

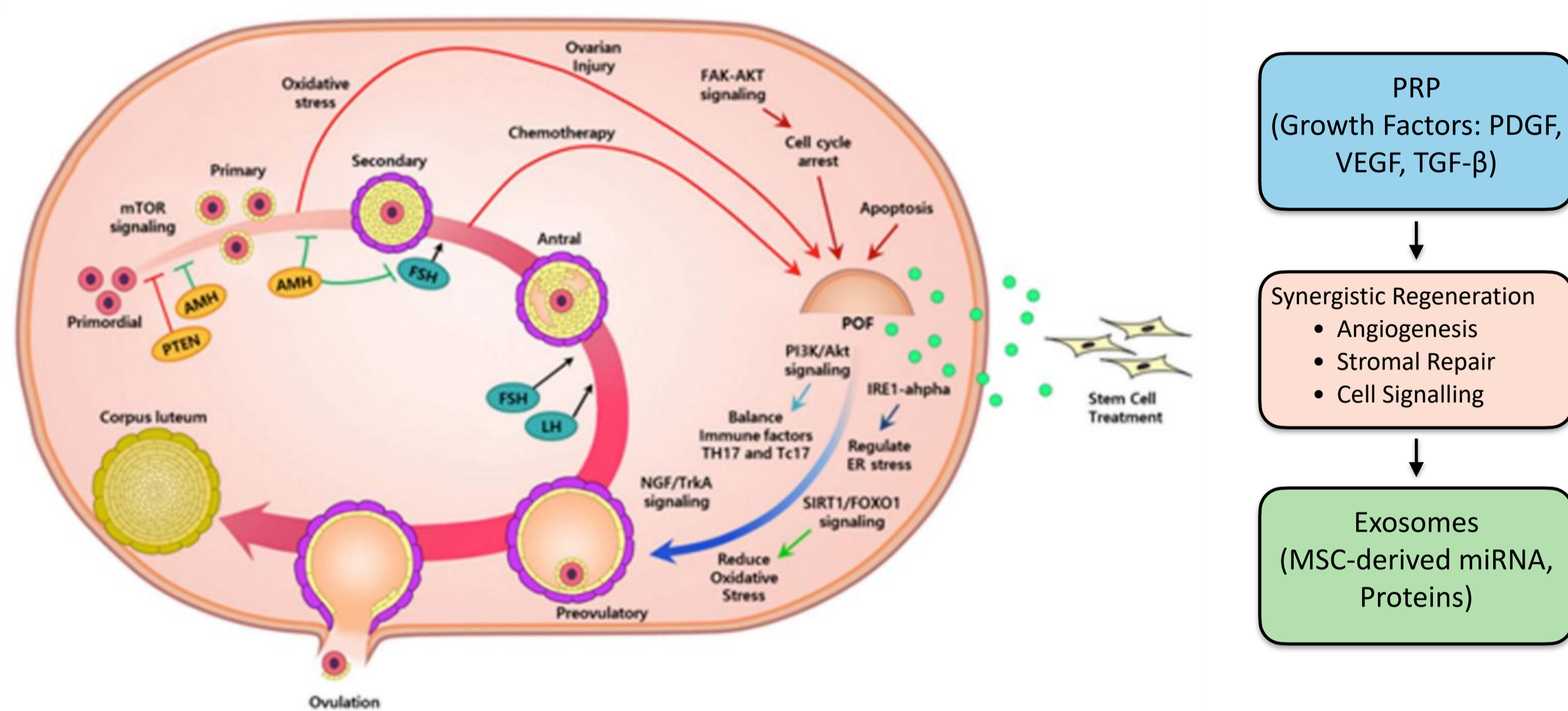
COMBINED USE OF PRP AND EXOSOMES IN POOR RESPONDERS AGED 35–43: A RETROSPECTIVE CONTROLLED GROUP STUDY

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INTRODUCTION

POR remains a major challenge in ART, especially in women aged > 35. Regenerative therapies such as PRP and exosomes have recently emerged as potential tools to enhance ovarian function and IVF outcomes. PRP provides concentrated growth factors that promote angiogenesis and follicular activation, while MSC-derived exosomes deliver microRNAs and proteins supporting cell repair and communication —> enhance both oocyte yield and quality by improving stromal perfusion, reducing oxidative stress, and stabilising mitochondrial function. Results - *combination therapy may deliver superior regenerative outcomes in POR patients*. Limitations include retrospective design, limited sample size, and absence of live birth data. Prospective randomised trials are warranted.



