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Innovative Approach to Fertility Restoration in Women of Late Reproductive Age with Low Ovarian Reserve

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ABSTRACT

Background. *Fertility restoration in women of late reproductive age with low ovarian reserve is one of the pressing challenges in modern reproductive medicine. The decline in ovarian reserve, combined with age-related changes, limits the chances of natural conception, increases the risk of reproductive failures, and prompts specialists to seek practical and safe stimulation methods.*

The aim of the study. *Evaluation of the Effectiveness of PRP Therapy in Combination with a Clomiphene-Containing Drug for Fertility Restoration in Women of Late Reproductive Age with Low Ovarian Reserve*

Materials and methods. *The study included 110 women of late reproductive age with low ovarian reserve. Sixty women with low ovarian reserve received PRP therapy (Group I), and 50 women with meagre ovarian reserve received PRP therapy in combination with a clomiphene-containing drug (Group II). The control group consisted of 30 healthy women. All patients underwent a comprehensive clinical laboratory, hormonal, immunological, and instrumental examination.*

Results. *The results showed that the use of PRP therapy in combination with a clomiphene-containing drug in women of late reproductive age with low and extremely low ovarian reserve led to ovulation in 75.3% and 72.5% of women, respectively, and pregnancy in 73.3% and 62.5% of these groups.*

Conclusion. *The use of PRP therapy in combination with a clomiphene-containing drug in women of late reproductive age with low ovarian reserve led to a 2.2-fold reduction in infertility rates, a 2.2-fold increase in fertility restoration, and a fourfold reduction in treatment costs, highlighting both the medical and economic effectiveness of this approach.*

Keywords: *Platelet-Rich Plasma (PRP), Ovarian Reserve, Duinum®, Late Reproductive Age, Fertility Restoration.*

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INTRODUCTION

Diminished ovarian reserve (DOR) in women of advanced reproductive age presents a significant challenge in modern reproductive medicine, significantly limiting their fertility potential and posing considerable emotional and social burdens [1-5]. As the average age of childbirth rises, more women face DOR as a critical barrier to natural conception, often leading to early onset of menopause and reduced response to fertility treatments [6-10].

In recent years, interest has surged in exploring novel, less invasive approaches to address DOR, particularly those utilizing autologous biological materials, as they present fewer immunological risks and can enhance ovarian functionality [11-15]. Among these innovative methods, platelet-rich plasma (PRP) therapy has gained recognition for its potential to rejuvenate ovarian tissue, stimulate folliculogenesis, and possibly extend the reproductive lifespan of women facing DOR [16-20].

Emerging studies have shown that PRP may significantly impact ovarian function restoration. For instance, PRP injections directly into the ovarian tissue have been associated with improved ovulatory function and increased anti-Müllerian hormone (AMH) levels, a critical marker for ovarian reserve [21-25]. By enhancing the ovarian microenvironment and promoting cellular regeneration, PRP therapy offers a promising alternative or adjunctive approach to conventional fertility treatments [26-30].

Evidence also suggests that PRP therapy can improve ovarian response to stimulation, thereby increasing the likelihood of successful pregnancy, even in women with otherwise poor prognosis for conception [31-35]. However, despite these promising outcomes, several aspects of PRP's impact on ovarian tissue remain underexplored, including the exact mechanisms by which it influences cellular repair and the long-term effects on ovarian function and overall health [36-40].

Additionally, critical questions remain about the safety profile of PRP, including the optimal dosage, the frequency of administration, and potential risks associated with repeated treatments [41-45]. Another area of interest is the potential synergy between PRP and ovulation-stimulating medications, such as clomiphene citrate. Combining PRP therapy with a clomiphene-containing regimen may yield enhanced results, especially in increasing ovulatory cycles and improving pregnancy rates [46-50].

This study addresses the urgent need to develop effective treatments for DOR in women of advanced reproductive age, focusing on the combined application of PRP therapy and clomiphene. By investigating the role of growth factors within PRP and their interactions with ovarian tissue, alongside ovulatory stimulation with clomiphene, we aim to contribute to developing protocols that could improve reproductive potential in this demographic.

The study aims to evaluate the effectiveness of PRP therapy in combination with a clomiphene-containing medication for restoring fertility in women of advanced reproductive age with diminished ovarian reserve.

