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TITLE

CAPACITATION CULTURE OF HUMAN OOCYTES FROM SMALL ANTRAL FOLLICLES IMPROVES IN VITRO MATURATION OUTCOME

AUTHOR/S

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ABSTRACT

Context: In vitro maturation (IVM) could reduce Assisted Reproductive Technique (ART)-related burden, risks and costs in selected patients. However, reduced efficiency compared to conventional ART precludes a more widespread uptake of the technique. Heterogeneity in IVM cycles protocols across clinics and a lack of knowledge of the physiology of oocyte maturation can be responsible for the low performance of IVM.

Objective: The establishment of a pre-maturation system for IVM (CAPA-IVM) which may improve developmental competence of human immature oocytes from small antral follicles.

Methods: Prospective pilot study in sibling cumulus-oocytes-complexes (COCs) donated by PCOS patients enrolled in a standard IVM program.

Patient(s): 30 PCOS women (AFC>30, follicles between 2 and 6 mm)

Intervention(s): Oocyte retrieval after 3 days stimulation with HP-hMG and without hGC ovulation trigger. Incubation of COCs in a pre-IVM culture step followed by IVM.

Main Outcome: CAPA-IVM increases meiotic maturation rate (70% vs 48%, p=0.0001) of COCs by 46% over standard IVM and doubled the amount of transferable day 3 embryos (43% vs 23%, p=0.0006) and good quality blastocysts (18% vs 8%, p=0.0116) per oocyte.

Measure(s): Maturation and fertilization rates, yield of Good Quality Embryos on Day 3 and Good Quality Blastocysts per COC, blastocysts aneuploidy rate; effect of CAPA-IVM on cumulus–oocyte connections, cumulus cell apoptosis, oocyte chromatin configuration.

Result(s): CAPA-IVM preserved the maintenance of trans-zonal projections and significantly improved maturation rate and blastocyst yield. NGS analysis of 20 good quality CAPA-IVM blastocysts did not reveal increased aneuploidy compared to age matched routine ICSI patients.

Conclusions: CAPA-IVM is more efficient than standard IVM and opens new horizons for developing safer, more patient friendly and cost-saving ART.

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