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

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Title:
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Preferred Presentation Type:
Oral or Poster

Study Type:
Retrospective Cohort Study (includes comparator groups)

Category - Subcategory(ies):
Fertility Preservation: Fertility Preservation General

References:

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Abstract Category:
Infertility

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Abstract Text:
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 <3 years. 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 4 was 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.

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Biographical Sketch Dr. Samantha Estevez is a fellow in Reproductive Endocrinology and Infertility at the Icahn School of Medicine at Mount Sinai in New York City and Reproductive Medicine Associates of New York. Dr. Estevez earned her Bachelor of Arts in History and Women’s Studies at the University of North Carolina at Chapel Hill where she graduated summa cum laude and with her honor’s thesis in Japanese history. She completed her medical school education at the Northwestern University Feinberg School of Medicine in Chicago and her residency in Obstetrics and Gynecology at the Donald and Barbara Zucker School of Medicine at Hofstra Northwell in New York. Throughout her medical training, Dr. Estevez has received numerous awards, including Northwestern’s Global Health Initiative Scholarship, the Northwell Health Culture of Care in Action Award, and induction into the Gold Humanism Honors Society. As a resident, Dr. Estevez was the Chief Resident of Research and a member of the residency interview committee. She has authored numerous articles in peer-reviewed
journals and presented at several prestigious conferences, including the American Society for Reproductive Medicine Annual Meeting, the American College of Obstetricians and Gynecologists Annual Meeting, and the World Professional Association for Transgender Health Annual Scientific Symposium. Her research and clinical interests include LGBTQIA+ fertility, access to care for underrepresented minorities, reducing health disparities, and fertility preservation.

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