MATERIALS AND METHODS

The study included 110 women of advanced reproductive age with diminished ovarian reserve. Of these, 60 women with diminished ovarian reserve received PRP therapy (Group I), and 50 women with severely diminished ovarian reserve received PRP therapy combined with a clomiphene-containing medication (Group II). A control group consisted of 30 healthy women. All participants underwent comprehensive clinical-laboratory, hormonal, immunological, and instrumental examinations.

Inclusion Criteria: Women aged 36-43 years diagnosed with diminished or severely diminished ovarian reserve (defined by AMH levels and antral follicle count (AFC)), without active infections or inflammatory diseases, who voluntarily consented to participate in the study and PRP therapy, with no contraindications to its use.

Exclusion Criteria: Women under 35 or over 43 years of age, with oncological diseases or suspected malignancies, severe chronic diseases potentially affecting study outcomes (such as diabetes, liver or kidney diseases), refusal to participate, non-compliance with treatment recommendations, or allergies to PRP components.

Autologous platelet-rich plasma was prepared via centrifugation using certified centrifuges, blood collection kits, sterile tubes with anticoagulants, and PRP injection kits. Each patient's 20 ml of venous blood was drawn from the antecubital vein into sterile tubes with an anticoagulant. Blood tubes were centrifuged at 1500 rpm for 10 minutes, separating blood into erythrocytes, platelet-rich plasma (PRP), and platelet-poor plasma. The upper plasma layer was removed, and the middle PRP layer was transferred to a sterile tube, yielding approximately 2-3 ml of PRP.

PRP was injected directly into the ovaries under ultrasound guidance. Patients underwent transvaginal ovarian puncture. After antiseptic preparation of the vaginal and cervical area, a specialized needle was inserted through

the lateral vaginal fornices to the ovaries under ultrasound control. Each patient received 2-3 ml of PRP per ovary. This procedure was performed three times at one-month intervals under local anaesthesia (1% lidocaine). Patients were monitored for 1-2 hours post-procedure to assess any immediate reactions or complications and advised to avoid strenuous physical activity and sexual activity for 24 hours.

Group II combined PRP therapy with a clomiphene-containing medication to stimulate ovulation. Clomiphene dosing was adjusted for the women's diminished ovarian reserve. The stimulation schedule was as follows: for 21 patients (52.5%) with a 28-day menstrual cycle, one tablet daily was recommended from days 3 to 7; for 19 patients (47.5%) with a 26-day cycle, dosing was similarly advised from days 2 to 6. In the second cycle month, the dosage was increased to two tablets per day (100 mg) for 5 days, and in the third month, the dosage increased to three tablets daily (150 mg) from days 3 to 7.

The study was conducted as a controlled clinical trial, with a control group of healthy women showing no signs of diminished ovarian reserve. Statistical data processing uses descriptive statistics, including means and standard deviations. The Student's t-test and Mann-Whitney test were used to compare indicators between groups. Pearson correlation analysis was used to identify relationships between growth factors and other ovarian reserve parameters. Statistical significance was set at $p < 0.05$.

RESULTS

The mean age of women in the study was 39.5±3.2 years. All participants' average body mass index (BMI) was 26.7±3.1 kg/m². Data analysis showed significant differences in BMI values between the groups ($p < 0.05$). In Group I, women with low ovarian reserve had an average BMI of 25.9±2.8 kg/m². Group II, consisting of women with meagre ovarian reserve, had a higher BMI at 27.5±3.3 kg/m², suggesting a possible association between a marked decrease in ovarian reserve and an elevated BMI ($p<0.05$). In the control group, composed of healthy women with usual ovarian reserve, the mean BMI was the lowest at 24.8±2.6 kg/m². These BMI differences across groups highlight a potential connection between the degree of ovarian reserve reduction and BMI ($p<0.05$).

To evaluate the effectiveness of PRP therapy combined with a clomiphene-containing medication in ovarian revitalization for women of advanced reproductive age with low ovarian reserve, ovarian reserve levels, hormone levels, and growth factors were analyzed before and after treatment. The key indicators reflecting ovarian function and ovulatory potential are AMH levels and the antral follicle count (AFC).

In Group I, the mean AMH level was 0.76±0.09 ng/ml, and the mean AFC was 3.2±0.6. Three months post-PRP therapy, significant improvements were observed in ovarian reserve: AMH levels increased to 2.23±0.15 ng/ml ($p<0.001$), and the AFC rose to 6.4±0.8 ($p<0.01$). These results confirm the positive impact of PRP therapy on restoring ovarian function and enhancing reproductive potential in this Group.