MATERIALS & METHODS

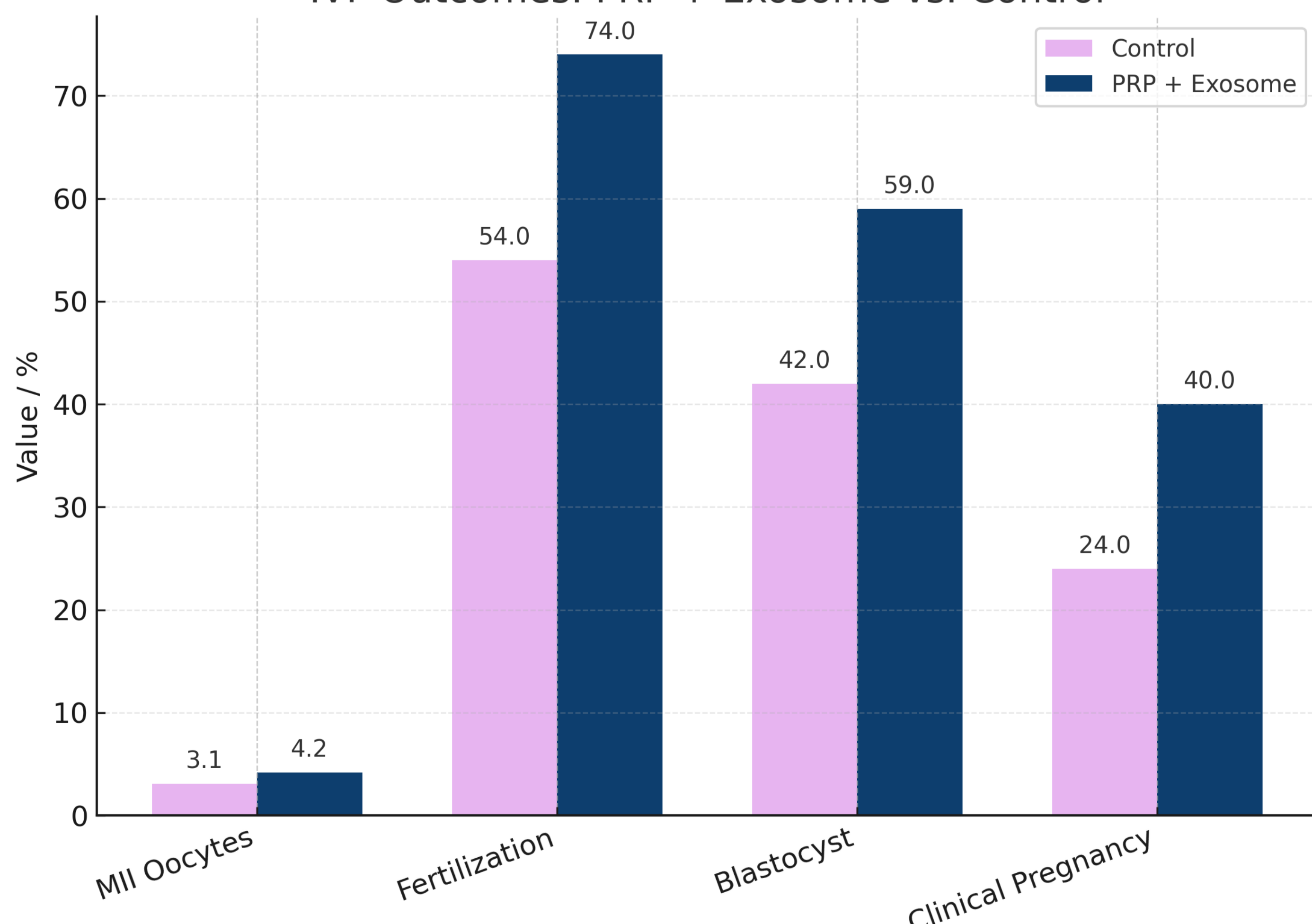
Study design: Retrospective, controlled group study conducted at the Georgian-German Reproduction Center (Jan 2022 – Mar 2025).
Participants: 126 women aged 35–43 years meeting Bologna criteria for POR.
Subgroups: 35–40 yrs and 40–43 yrs.
Intervention group: Intraovarian PRP + MSC-derived exosome injection.
Control group: Standard stimulation only.
PRP preparation: Double-spin centrifugation (1500 rpm × 10 min, then 3000 rpm × 10 min).
Exosomes: Umbilical-cord MSC-derived; characterised by CD63, CD81, TSG101 markers.
Stimulation protocol: GnRH antagonist; recombinant FSH ± Menopur, hCG trigger, oocyte retrieval 36 h later.
Safety: No cases of OHSS or adverse events observed.
Outcomes: MII oocyte count, fertilisation, blastocyst rate, and clinical pregnancy.

