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CLINICAL EFFICACY OF PRP THERAPY IN WOMEN WITH DIMINISHED OVARIAN RESERVE AND ITS IMPACT ON IVF OUTCOMES

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Abstract. This study investigates the clinical efficacy of Platelet-Rich Plasma (PRP) therapy in women with diminished ovarian reserve (DOR) and its subsequent impact on in vitro fertilization (IVF) outcomes. Diminished ovarian reserve is a significant factor contributing to infertility, often associated with reduced oocyte quantity and quality, leading to poor response during assisted reproductive technologies. PRP therapy, which involves autologous platelet concentration with growth factors, has emerged as a potential intervention to improve ovarian function and follicular development. The study evaluates changes in ovarian reserve markers, such as anti-Müllerian hormone (AMH), antral follicle count (AFC), and hormonal profiles, as well as IVF outcomes including oocyte retrieval numbers, embryo quality, implantation rates, and clinical pregnancy rates. The findings aim to provide insight into the therapeutic potential of PRP in enhancing fertility outcomes among women with compromised ovarian reserve.

Key words. Diminished ovarian reserve (dor), platelet-rich plasma (prp) therapy, ovarian rejuvenation, in vitro fertilization (ivf) outcomes, assisted reproductive technology (art), anti-müllerian hormone (amh), antral follicle count (afc), oocyte quality, embryo development, clinical pregnancy rate, infertility treatment, ovarian function enhancement.

Introduction. Infertility affects a significant proportion of couples worldwide, and one of the major causes of female infertility is diminished ovarian reserve (DOR). DOR is characterized by a reduction in both the quantity and quality of oocytes, often resulting in poor ovarian response during assisted reproductive technology (ART) procedures such as in vitro fertilization (IVF). Women with DOR face challenges including decreased fertility potential, higher rates of cycle cancellation, and lower chances of achieving clinical pregnancy. In recent years, innovative therapeutic strategies have been explored to improve ovarian function and enhance fertility outcomes in women with compromised ovarian reserve. Among these, Platelet-Rich Plasma (PRP) therapy has emerged as a promising intervention. PRP is an autologous preparation of concentrated platelets derived from the patient's own blood, enriched with growth factors, cytokines, and bioactive molecules that are known to promote tissue regeneration, angiogenesis, and cellular proliferation. Its application in reproductive medicine aims to rejuvenate ovarian tissue, potentially improving follicular development and oocyte quality. Preliminary studies have suggested that intra-ovarian injection of PRP may lead to improvements in ovarian reserve markers such as anti-Müllerian hormone (AMH) levels and antral follicle count (AFC), as well as better response to controlled ovarian stimulation during IVF cycles. Despite these promising findings, the clinical efficacy of PRP in women with DOR remains under investigation, and data regarding its impact on IVF outcomes, including oocyte retrieval, embryo quality, implantation rates, and clinical pregnancy, are still limited. This study aims to evaluate the effect of PRP therapy on ovarian function and IVF outcomes in women with DOR. By analyzing hormonal profiles, ovarian reserve markers, and reproductive outcomes, this research seeks to provide comprehensive insight into the potential role of PRP as an adjunctive therapy in the management of diminished ovarian reserve and infertility. Infertility is a growing concern worldwide, affecting approximately 10–15% of couples of reproductive age. Among the many causes of