In Group II, initial levels were even lower, with a mean AMH level of 0.28±0.04 ng/ml and a mean AFC of 1.7±0.4. However, significant improvements were also recorded post-PRP therapy: AMH levels rose to 1.65±0.07 ng/ml ($p<0.001$), and the AFC increased to 5.1±0.5 ($p<0.01$). While results in this Group were lower than in Group I, the positive trend indicates the effectiveness of PRP therapy even in women with a meagre ovarian reserve in Group II (Figure 1).

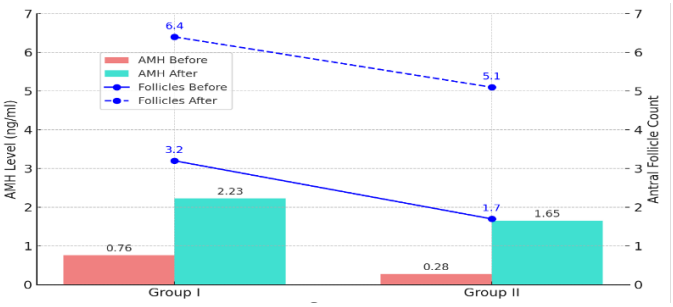

Figure 1. Ovarian Reserve Status Before and After Innovative Treatment in Study Participants.

In the control group, AMH levels and antral follicle counts remained stable: the mean AMH level was 3.45±0.25 ng/ml, and the antral follicle count was 8.6±1.1. Over the three-month observation period, no significant changes were observed in these indicators ($p>0.05$), confirming the stability of ovarian reserve and normal ovarian function.

The study results confirmed that PRP therapy is a practical, innovative method for improving ovarian reserve in women of advanced reproductive age with low ovarian reserve. Hormonal testing results showed significant changes in hormonal profiles after PRP therapy, indicating improved ovarian function.

Thus, the study results affirm that PRP therapy effectively enhances ovarian reserve in women of advanced reproductive age with low ovarian reserve. At the same

time, the lack of significant changes in the control group confirms that these improvements are indeed attributable to PRP therapy rather than natural fluctuations in these indicators.

Hormonal testing results showed significant changes in hormonal profiles post-PRP therapy, indicating improved ovarian function.

Before PRP therapy, FSH levels in Group I were 14.5±4.3 mIU/ml and 15.8±5.1 mIU/ml in Group II. After PRP therapy, FSH levels significantly decreased to 10.8±2.9 mIU/ml in Group I and 12.2±3.8 mIU/ml in Group II ($p<0.05$), indicating improved ovarian function and reduced need for stimulation.

In Group I, LH levels before PRP therapy were 13.6±3.2 mIU/ml, while in Group II, they were 13.4±4.0 mIU/ml. Post-therapy, LH levels increased to 9.3±1.6 mIU/ml in Group I and 10.8±2.5 mIU/ml in Group II ($p<0.05$), suggesting enhanced hypothalamic-pituitary system activity and the restoration of hormonal balance (see Table 1).

Table 1. Hormonal Study Results Before and After PRP Therapy in Study Participants, M±m.

Hormones	Group I, n=60		Group II, n=50		Control Group, n=30
	Before Treatment	After Treatment	Before Treatment	After Treatment	
FSH (mIU/ml)	14.5 ± 4.3*	10.8 ± 2.9	18.7 ± 4.6	12.2 ± 3.8	8.2 ± 1.7
LH (mIU/ml)	13.6 ± 3.2*	9.3 ± 1.6	7.5 ± 2.1	10.8 ± 2.5	6.5 ± 1.3
Estradiol (pg/ml)	25.6 ± 8.4*	90.4 ± 11.04	28.4 ± 6.02	86.2 ± 9.01	45.0 ± 10.07
Progesterone (ng/ml)	1.8 ± 3.6*	2.6 ± 0.5	1.0 ± 0.3	2.4 ± 0.4	2.5 ± 0.6

Note: Statistical significance ($p<0.05$) indicates meaningful changes in hormone levels following PRP therapy, demonstrating the therapy's effectiveness in improving ovarian function.

