupus antibodies (VA) occurred in 82% of women. The titer of von Willebrand factor after complex therapy with the use of PA and medical ozone has decreased in two times. There was a marked decrease in levels of thrombin-antithrombin (TAT) by 41% and platelet factor 4 (PF4) by 35%. The effect of plasmapheresis and ozone therapy was reflected in a significant change in the morphofunctional status of thrombocytes: the number of rest forms increased by 18% and the number of activated cells decreased by 17%. In the 2nd group of women, a control study of the hemostasis system was performed after appropriate medication correction in 22% of patients in connection with the detection of general hypercoagulation, platelet hyperfunction, and activation of intravascular coagulation and BA activity.

It was demonstrated, that therapeutic plasmapheresis and ozotherapy improve clinical symptoms, improves parameters of

hemostasis and the results of IVF- program. After the course of therapeutic plasmapheresis and ozonotherapy just before IVF-program the frequency of pregnancy in main group was 52% (in comparative group it was 40%).The frequency of reproductive losses in main group was 1.5 times lower. In the group of women who received medication before the program, the incidence of ovarian hyperstimulation syndrome (OHS) was 28%. In women of the main group (with the use of PA and ozonotherapy), the OHS developed 3.5 times less frequently. In this group of patients only mild and moderate severity OHS of was observed, whereas in the comparative group 4% of women developed severe OHS

Conclusion

As a result of the study, the feasibility of conducting PA and ozonotherapy for women with tubal peritoneal infertility for the purpose of preparing for IVF and ET was demonstrated. The conducted study showed high efficiency of using this technique for correcting the "hidden" activation of DIC, which contributed to a significant decrease in the activating effect of steroid hormones on the hemostasis system during the stimulation of superovulation and development of the embryo in early pregnancy. PA and ozonotherapy in the preparation of women with tubo-peritoneal infertility for IVF and PE, contribute to the onset of pregnancy, significantly reduce reproductive losses and the incidence of OHS, as well as fewer complications of pregnancy in the I and II trimesters compared to a group of women who received traditional medical therapy.



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