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Clinical And Transfusiological Assessment Of Prp-Therapy In The Treatment Of Men's Infertility In Non-Structural Azoospermia

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Abstract. *Non-obstructive azoospermia (NOA) is one of the most complex forms of male infertility, caused by a primary disruption of spermatogenesis. The purpose of this study was the clinical and transfusiological assessment of the effectiveness and safety of PRP-therapy in patients with non-obstructive azoospermia. The study included 60 patients with confirmed NA, who underwent autologous PRP intrastiticular administration. Clinical, hormonal, ultrasound, and laboratory indicators were assessed before treatment and 3 and 6 months after treatment.*

Keywords: *non-obstructive azoospermia, male infertility, PRP therapy, autologous platelet-enriched plasma, transfusiology.*

Relevance. Male infertility accounts for 40-50% of infertile marriages, with non-obstructive azoospermia diagnosed in 10-15% of men with reproductive dysfunction. This form of the condition is characterized by severe damage to the spermatogenic epithelium and the low effectiveness of traditional medical treatments [1-3].

Current approaches to treating NOA include hormonal therapy, microsurgical sperm retrieval techniques (micro-TESE), and assisted reproductive technologies. However, even with these methods, the likelihood of obtaining viable sperm remains limited[4, 5].

In this regard, the search for new regenerative and minimally invasive treatment methods is relevant. Autologous platelet-rich plasma, containing growth factors (PDGF, TGF-β, VEGF, IGF), cytokines, and biologically active substances, is of interest for stimulating angiogenesis, cell proliferation, and restoring testicular tissue function. From a transfusion perspective, PRP therapy is a biologically safe method, as it utilizes the patient's autologous tissue [6, 7].

Purpose of the study. To evaluate the clinical efficacy, hormonal changes and transfusion safety of PRP therapy in patients with male infertility due to non-obstructive azoospermia.

Materials and methods. A prospective single-center clinical study was conducted for the period 2023-2025. The study included 60 men aged 22 to 45 years (mean age 34.6 ± 5.2 years) with a diagnosis of non-obstructive azoospermia, confirmed by at least two spermograms and hormonal examination.

Inclusion criteria were confirmed non-obstructive azoospermia; normal or reduced testicular volume; absence of vas deferens obstruction; and written informed consent.

Exclusion criteria also included: obstructive azoospermia; acute inflammatory diseases; oncological and autoimmune diseases; and coagulopathy.

PRP was obtained from 20 ml of the patient's venous blood using a two-stage centrifugation method. Platelet concentrations were 4-5 times higher than baseline. Autologous PRP was injected intratesticularly under ultrasound guidance at a dose of 3-4 ml on each side. The procedure was repeated twice, 4 weeks apart.

The following assessment methods were performed: spermogram (WHO, 2021); hormonal profile (FSH, LH, testosterone); ultrasound of the scrotum; clinical observation; statistical data processing (SPSS 23.0, Student's t-test, $p < 0.05$).

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Results and discussion. Before treatment, all patients had no sperm in their ejaculate. The average FSH level was 18.4 ± 4.1 IU/L, LH 9.2 ± 2.3 IU/L, and total testosterone 11.1 ± 2.8 nmol/L.

Three months after PRP therapy, a decrease in FSH levels to 15.9 ± 3.6 IU/L ($p < 0.05$) was observed; an increase in testosterone levels to 13.4 ± 3.1 nmol/L ($p < 0.05$); the appearance of single spermatozoa in the ejaculate in 12 (20%) patients.

After 6 months, the following was revealed: the average FSH level decreased to 14.8 ± 3.2 IU/L ($p < 0.01$); testosterone level increased to 14.6 ± 3.4 nmol/L ($p < 0.01$); spermatozoa were detected in 18 (30%) patients, of which 6 patients had a concentration of more than 1 million/ml. Complications, infectious reactions and transfusion complications were not registered.

The obtained data confirm that PRP therapy has a positive effect on the functional state of testicular tissue. A decrease in FSH levels may indicate partial restoration of spermatogenesis, while an increase in testosterone may indicate improved Leydig cell function. From a transfusion perspective, the use of autologous PRP minimizes the risk of immunological reactions and infectious complications, making the method safe and reproducible. The results are consistent with international studies demonstrating an increased likelihood of sperm recovery using regenerative technologies in patients with NOA.

Conclusions:

1. PRP therapy is a safe and clinically proven treatment method for patients with non-obstructive azoospermia.
2. The use of autologous platelet-rich plasma helps improve hormonal profiles and restore spermatogenesis in some patients.
3. The appearance of sperm in the ejaculate in 30% of patients indicates the method's potential as an adjunctive therapy before ART.
4. PRP therapy can be considered a promising approach to regenerative andrology, requiring further multicenter studies.

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