Before PRP therapy, the estradiol level in Group I was 25.6±8.4 pg/ml, while in Group II, it was 28.4±6.02 pg/ml. After PRP therapy, the estradiol level increased to 90.4±11.04 pg/ml in Group I and 86.2±9.01 pg/ml in Group II ($p<0.05$). This increase in estradiol suggests improved ovulatory function.

Before PRP therapy, the progesterone level in Group I was 1.8±3.6 ng/ml, while in Group II, it was 1.0±0.3 ng/ml. Post-therapy, the progesterone level increased to 2.6±0.5 ng/ml in Group I and 2.4±0.4 ng/ml in Group II ($p<0.05$). These changes indicate normalization of the luteal phase, an essential marker of restored reproductive function.

PRP therapy demonstrated its effectiveness in normalizing hormonal balance in women of advanced reproductive age with low ovarian reserve. The significant improvements in all hormonal indicators confirm this.

For a more detailed analysis of PRP therapy's impact on ovarian function in women with low and meagre ovarian reserve, levels of key growth factors—vascular endothelial growth factor (VEGF), transforming growth factor-beta (TGF-β), and insulin-like growth factor 1 (IGF-1)—were examined. These factors play critical roles in regenerative processes, influencing angiogenesis, cell proliferation, and tissue repair, all vital for enhancing reproductive function. Before PRP therapy, the mean VEGF level in Group I was 135.3±0.16 pg/ml, indicating insufficient blood supply and reduced angiogenesis in the ovaries. In Group II, where the ovarian reserve was further diminished, the initial VEGF level was 110.1±18.2 pg/ml, highlighting even more pronounced blood supply issues.

In the control group, the mean VEGF level was 160.21±0.5 pg/ml, consistent with regular blood supply and angiogenesis. Following PRP therapy, VEGF levels significantly increased to 210.05±25.18 pg/ml in Group I and 190.22±22.30 pg/ml in Group II ($p<0.01$), with no significant changes observed in the control group ($p>0.05$). These changes demonstrate the stimulatory effect of PRP on angiogenesis, promoting improved ovarian blood flow and functional recovery.

The baseline TGF-β level in Group I was 85.09±14.14 pg/ml, while in Group II, it was 70.11±12.54 pg/ml, suggesting the presence of chronic inflammation and delayed tissue regeneration. The mean TGF-β level in the control group was 90.14±14.12 pg/ml, reflecting normal regenerative processes. After PRP therapy, TGF-β levels significantly increased to 127.32±18.32 pg/ml in Group I and 115.16±16.24 pg/ml in Group II ($p<0.01$), with no significant changes in the control group ($p>0.05$). The rise in TGF-β levels is associated with its vital role in regulating cell differentiation and tissue regeneration, potentially aiding the repair of damaged or weakened ovarian structures (Table 2).

Before PRP therapy, the IGF-1 level in Group I was 153.45±18.61 ng/ml, and in Group II, it was 130.2±20.15 ng/ml, indicating reduced cellular metabolism and regenerative activity in the ovaries. In the control group, the IGF-1 level was 180±23 ng/ml, indicating normal metabolic processes. Following PRP therapy, IGF-1 levels significantly increased to 220.52±3.59 ng/ml in Group I and 190.10±21.48 ng/ml in Group II ($p<0.01$), with no significant changes in the control group ($p>0.05$). The increase in IGF-1 levels indicates enhanced cell proliferation and metabolic activity, sup-

porting improved ovarian reserve and ovarian function restoration. These findings confirm that the observed changes in Groups I and II were directly attributable to PRP therapy rather than random fluctuations or external factors.

Table 2. Growth Factor Levels Before and After PRP Therapy in Study Participants, M±m.

Growth Factors	Group I, n=60		Group II, n=50		Control Group, n=30	P
	Before Treatment	After Treatment	Before Treatment	After Treatment		
VEGF (pg/ml)	135.03±0.16	210.05±25.18	100.1± 18.02	190.22± 22.30	160.21± 2.05	< 0.01
TGF-β (pg/ml)	85.09 ±14.14	127.32±18.32	70.11± 12.54	115.16± 16.24	90.14± 14.12	< 0.01
IGF-1 (ng/ml)	153.45±18.61	220.52 ± 3.59	130.20 ± 20.15	190.10 ± 21.48	180.23±23.11	< 0.01

Note: Statistical significance ($p<0.01$) indicates meaningful changes in growth factor levels following PRP therapy, demonstrating the therapy's impact on angiogenesis, cell proliferation, and tissue regeneration.

