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TOO MUCH OF A GOOD THING? ASSESSING THE OPTIMAL NUMBER OF OOCYTES TO THAW TO PREDICT THE LIKELIHOOD DEVELOPING TWO OR MORE BLASTOCYSTS

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OBJECTIVE:

As utilization of planned oocyte cryopreservation (OC) rises, patients are more frequently returning to thaw their oocytes with the goal of family building. Large oocyte thaws can create burdens to laboratory workflow, especially when robust utilization of thawed oocytes requires intracytoplasmic sperm injection, often combined with embryo biopsy for preimplantation genetic testing for aneuploidy. Patient benefit of thawing all available oocytes versus gradually thawing a smaller number from a large cohort of frozen tissue remains uncertain. Clarifying this variability could prevent the creation of supernumerary embryos and preserve unfertilized oocytes for reproductive autonomy. Therefore, it is paramount to calculate the optimal number of oocyte thaws to maximize the likelihood of blastocyst formation. This study analyzes the dynamic of an optimal threshold of oocyte thaws to yield two or more blastocysts.

MATERIALS AND METHODS:

This single center study includes all patients who underwent OC and returned for oocyte thaw from January 2012 to August 2023. Patients were divided into groups based on number of oocytes thawed (Group A: 0-6, B: 7-12, C: 13-18, and D: >18 oocytes). Primary outcome was rate of patients with ≥2 blastocysts formed after oocyte thaw. Subgroup analysis was performed on patients who thawed 100% and <100% of their cryopreserved oocytes. Kruskal Wallis and chi-square tests were used to compare groups, and logistic regression was used to calculate odds ratio and adjust for confounders; $p<0.05$ was considered significant. Received operator curves (ROC) were created to predict the threshold number of oocytes to thaw to predict the best chance of obtaining ≥2blastocysts, and a cut off value was obtained based on a sensitivity and specificity analysis.

RESULTS:

502 oocyte freeze-thaw cycles were included. 92.4% patients in group D (n=66) achieved ≥2blastocysts, compared to 85.3% in group C (n=102), 65.0% in group B (n=217), and 23.1% in group A (n=117) (p<0.01). After adjusting for age at OC and other confounders, compared to group D, patients in groups A and B had significantly lower odds of obtaining ≥2 blastocysts (A: aOR 0.04,95% CI 0.01-0.13; B: aOR 0.25, 95% CI 0.08-0.79); however, patients in group C had similar chances (aOR 0.61, 95% CI 0.18-2.15). Patients who thawed <100% of oocytes (n=126, median 8.0oocytes thawed) were just as likely to produce ≥2 blastocysts compared to those who thawed 100%of their oocytes (n=376, median 11.0 oocytes thawed), aOR 0.78, 95% CI 0.45-1.35. After analyzing ROCs and based on highest Youden Index, after adjusting for age at OC, a threshold of 10.9 thawed oocytes were needed to have a 60.6% chance of obtaining ≥2 blastocysts, with sensitivity 74.3%and specificity 79.0%.

CONCLUSIONS:

Adjusting for age at time of OC, patients who thaw 13-18 oocytes have similar chances of producing≥2 blastocysts compared to those who thaw >18 oocytes. However, patients who thaw <13 oocytes have lower chances of producing ≥2 blastocysts and may benefit from thawing all available oocytes, and if limited, might consider additional cryopreservation cycles.

IMPACT STATEMENT:

Patients can anticipate achieving ≥2 blastocysts when thawing 13 to 18 oocytes.

REFERENCES:

N/A