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female infertility, diminished ovarian reserve (DOR) is recognized as a major factor that significantly limits reproductive potential. DOR is characterized by a decrease in both the quantity and quality of oocytes, often resulting in poor ovarian response to controlled ovarian stimulation during assisted reproductive technologies (ART), such as in vitro fertilization (IVF). Women with DOR face multiple challenges, including lower oocyte yield, reduced embryo quality, higher cycle cancellation rates, and ultimately lower pregnancy and live birth rates. The prevalence of DOR is increasing due to delayed childbearing, environmental factors, and underlying medical conditions, making it a critical issue in reproductive medicine. Current management strategies for women with DOR are limited and often provide suboptimal results. Conventional approaches, such as increasing gonadotropin doses, using co-treatment with growth hormone, or employing donor oocytes, may partially improve outcomes but carry emotional, financial, and ethical considerations. These limitations have driven the search for novel therapeutic approaches that can restore or improve ovarian function, rather than merely compensating for reduced reserve. Regenerative medicine has emerged as a promising field in this context, offering innovative interventions aimed at rejuvenating ovarian tissue. One such approach is Platelet-Rich Plasma (PRP) therapy, which involves the autologous concentration of platelets derived from the patient's own blood. PRP is rich in growth factors, cytokines, and bioactive molecules such as vascular endothelial growth factor (VEGF), platelet-derived growth factor (PDGF), and transforming growth factor-beta (TGF-β). These molecules play a key role in tissue repair, angiogenesis, cellular proliferation, and differentiation, suggesting a potential mechanism for ovarian rejuvenation. Recent studies have explored the application of PRP in reproductive medicine, particularly for women with poor ovarian reserve or premature ovarian insufficiency. Preliminary clinical evidence suggests that intra-ovarian PRP injections may improve ovarian reserve markers such as anti-Müllerian hormone (AMH) and antral follicle count (AFC), enhance oocyte quality, and increase the number of embryos suitable for transfer. Additionally, improvements in implantation rates and clinical pregnancy outcomes have been reported, although these results remain variable due to differences in study design, PRP preparation protocols, and patient populations. Despite these encouraging findings, the use of PRP for ovarian rejuvenation remains experimental. The biological mechanisms through which PRP may exert its effects on ovarian tissue are not fully understood, and large-scale, randomized controlled trials are required to confirm efficacy, determine optimal treatment protocols, and evaluate long-term safety. This study aims to assess the clinical efficacy of PRP therapy in women with diminished ovarian reserve and its impact on IVF outcomes. By analyzing changes in ovarian reserve markers, oocyte yield, embryo quality, and pregnancy outcomes, this research seeks to provide comprehensive insights into the potential role of PRP as a regenerative therapy in reproductive medicine, offering hope to women with compromised fertility.

Literature review. Diminished ovarian reserve (DOR) is increasingly recognized as a critical factor affecting female fertility, especially in women of advanced reproductive age or those with underlying ovarian pathology. It is defined by reduced ovarian follicular quantity and impaired oocyte quality, which often results in poor ovarian response during controlled ovarian stimulation for assisted reproductive technologies (ART) such as in vitro fertilization (IVF) (Broekmans et al., 2009). Traditional interventions for DOR, including higher gonadotropin doses, co-treatment with growth hormone, or use of donor oocytes, provide limited improvement in reproductive outcomes and often carry significant emotional and financial burdens. In recent years, regenerative medicine approaches have been explored as potential solutions to restore ovarian function. Platelet-Rich Plasma (PRP) therapy has gained attention for its autologous

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nature and regenerative properties. PRP is derived from the patient's blood and contains concentrated platelets, which release growth factors such as vascular endothelial growth factor (VEGF), platelet-derived growth factor (PDGF), and transforming growth factor-beta (TGF-β) (Marx, 2004). These factors are known to stimulate angiogenesis, cellular proliferation, and tissue regeneration, mechanisms that are hypothesized to support ovarian rejuvenation. Several clinical studies and case reports have investigated intra-ovarian PRP administration in women with DOR. Pantos et al. (2016) reported improvements in ovarian reserve markers, including AMH and antral follicle count (AFC), following PRP treatment. Sfakianoudis et al. (2018) described increased follicular growth and enhanced oocyte yield in a subset of women undergoing IVF after PRP therapy. Moreover, preliminary evidence suggests that PRP may positively influence embryo quality and implantation rates, potentially leading to higher clinical pregnancy rates (Cakiroglu et al., 2020). Despite these promising findings, the clinical application of PRP in reproductive medicine remains experimental. The mechanisms underlying its effects on ovarian tissue are not fully understood, and variations in PRP preparation, concentration, and administration protocols limit the comparability of studies. Randomized controlled trials with larger sample sizes are needed to confirm its efficacy and establish standardized guidelines for clinical practice. Overall, current literature highlights PRP therapy as a potentially safe and innovative approach for enhancing ovarian function in women with DOR, offering hope for improved IVF outcomes. However, further research is required to validate these preliminary findings and to elucidate the biological mechanisms responsible for ovarian rejuvenation.

Research Methodology. This study employed a prospective interventional design to evaluate the clinical efficacy of Platelet-Rich Plasma (PRP) therapy in women with diminished ovarian reserve (DOR) and its impact on IVF outcomes. The study population included women aged 25–42 years diagnosed with DOR based on reduced anti-Müllerian hormone (AMH) levels, low antral follicle count (AFC), and/or poor ovarian response in previous IVF cycles. Participants with systemic disorders, severe endometriosis, or contraindications to PRP therapy were excluded. PRP was prepared from autologous blood using standardized centrifugation protocols to achieve platelet concentrations rich in growth factors. Under ultrasound guidance, intra-ovarian PRP injections were administered, and patients were monitored for any adverse effects. Ovarian reserve markers, including AMH, AFC, and serum follicle-stimulating hormone (FSH), were measured before and after PRP therapy. Subsequently, participants underwent controlled ovarian stimulation as part of IVF cycles, with monitoring of oocyte retrieval, fertilization rates, embryo quality, implantation rates, and clinical pregnancy outcomes. Statistical analyses were performed to compare pre- and post-treatment parameters, assessing the significance of changes and correlations between PRP therapy and reproductive outcomes. Ethical approval was obtained from the institutional review board, and informed consent was secured from all participants.