The increased levels of growth factors such as VEGF, TGF-β, and IGF-1 following PRP therapy indicate a substantial improvement in angiogenesis, regeneration, and cell proliferation in the ovaries, underscoring the potential of this method for treating women with diminished ovarian reserve.

To assess the relationships between growth factors and hormone levels before and after PRP therapy in women with low ovarian reserve, a correlation analysis was conducted, revealing the following significant correlations:

In Group I, a positive correlation was found between increased VEGF levels and AMH levels ($r=0.72$, $p<0.001$), indicating the role of VEGF in stimulating ovarian activity and improving ovarian reserve. Additionally, in this Group, a negative correlation was observed between VEGF levels and FSH ($r=-0.64$, $p<0.01$), suggesting decreased need for pituitary stimulation of the ovaries as ovarian reserve increases. Furthermore, a positive correlation between IGF-1 and AMH levels ($r=0.68$, $p<0.01$) was identified, confirming the stimulatory effect of IGF-1 on ovarian function (Figure 2).

In Group II, the correlation between VEGF and AMH levels was also positive but less pronounced ($r=0.63$, $p<0.01$), indicating a milder impact of PRP therapy on ovarian function restoration in this Group. A negative correlation was also observed between VEGF and FSH levels ($r=-0.52$, $p<0.01$). A positive correlation was also identified between TGF-β and AMH levels ($r=0.60$, $p<0.01$), underscoring the critical role of TGF-β in ovarian regenerative processes. These findings emphasize the importance of VEGF as a potential biomarker of PRP therapy efficacy and its role in enhancing ovarian function in women with diminished ovarian reserve.

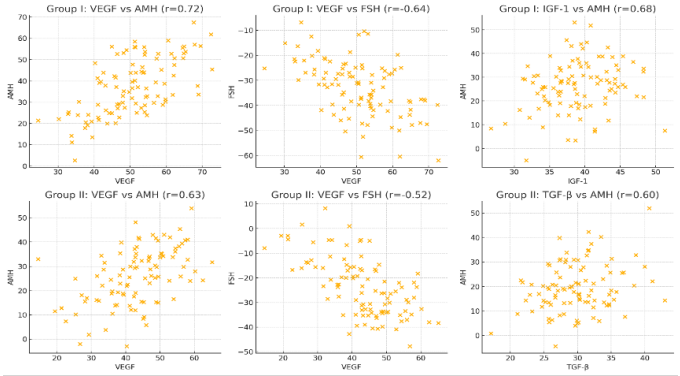

Figure 2. Figure 3. Correlation Analysis Between Hormones and Growth Factor Levels.

To evaluate the prognostic value of various growth factors and hormones in predicting ovarian reserve improvement after PRP therapy, an ROC analysis was conducted. This method allows assessment of each biomarker's ability to distinguish between patients who experience positive outcomes and those with minimal change. A high area under the curve (AUC) in ROC analysis indicates strong predictive ability, underscoring the relevance of selected biomarkers in evaluating PRP therapy efficacy.

In particular, VEGF levels demonstrated an AUC of 0.88 (95% CI: 0.83–0.92, $p<0.001$), indicating high prognostic accuracy. The optimal threshold for VEGF was 185 pg/ml, achieving sensitivity and specificity of 86% and 87%, respectively. Insulin-like growth factor 1 (IGF-1) also displayed significant prognostic value, with an AUC of 0.85 (95% CI: 0.80–0.89, $p<0.001$). The optimal threshold for predicting ovarian reserve improvement was 205 ng/ml, with sensitivity and specificity of 86% and 87%.

Transforming growth factor-beta (TGF-β) demonstrated an AUC of 0.87 (95% CI: 0.82–0.91, $p<0.001$), also supporting its value in predicting PRP therapy success. The optimal threshold for TGF-β was set at 120 pg/ml, with sensitivity and specificity reaching 86% and 87%, respectively (Figure 3).

These results confirm that VEGF, IGF-1, and TGF-β are key prognostic markers that can enhance the accuracy of predictions and optimize the treatment of women of advanced reproductive age with low ovarian reserve following PRP therapy.

