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PATIENCE IS A VIRTUE: THE CLINICAL VIABLITY OF EMBRYOS DERIVED FROM LATE MATURING OOCYTES

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OBJECTIVE:

During egg freezing cycles, patients who suffer from compromised ovarian reserve or low metaphase II (MII) oocyte counts at retrieval after stimulation may benefit from culturing immature oocytes. Yet, limited data has been published about developmentally delayed oocytes that undergo late maturation in culture prior to cryopreservation. This study assessed the clinical utility of blastocysts derived from late maturing oocytes.

MATERIALS AND METHODS:

The study included all patients who underwent an elective oocyte vitrification cycle(s) with subsequent thawing and fertilization from 2016 to 2022. After retrieval, immature oocytes (Germinal Vesicle and Metaphase I) underwent maturation in culture for 24 hours or until reaching the MII stage of oocyte development. All late-MII and normally developed MII oocytes were vitrified and then thawed prior to ICSI. All fertilized oocytes that reached the blastocyst stage of embryo development underwent preimplantation genetic testing for aneuploidy (PGT-A). A paired analysis with sibling Late-MII and MII oocyte(s) was performed in the same patient cycle(s). Fertilization rate, blastulation rate, and euploidy rates were evaluated. Descriptive 8analysis and paired Xi2-test, also a multivariate regression analysis fitted with a GEE model were performed for statistical analysis.

RESULTS:

A total of 128 patients underwent an oocyte thaw cycle. Patients had a mean age of 36.6 SD 3.4, BMI of 24.2 SD 4.4, AMH 3.3 SD 2.6, and an average of 16 SD 9.1 frozen oocytes during their retrieval cycle. 261 Late-MII oocytes were compared with 1370 MII oocytes. Oocyte thaw survival were comparable among Late-MII and MII oocytes (74.3% vs. 78.2%, p=0.17). Fertilization rates (55.5% vs 77.2%, p=<0.0001) and blastulation rates (40.5% vs 58.7, p=0.01)

were significantly lower in Late-MII compared with MII oocytes. An adjusted multivariate analysis confirmed a significant association between Late-MII oocytes and lower fertilization rate (aOR 0.26 CI95% 0.20-0.33), and lower blastulation rate (aOR 0.32 CI95% 0.22-0.43). No differences in the percent of euploid, aneuploidy or mosaic embryos were found between Late-MII and MII oocytes. Finally, an adjusted analysis showed no association between Late-MII oocytes and higher odds of embryo aneuploidy. (aOR 0.61 CI95% 0.37-0.80).

CONCLUSIONS:

Blastocysts derived from cryopreserved/thawed late maturing-MII oocytes have reproductive utility, albeit reduced in comparison to normally developing MII oocytes. Yet, we suggest egg freezing patients consider extended culture of late maturing oocytes in order to increase the number of oocytes that can be inseminated. Embryos derived from late maturing oocytes have the ability to develop normally, have reproductive potential, and provide increased ability for patients to achieve pregnancy.

IMPACT STATEMENT:

Implementation of in-vitro culture and maturation of immature oocytes in egg freezing cycles increases the total number of viable and/or euploid blastocysts available to patients at transfer; enhancing the patient's opportunity to build a family.

REFERENCES:

N/A