RESULTS

IVF Outcomes Comparison

Parameter	Control	PRP + Exosome	% Change
MI I oocytes (mean ± SD)	3.1 ± 1.4	4.2 ± 1.6	+35.5 %
Fertilization rate	54 %	74 %	+20 %
Blastocyst formation	42 %	59 %	+17 %
Clinical pregnancy rate	23.8 %	40.4 %	+16.6 %

IVF Outcomes: PRP + Exosome vs. Control

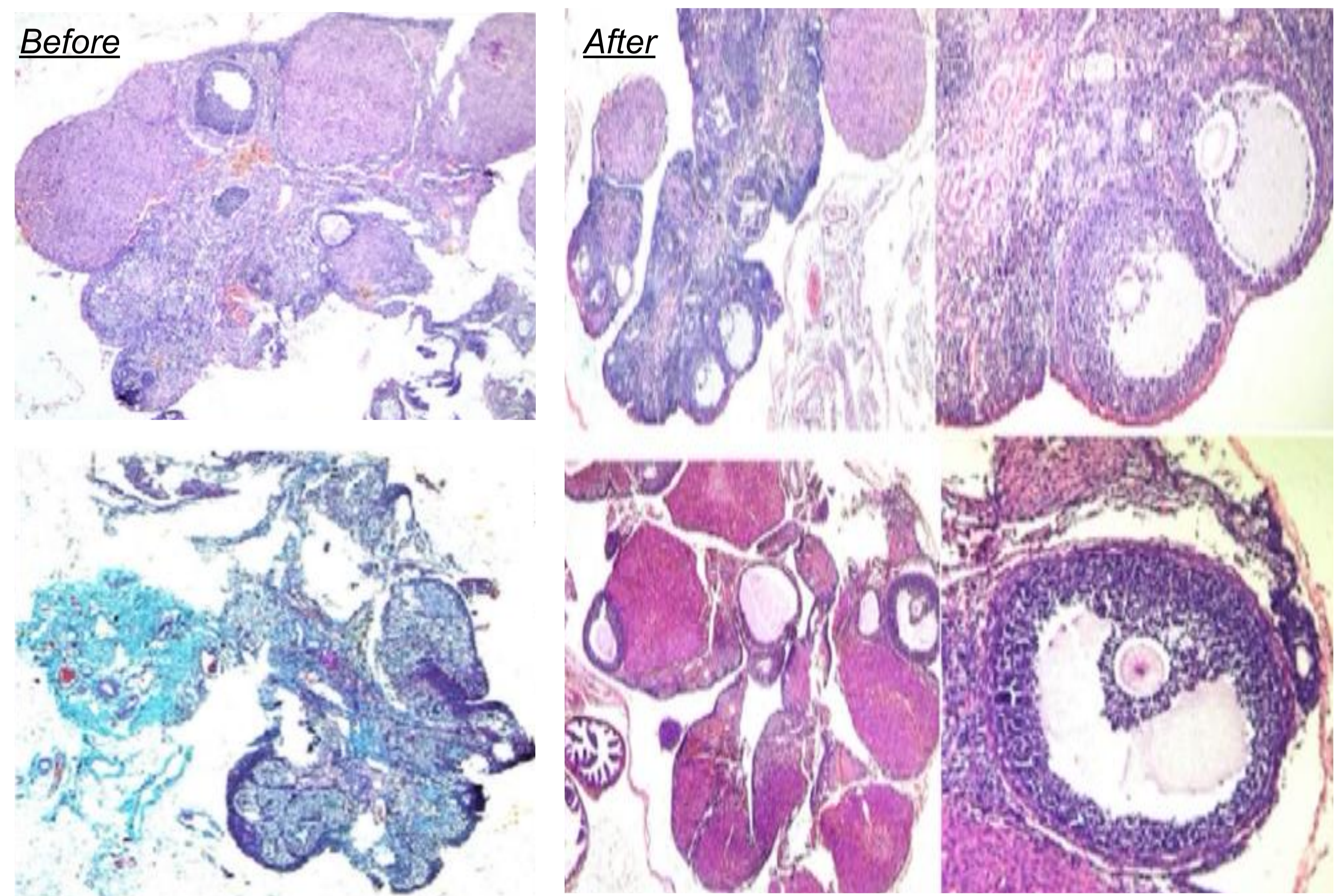


CONCLUSION

The combined intraovarian application of PRP and MSC-derived exosomes demonstrated a clear positive impact on ovarian function and IVF outcomes in women aged 35–43 diagnosed with poor ovarian response. Compared to conventional stimulation alone, this regenerative approach **improved oocyte maturity, fertilisation rate, blastocyst development, and clinical pregnancy outcomes, with no reported adverse effects.**

The observed benefits are likely due to complementary mechanisms: PRP-released growth factors enhance stromal vascularisation and local tissue regeneration, while exosomes provide a molecular signal that promotes follicular activation, reduces oxidative stress, and stabilises mitochondrial function. Together, these effects may restore a more physiologic ovarian microenvironment and improve the developmental competence of retrieved oocytes.

Although our findings are encouraging, further large-scale, prospective randomised studies are required to validate efficacy, establish optimal dosing and timing, and explore the durability of clinical benefits. Nevertheless, the integration of PRP and MSC-derived exosomes represents a promising regenerative strategy for improving IVF success in women with diminished ovarian reserve.



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