Comparative analysis of various indicators revealed that the combination of VEGF and AMH levels holds the

highest prognostic value, allowing for more accurate predictions of ovarian function restoration effectiveness and the likelihood of pregnancy. Creating a combined model that includes both indicators resulted in an AUC of 0.88 ($p < 0.001$), underscoring the rationale for their simultaneous application in clinical practice.

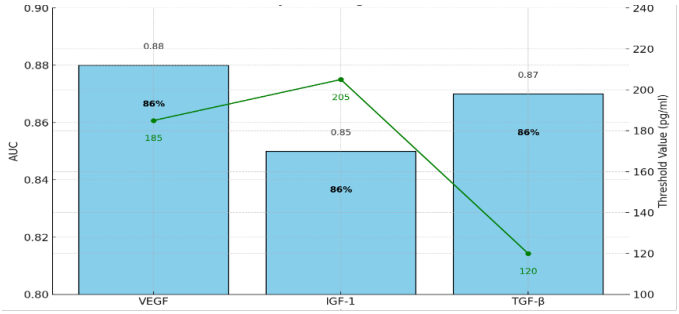

Figure 3. ROC Analysis of the Prognostic Value of Growth Factors in Predicting Ovarian Reserve Improvement After PRP Therapy

Thus, the ROC analysis results confirm the high clinical significance of VEGF levels and their combination with AMH in predicting a favourable outcome of PRP therapy, opening new perspectives for personalized medicine in reproductive health.

PRP therapy led to a significant restoration of ovarian reserve in the studied groups. In Group I (low ovarian reserve), ovarian reserve recovery was achieved in 70% of cases, indicating substantial improvement in ovarian health for most patients. In Group II (meagre ovarian reserve), PRP therapy led to ovarian reserve recovery in 50% of cases, which is also a significant result, given the initially severe condition of these patients. Thus, PRP therapy positively restored ovarian reserve, proving highly effective for women with low

Follicuometry was performed with endometrial thickness measurement to assess ovarian function stimulation during the menstrual cycle and treatment. Ultrasound assessed the thickness and echogenicity of the endometrium, the number and size of dominant follicles on days 8, 12, and 14 of the cycle, and ovulation and corpus luteum formation.

In women in Group I, the diameter of the dominant follicle significantly increased ($p < 0.05$), averaging 2.2 ± 0.4 cm; in Group II, this indicator averaged 2.0 ± 0.3 cm. Both groups also showed significant increases in endometrial thickness ($p < 0.05$), averaging 0.9 ± 0.03 cm in Group I and 1.0 ± 0.2 cm in Group II (Figure 4).

A comparison of indicators between the two groups showed that patients in Group I had a significantly greater dominant follicle diameter and endometrial thickness than those in Group II ($p < 0.05$).

Figure 4. Indicators of Dominant Follicles and Endometrial Thickness in Study Participants.

Ovulation occurred in 45 (75.3%) women in Group I, with two (6.6%) ovulating in the second menstrual cycle. Pregnancy was recorded in 44 (73.3%) patients in this Group. In Group II, ovulation was observed in 29 (72.5%) women, and pregnancy occurred in 25 (62.5%) of them. For three patients (10.0%), ovulation occurred in the second and third months of stimulation with a clomiphene-containing medication at a dose of 100-150 mg per day. In the control group, pregnancy occurred in three patients (10.0%) (Figure 5).

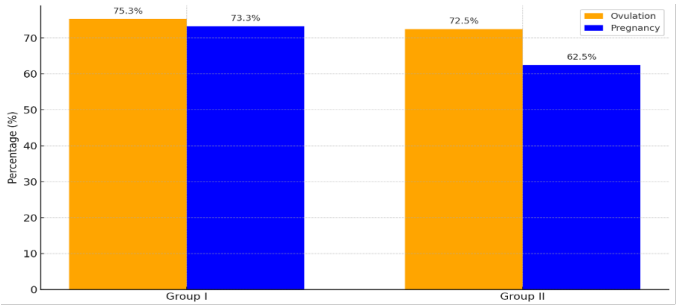

Figure 5. Ovulation and Pregnancy Rates in Study Participants, %

Thus, ovulation stimulation using PRP therapy in combination with a clomiphene-containing medication is an effective method for women of advanced reproductive age with meagre ovarian reserve, achieving ovulation in 75.3% and 72.5% of women, respectively. According to the data, with clomiphene use across 40 ovulation cycles, the average number of dominant follicles over 18 mm in diameter by mid-cycle was 29 (72.3%), with all follicles reaching maturity, allowing successful folliculogenesis stimulation. In six ovulation cycles, two follicles matured.