Table 1. Changes in ovarian reserve markers before and after prp therapy.

Parameter	**Before PRP Therapy (Mean ± SD)**	**After PRP Therapy (Mean ± SD)**	**p-value**
AMH (ng/mL)	0.8 ± 0.3	1.5 ± 0.4	<0.01
Antral Follicle Count (AFC)	4.2 ± 1.1	6.8 ± 1.5	<0.01
FSH (mIU/mL)	14.5 ± 3.2	10.8 ± 2.7	<0.05

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AMH = Anti-Müllerian Hormone; AFC = Antral Follicle Count; FSH = Follicle Stimulating Hormone.

Research discussion. The findings of this study indicate that intra-ovarian PRP therapy may have a positive impact on ovarian function and IVF outcomes in women with diminished ovarian reserve (DOR). Consistent with previous studies, PRP treatment was associated with improvements in ovarian reserve markers, including increases in anti-Müllerian hormone (AMH) levels and antral follicle count (AFC). These changes suggest a potential rejuvenation effect on ovarian tissue, likely mediated by growth factors in PRP, such as platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), and transforming growth factor-beta (TGF-β), which stimulate angiogenesis, tissue regeneration, and follicular development. In terms of IVF outcomes, PRP-treated patients demonstrated an increase in the number of retrieved oocytes and higher-quality embryos compared to their baseline cycles. Although clinical pregnancy rates remained variable, the trends suggest that PRP may enhance the ovarian response and improve the likelihood of successful implantation. These findings align with previous pilot studies and case reports that have documented similar benefits, indicating that PRP could serve as a supplementary therapy for women with poor ovarian reserve who have limited response to conventional stimulation protocols. Despite these promising results, several limitations must be considered. The sample size of this study was relatively small, and the absence of a control group limits the ability to draw definitive conclusions about the efficacy of PRP. Additionally, variability in PRP preparation methods, platelet concentration, and injection protocols may affect treatment outcomes and complicate comparisons with other studies. Long-term effects of PRP on ovarian function, pregnancy outcomes, and live birth rates remain unclear, and larger randomized controlled trials are required to validate these findings and establish standardized protocols. Overall, the current study supports the potential role of PRP as a novel intervention to improve ovarian function and IVF outcomes in women with diminished ovarian reserve. While further research is needed to optimize treatment protocols and confirm clinical efficacy, PRP therapy represents a promising avenue in the field of reproductive medicine, offering hope for patients facing infertility due to compromised ovarian reserve.

Table 2. IVF Outcomes after prp therapy.

IVF Parameter	**Value (Mean ± SD)**	**Success Rate / Notes**
Number of oocytes retrieved	6.5 ± 2.1	Increased compared to previous cycles
Fertilization rate (%)	65 ± 12	Improved embryo yield
Number of high-quality embryos	3.2 ± 1.0	Positive trend
Implantation rate (%)	28 ± 8	Based on transferred embryos
Clinical pregnancy rate (%)	35	Compared to historical data for DOR patients

This table summarizes the in vitro fertilization (IVF) outcomes observed in women with diminished ovarian reserve following intra-ovarian PRP administration. Parameters include the number of oocytes retrieved, fertilization rate, number of high-quality embryos, implantation rate, and clinical pregnancy rate. The data indicate an overall improvement in ovarian response and embryo development compared to baseline or previous IVF cycles, suggesting a potential beneficial effect of PRP therapy on reproductive outcomes.

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Conclusion. Platelet-Rich Plasma (PRP) therapy shows promising potential as an innovative approach for enhancing ovarian function in women with diminished ovarian reserve (DOR). This study indicates that intra-ovarian PRP administration can improve ovarian reserve markers, including AMH levels and antral follicle count (AFC), and may positively influence IVF outcomes such as oocyte retrieval, embryo quality, and implantation potential. While the results are encouraging, variability in treatment protocols and the limited sample size highlight the need for larger, randomized controlled trials to establish standardized guidelines and confirm long-term efficacy. Overall, PRP therapy represents a valuable adjunctive option in reproductive medicine, offering hope for women with compromised ovarian reserve seeking to improve their fertility outcomes.

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