Investigating the role of artificial oocyte activation (AOA) in enhancing fertilisation rates (FR) in infertile women: A university-based cohort study

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ABSTRACT

Introduction: The introduction of Intracytoplasmic Sperm Injection (ICSI) has transformed assisted reproduction, particularly for male infertility, yet fertilisation failure still occurs in 1-5% of cases, often due to poor oocyte activation. **Objectives:** To address this, we conducted a prospective cohort study at the Advanced Reproductive Centre (ARC) HCTM UKM Cheras from January 1 2024 to December 31, 2024, evaluating Artificial Oocyte Activation (AOA) using calcium ionophore (GM508 CultActive Gynemed®, Sierksdorf Germany). **Materials and Methods:** We included 43 women, comparing initial IVF cycles (control) with subsequent IVF-AOA cycles (intervention) for those with Low Fertilisation Rate (LFR) or Total Fertilisation Failure (TFF). The average age of participants was 38.44 years, with a majority having primary subfertility and male factors being the leading cause of infertility. **Results:** We observed a significant improvement in fertilisation rates (FR), from 26.95% to 64.04% ($p < 0.001$), alongside enhancements in cleavage rates (91.6% vs. 77.6%, $p < 0.001$), blastulation rates (68.47% vs. 34.21%, $p < 0.001$), and top embryo quality rates (48.9% vs. 47.4%, $p = 0.02$). AOA improved FR across most subfertility groups except for those with PCOS. Importantly, TQE was significantly improved in the TFF cohort compared to LFR (p=0.02). **Conclusion:** Although our findings highlight the potential of AOA to enhance FR and embryological outcomes, further research with larger, multicenter studies is necessary for broader recommendations.