The average pre-ovulatory follicular development stage duration was 13.5±0.2 days. The average diameter of the dominant follicle in women with confirmed ovulation on cycle days 12-14 was 18.0±1.3 mm. Across all

study participants' average mid-cycle endometrial thickness was 9.2±0.3 mm, considered optimal for embryo implantation.

Thus, PRP therapy demonstrated high effectiveness not only in improving ovarian reserve but also in restoring menstrual-ovarian function and fertility in women of advanced reproductive age with low ovarian reserve.

The results showed that PRP therapy combined with a clomiphene-containing medication led to ovulation in 75.3% and 72.5% of women in groups with low ovarian reserve, respectively, and to pregnancy in 73.3% and 62.5% of these groups.

Consequently, the use of PRP therapy combined with a clomiphene-containing medication in women of advanced reproductive age with low and very low ovarian reserve reduced infertility rates by 2.2 times, restored fertility by 2.2 times, and reduced treatment costs by 4 times, highlighting both the medical and economic effectiveness of this approach.

DISCUSSION

Our study demonstrated that PRP therapy combined with a clomiphene-containing medication significantly improves ovarian reserve indicators, hormonal status, and growth factor levels in women of advanced reproductive age with low and very low ovarian reserve. These results highlight the promising potential of PRP therapy in restoring fertility in this patient group, offering new approaches to treating age-related infertility.

The substantial increase in anti-Müllerian hormone (AMH) levels and antral follicle count (AFC) following PRP therapy indicates ovarian reserve restoration, positively impacting ovulatory potential and the likelihood of pregnancy. Concurrently, reducing follicle-stimulating hormone (FSH) and luteinizing hormone (LH) levels after therapy suggests hormonal balance normalization, creating optimal conditions for ovulation and improving reproductive status.

Our findings align with those presented in studies by Harris B.S.et al. (2020) and Moolhuijsen LME et al. (2020), which also noted improved reproductive outcomes following PRP therapy in women with low ovarian reserve. This data supports PRP as a promising method capable of enhancing ovulatory outcomes and pregnancy chances in conditions of diminished ovarian reserve.

The PRP therapy procedure involved venous blood collection, centrifugation to obtain platelet-rich plasma, and transvaginal PRP injection into the ovaries under ultrasound guidance, administered three times at one-month intervals. The significant improvement in ovarian reserve and hormonal profile confirms the effectiveness of PRP therapy in restoring reproductive function in women of advanced reproductive age.

The practical significance of our study lies in the potential use of PRP therapy in combination with clomiphene-containing medications to restore ovarian reserve and enhance reproductive potential in women with low ovarian reserve. Further studies should focus on evaluating the long-term effects of PRP therapy and determining optimal treatment protocols to achieve maximum clinical outcomes.

CONCLUSION

The results showed that PRP therapy combined with a clomiphene-containing medication led to ovulation in 75.3% and 72.5% of women in groups with low ovarian reserve, respectively, and to pregnancy in 73.3% and 62.5% of these groups. The use of PRP therapy in combination with a clomiphene-containing medication for women of advanced reproductive age with low ovarian reserve reduced infertility rates by 2.2 times, restored fertility by 2.2 times, and reduced treatment costs by four times, highlighting both the medical and economic effectiveness of this approach.

Ethics approval and consent to participate - All patients gave written informed consent to participate in the study.

Consent for publication - The study is valid, and recognition by the organization is not required. The author agrees to open the publication.

Availability of data and material - Available

Competing interests - No

Financing – No financial support has been provided for this work

Conflict of interest- The authors declare no conflict of interest.

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PAST TUXUMDON ZAXIRALI KECh REPRODUKTIV YoSHDAGI AYOLLARDA FERTILLIKNI TIKLASHDA INNOVATSION YONDASHUV

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ABSTRAKT

Dolzarbligi. Past tuxumdon zaxirali kech reproduktiv yoshdagi ayollarda fertillikni tiklash zamonaviy reproduktiv tibbiyotining dolzarb muammolaridan biri bo‘lib hisoblanadi. Tuxumdon zahirasi kamayishi yoshga bog‘liq o‘zgarishlar bilan birga tabiiy homiladorlik imkoniyatlarini cheklaydi, reproduktiv muvaffaqiyatsizliklar xavfini oshiradi bu o‘z navbatida mutaxassislardan samarali va xavfsiz stimulyatsiya usullarini izlab topishni talab etadi.

