

Ovarian Rejuvenation in Infertile Women with Low Anti-Müllerian Hormone Using Peripheral Blood–Derived Stem Cell Techniques

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Abstract- Diminished ovarian reserve (DOR) represents a major contributor to female infertility and is often characterized by reduced levels of anti-Müllerian hormone (AMH) and impaired folliculogenesis. This study evaluates the therapeutic efficacy of peripheral blood–derived stem cell (PBSC) therapy in restoring ovarian function and improving fertility outcomes in women presenting with low AMH levels. A cross-sectional study was conducted involving sixty participants divided equally into control and intervention groups at Vine Branch Fertility Centre, Ibadan, Nigeria. Peripheral blood samples (16 mL) were collected and processed via differential centrifugation to isolate the buffy coat containing stem and progenitor cells. The concentrated PBSC preparation was subsequently administered through intraovarian injection under ultrasound guidance. Anthropometric and biochemical parameters including AMH, follicle-stimulating hormone (FSH), luteinizing hormone (LH), estradiol, and antral follicle count (AFC) were evaluated. Statistical analysis was performed using SPSS with a significance level set at $p < 0.05$. Results demonstrated significant improvement in ovarian reserve markers in the intervention group, with AMH levels nearly doubling and AFC increasing substantially compared to controls. These findings suggest that PBSC therapy may promote ovarian rejuvenation through angiogenic signaling, stromal remodeling, and paracrine mechanisms.

Index Terms- Ovarian Rejuvenation, Peripheral Blood Stem Cells, Anti-Müllerian Hormone, Infertility, Ovarian Reserve, Regenerative Medicine

I. INTRODUCTION

Female infertility remains a significant global health challenge affecting millions of women of reproductive age. Among the numerous etiologies of infertility, diminished ovarian reserve (DOR) plays a critical role because it directly influences oocyte quantity, quality, and reproductive outcomes.

Ovarian reserve refers to the quantity and quality of primordial follicles present in the ovaries at any given time. Although the decline of ovarian reserve is a natural biological process, in some women depletion occurs prematurely due to genetic, environmental, or iatrogenic factors.

Age remains the primary determinant of ovarian reserve. The progressive decline in both the number and quality of oocytes is a hallmark of reproductive aging. While the decline begins in the mid-twenties, the rate of follicular depletion accelerates significantly after the age of 35.

II. MATERIALS AND METHODS

Study Design:

This study employed an experimental biomedical design within a translational clinical research framework to evaluate the efficacy of peripheral blood–derived stem cell injections for ovarian rejuvenation in infertile women with low AMH levels.

Study Area:

The research was conducted at Vine Branch Fertility Centre, Ibadan, Oyo State, Nigeria.

Study Population:

The study population consisted of infertile women aged 25–45 years diagnosed with diminished ovarian reserve (AMH < 1.0 ng/mL) and with a history of at least one failed assisted reproductive treatment cycle.

III. RESULTS

Sixty women with infertility were recruited and equally divided into two groups: Control (n = 30) and Intervention (n = 30). Baseline ovarian reserve

markers including AMH, AFC, FSH, and LH were evaluated prior to intervention.

Post-intervention analysis demonstrated significant improvement in ovarian reserve indicators within the intervention group. AMH levels increased substantially while AFC improved across most participants, suggesting restoration of follicular recruitment. Hormonal balance also showed improvement, with partial normalization of FSH and LH in several participants.

IV. DISCUSSION

The findings of this study support the regenerative potential of peripheral blood-derived stem cell therapy in improving ovarian reserve among women with diminished ovarian function. PBSCs appear to exert therapeutic effects through paracrine signaling, angiogenesis, and restoration of the ovarian microenvironment. These findings align with emerging literature suggesting that stem cell-based therapies may provide a novel treatment strategy for infertility associated with ovarian aging.

V. CONCLUSION

Peripheral blood-derived stem cells demonstrate promising regenerative capabilities for ovarian rejuvenation. The therapy may represent a minimally invasive and clinically viable approach for improving ovarian reserve and fertility outcomes in women with diminished ovarian reserve. Further large-scale studies are recommended to validate long-term efficacy and safety.

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