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PLOIDY IN EMBRYOS DERIVED FROM CRYOPRESERVED OOCYTES COMPARED TO FRESH OOCYTES FROM INFERTILE PATIENTS UNDERGOING FERTILITY TREATMENT

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OBJECTIVE:

The use of oocyte cryopreservation (OC) for fertility preservation has increased over the last decade. Vitrified-thawed oocytes have been shown to result in similar euploid rates compared to fresh oocytes retrieved during in vitro fertilization (IVF) (1). However, that finding may be questioned due to study design, which often includes heterogeneous populations comprising oocyte donors, patients diagnosed with cancer, and infertility. Further, prior results conflict on whether infertile patients undergoing IVF produce higher aneuploid rates compared to fertile patients (2). This study evaluates embryo euploidy in patients with no history of infertility who underwent planned OC compared to a matched cohort of infertile counterparts undergoing IVF.

MATERIALS AND METHODS:

This single center study included all patients who underwent OC and returned for oocyte thaw with preimplantation genetic testing for aneuploidy (PGT-A) from January 2016 to March 2024. OC patients were 1:3 matched by oocyte age, body mass index, and year of PGT-A to infertile controls undergoing IVF with PGT-A. Infertile controls were defined as age <35 years trying to conceive for≥12 months, or ≥35 years trying to conceive for ≥6 months. The study only evaluated patients' first retrieval cycle. Oocyte donors and patients using surgically extracted sperm were excluded. Primary outcome was euploid rate. Secondary outcomes were aneuploid and mosaic rates, blastulation rate, and total and mature oocytes (M2s) retrieved. Wilcoxon rank, chi-square, and logistic regression were used for statistics; $p<0.05$ was considered significant. A priori power analysis showed that 388biopsied blastocysts per group would detect a 10% difference in euploidy rate with 80% power and alpha error of 0.05.

RESULTS:

230 paired OC-thaw cycles and 690 IVF cycles of infertile patients were included. The OC cohort included 922 blastocysts from 3586 cryopreserved M2s; the IVF cohort included 3371

blastocysts from 8102 fresh M2s. OC patients produced more oocytes than IVF patients (19.1±10.0 vs15.5±10.5, p<0.01) and more M2s (15.6±8.3 vs 11.7±8.1, p<0.05); after thaw, OC patients still had more M2s than IVF patients (12.3±6.8 vs 11.7±8.1, p=0.03). Blastulation rate was higher in IVF patients (52.9 vs 42.8%, p<0.01), with 4.9±4.2 blastocysts produced compared to 4.0±3.3 in OC patients. In univariate analysis, euploid rate was similar in the OC and IVF groups (50.0 vs 53.2%, p=0.09). Aneuploid and mosaic rates were also similar (34.9 vs 33.8%, p=0.51; 11.9 vs 9.7%, p=0.05). After adjusting for covariates, OC patients continued to have similar odds of euploidy compared to IVF patients (aOR 0.91, 95% CI 0.8-1.1). OC patients had similar odds of aneuploidy compared to IVF patients (aOR 0.99, 95% CI 0.8-1.2); though slightly higher odds of mosaicism (aOR 1.28, 95% CI 1.0-1.6).

CONCLUSIONS:

Patients undergoing OC may be counseled that their expected euploid rate after oocyte thaw is comparable to age-based estimates of euploidy in infertile patients undergoing IVF, though they may have lower blastulation rates after oocyte thaw.

IMPACT STATEMENT:

Fertile patients undergoing OC produce similar euploid rates compared to infertile patients undergoing IVF.

REFERENCES:

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