Maqsad. Kech reproduktiv yoshdagi ayollarda past tuxumdon zahirasini tiklashda PRP terapiyani klomifen tarkibli preparat bilan birgalikda qo‘llashning samaradorligini baholash.

Tadqiqot materiali va usullari. Tadqiqotga past tuxumdon zahirasini tiklashga muhtoj bo‘lgan kech reproduktiv yoshdagi 110 nafar ayol kiritildi. Ulardan past tuxumdon zahirali PRP terapiyasini olgan 60 nafar ayol (I guruh), hamda o‘ta past tuxumdon zahirali PRP terapiyani klomifen tarkibli preparti bilan birgalikda olgan 50 nafar ayol (II guruh) tashkil etdi. Nazorat guruhini esa sog‘lom 30 nafar ayol tashkil qildi. Barcha ishtirokchilarda to‘liq klinik-laborator, gormonal, immunologik va instrumental tadqiqotlar o‘tkazildi.

Natijalar. Natijalar shundan dalolat beradiki, kech reproduktiv yoshdagi past va o‘ta past tuxumdon zahirali ayollarda PRP terapiyasini klomifen tarkibli preparat bilan birgalikda qo‘llash natijasida ovulyatsiya guruxlarda mos ravishda 75,3% va 72,5% ayollarda sodir bo‘lgan, homiladorlik esa ushbu guruhlarda mos ravishda 73,3% va 62,5%da qayd etilgan.

Xulosa. Kech reproduktiv yoshdagi past va o‘ta past tuxumdon zahirali ayollarda PRP terapiyasini klomifen klomifen tarkibli preparat bilan birgalikda qo‘llash natijasida bepushtlik holatlari 2,2 barobarga kamaygan, fertillikni tiklash 2,2 barobarga oshgan, shuningdek, davolash xarajatlari 4 barobarga qisqargan. Bu esa ushbu yondashuvning tibbiy va iqtisodiy samaradorligini ko‘rsatadi.

Kalit so‘zlar. trombotsitlarga boy plazma (PRP), tuxumdon zahirasi, Duinum®, kech reproduktiv yosh, fertillikni tiklash.

ИННОВАЦИОННЫЙ ПОДХОД К ВОССТАНОВЛЕНИЮ ФЕРТИЛЬНОСТИ У ЖЕНЩИН ПОЗДНЕГО РЕПРОДУКТИВНОГО ВОЗРАСТА С НИЗКИМ ОВАРИАЛЬНЫМ РЕЗЕРВОМ

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АБСТРАКТ

Актуальность. Восстановление фертильности у женщин позднего репродуктивного возраста с низким овариальным резервом является одной из актуальных задач современной репродуктивной медицины.

Материалы и методы. В исследование были включены 110 женщин позднего репродуктивного возраста с низким овариальным резервом. Из них 60 женщин с низким овариальным резервом, получавших PRP-терапию (I группа), а 50 женщин с крайне низким овариальным резервом, получавших PRP-терапию в сочетании с кломифенсодержащим препаратом (II группа). Контрольную группу составили 30 здоровых женщин. Всем пациенткам было проведено комплексное клинико-лабораторное, гормональное, иммунологическое и инструментальное исследование.

Результаты. Результаты показали, что применение PRP-терапии в сочетании с кломифенсодержащим препаратом у женщин с низким и крайне низким овариальным резервом в позднем репродуктивном возрасте привело к овуляции у 75,3% и 72,5% женщин соответственно, а также к наступлению беременности у 73,3% и 62,5% в этих группах.

Заключение. Применение PRP-терапии в сочетании с кломифенсодержащим препаратом у женщин с низким и крайне низким овариальным резервом в позднем репродуктивном возрасте привело к снижению частоты бесплодия в 2,2 раза, восстановлению фертильности в 2,2 раза и сокращению затрат на лечение в 4 раза, что подчеркивает, как медицинскую, так и экономическую эффективность данного подхода.

Ключевые слова. плазма, обогащенная тромбоцитами (PRP), овариальный резерв, Duinum®, поздний репродуктивный возраст, восстановление фертильности