AMERICAN SOCIETY FOR REPRODUCTIVE MEDICINE
2023 SCIENTIFIC CONGRESS & EXPO

DOES LENGTH OF TIME IN CRYOSTORAGE AFFECT THE REPRODUCTIVE POTENTIAL OFVITRIFIED HUMAN OOCYTES?

Sarah C Roger, Samantha Lauren Estevez, Atoosa Ghofranian, Shawn Kripalani, Carlos Hernandez-Nieto, Morgan Baird, Joseph Lee, Alan B Copperman, and Rachel B Danis

(1) Icahn School of Medicine of Mount Sinai, New York, NY

(2) Reproductive Medicine Associates of New York, New York, NY

OBJECTIVE:

Oocyte cryopreservation (OC) has been used to circumvent age-related fertility decline and promote reproductive autonomy for the past two decades. Research has focused on the duration of cryostorage and reproductive potential of embryos. Yet, limited data exists on whether prolonged duration of time spent in liquid nitrogen affects thaw, fertilization, and blastulation rates of cryopreserved oocytes later used to create embryos.

MATERIALS AND METHODS:

This retrospective cohort study was conducted at a single academic center from 2011-2022. Women who underwent OC by vitrification for social reasons and returned to use oocytes for creation of embryos were included. Patients who were oocyte donors, did not return to thaw oocytes, underwent OC for medical indications, or whose oocytes were cryopreserved via slow freeze were excluded.

Data was divided into five cohorts based on duration of OC prior to thaw. Group 1: cryopreserved for <3years. Group 2: cryopreserved for 3-5 years. Group 3: cryopreserved for 5-7 years. Group 4: cryopreserved for 7-9 years. Group 5: cryopreserved for ≥9 years. The primary outcome was thaw survival rate. Secondary outcomes included fertilization and blastulation rates.

Statistical analyses were performed using SAS. Continuous data was reported as mean ± standard deviation or median (interquartile range). Comparative statistics were performed using chi-square and Kruskall-Wallis. Adjusted multivariate logistic regression analysis was performed to evaluate the association between duration of cryopreservation and thaw survival, fertilization, and blastulation rates. All p-values were two-sided and were considered significant if <0.05.

RESULTS:

315 OC cycles were identified and included in the analysis. No significant differences were found between maturation and fertilization rate per inseminated oocyte. Significant differences were found when comparing oocyte thaw survival rate ($p=0.031$) and blastulation rate ($p=0.018$). A significant difference in oocyte thaw survival was seen between Groups 1 and 3 (85.5% vs. 68.7%, $p<0.01$), and Groups 2 and 3 (79.7% vs. 68.7%, $p=0.03$). When comparing the oocyte thaw survival rate between individual groups, there was a significant difference between Group 5 and all other groups.

Logistic regression was performed to adjust for confounders with Group 1 as the standard. No association between duration of OC and thaw survival rate or odds of blastulation were seen. Group 4was associated with lower odds of fertilization based on duration of OC.

CONCLUSIONS:

These findings suggest that length of OC is not correlated with thaw survival, fertilization, or blastulation rates after adjusting for confounders. As insurance providers and employers expand benefits to include fertility preservation, more people will have access to this service. These findings reassure clinicians and patients that long-term OC does not seem to adversely affect viability of vitrified oocytes.

IMPACT STATEMENT:

As the number of people freezing oocytes increases, patients can be reassured that long-term cryostorage does not appear to affect the rate of thaw survival, fertilization, or blastulation.

REFERENCES:

1. Riggs R, Mayer J, Dowling-Lacey D, Chi TF, Jones E, Oehninger S. Does storage time influencepostthaw survival and pregnancy outcome? An analysis of 11,768 cryopreserved human embryos. FertilSteril. 2010 Jan;93(1):109-15. doi: 10.1016/j.fertnstert.2008.09.084. Epub 2008 Nov 21. PMID:19027110.