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DOES OOCYTE VITRIFICATION-WARMING IMPACT BLASTOCYST ANEUPLOIDY RATES?

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OBJECTIVE:
There is emerging research quantifying the effect of vitrification on oocyte integrity and IVF outcomes. Oocyte vitrification-warming has been proposed to cause meiotic spindle disruption leading to altered chromatin structure. Previous research concluded a neutral impact of oocyte cryopreservation on embryonic aneuploidy rates, albeit those studies often had small sample sizes, included slow-freeze cycles, and were conducted prior to significant technological improvements to vitrification. The current study aimed to compare blastocyst aneuploidy rates from IVF with PGT, using fresh and vitrified oocytes.

MATERIALS AND METHODS:
This single center, retrospective cohort study included IVF cycles and compared blastocysts from fresh and vitrified-warmed oocyte cycles that underwent PGT-A from 2010 to 2021. Donor oocyte cycles were excluded.

RESULTS:
Vitrified-warmed oocytes were more likely to result in embryos that were cryopreserved on days 6 and 7 ($p<0.01$) compared to fresh oocytes. Fresh and vitrified-warmed oocytes resulted in similar blastocyst aneuploidy rates (OR 0.79, CI 0.38-1.67). While the number of blastocysts were similar between the two groups, vitrified-warmed oocytes resulted in less favorable rates of fertilization (OR 0.14, CI 0.05-0.40) and blastulation (OR 0.14, CI 0.04-0.48) [Table].

CONCLUSIONS:
Our findings demonstrate that vitrifying and re-warming oocytes does not alter blastocyst ploidy rates. There is anecdotal evidence that the structural integrity of oocytes could be negatively impacted by cryopreservation, resulting in less efficient reproductive outcomes after thawing. Vitrified-warmed oocytes resulted in slower developing embryos, had inferior fertilization and decreased blastulation rates. However, the negative impact of oocyte vitrification at the molecular level does not appear to affect the embryonic genome, as aneuploidy rates did not significantly differ from that of embryos sourced from fresh oocytes.

IMPACT STATEMENT:
While providers may utilize this data to support the preferential use of fresh oocytes when available, they should continue to reassure patients that oocyte cryopreservation is a suitable option for fertility preservation.

	Fresh Oocyte Cycles (n=11190)	Vitrified-Warmed Oocyte Cycles (n=132)	p value

Patient age	37.5 ± 4.4	40.4 ± 4.1	<0.01
Oocyte age	36.8 ± 4.6	37.2 ± 3.6	0.41
AMH	2.8 ± 3.2	3.3 ± 2.3	0.19
BAFC	12.6 ± 7.2	13.2 ± 6.5	0.38
BMI	24.1 ± 4.5	23.6 ± 4.0	0.24
Day of embryo development (%) 5 6 7	6711 (60.0) 3976 (35.5) 472 (4.2)	50 (37.9) 70 (53.0) 12 (9.1)	<0.01
Fertilization Rate (%)	79.3 ± 16.9	71.1 ± 19.1	<0.01
# Blastocysts	6.7 ± 5.1	4.6 ± 3.1	<0.01
Blastulation Rate (%)	74.3 ± 20.7	61.9 ± 25.0	<0.01
# Aneuploid Embryos	1.9 ± 1.8	1.2 ± 1.0	<0.01
Aneuploid Rate (%)	47.0 ± 35.4	50.8 ± 40.2	0.22