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Title:

Fresh Versus Frozen Euploid Embryo Transfer into a Synthetically Prepared Endometrial Cavity: Examining the Effect of Blastocyst Vitrification on Cycle Outcome

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Objective:
Compared to a frozen-thawed embryo transfer (FET), patients undergoing fresh IVF embryo transfer (ET) after ovarian stimulation may experience suboptimal embryo-endometrial receptivity and/or lower implantation rates. Recent studies have demonstrated a tendency towards increased birthweight in FET vs. non-IVF conceptions. Oocyte donor (OD) recipient cycles, involving ET within a physiologic endometrial environment, provide an ideal model to study whether the vitrification and re-warming process, itself, influence early embryo development, endometrial interaction and implantation.

Design:
Retrospective cohort study

Materials and Methods:
OD recipients that underwent a fresh or frozen ET of a euploid embryo, from December 2011 to March 2016, were included. Blastocysts were derived from fresh donor oocytes and underwent trophectoderm biopsy. Main outcome measures included implantation (IR), clinical pregnancy (CPR), early pregnancy loss (EPL) and multiple pregnancy rates (MPR). A sub-analysis involving single ET (SET) only cycles was conducted. T-test, chi-square and binary logistic regression analysis was used.

Results:
Thirty-two screened donor oocyte embryos were transferred fresh (n=25 patients) and 46 were frozen-thawed and transferred (n=14 patients. Demographic, cycle characteristics and outcome data is shown in Table 1. The fresh cohort had significantly higher IR (80.0% vs. 65.1%, $P<0.05$), CPR (80.0% vs. 55.8% , $P<0.05$) and MPR (12.0% vs. 4.6%, P=NS) (Table 1). These

outcomes were equivalent in the sub-analysis limited to SETs. After adjusting for the number of blastocysts transferred, recipient age and BMI and oocyte age, the odds of IR (OR 1.8 [95% CI 0.6-5.9], p=0.31), CPR (OR 2.7 [95% CI 0.9-8.6], p=0.09) and EPL (OR 0.4 [95% CI 0.1-2.0], p=0.29) did not differ among the fresh or frozen cohorts.

Conclusions:

The transfer of a single, frozen-thawed, euploid blastocyst dramatically reduces the incidence of multiple gestations, while maintaining high implantation and pregnancy rates. Knowledge that the process of vitrification and thawing of preimplantation embryos, itself, does not affect cycle outcome should reassure patients and clinicians and further promote the strategy of embryo banking to facilitate successive single FETs.

Support:

None

Table 1:

	Fresh OD ET	Frozen OD ET	P value
Total cycles	25	43	
Patient's age at ET	43.4 ± 4.0	44.4 ± 4.0	NS
Oocyte's age	26.9 ± 3.7	28.5 ± 4.5	NS
BMI	23.2 ± 3.6	23.0 ± 4.0	NS
Endometrial Thickness at transfer (mm)	8.8 ± 1.9	8.5 ± 1.7	NS
Peak E2	670.6 ± 440.9	760.3 ± 532.2	NS
Number of Embryos Transferred	1.28 ± 0.46	1.07 ± 0.26	<0.05
Number of SETs	18	40	
Proportion of ETs with high quality blastocysts (>=4BC)	93.8% (30/32)	95.7% (44/46)	NS
Implantation rate (IR) SET IR	80.0% (20/25) 77.8% (14/18)	65.1% (28/43) 65.0% (26/40)	<0.05 NS
Clinical pregnancy rate (CPR) SET CPR	80.0% (20/25) 77.8% (14/18)	55.8% (24/43) 55.0% (22/40)	<0.05 NS
Multiple pregnancy rate (MPR) SET MPR	12.0% (3/25) 5.6% (1/18)	4.6% (2/43) 5.0% (2/40)	NS NS
Early pregnancy loss rate (LR) SET LR	12.0% (3/25) 11.1% (2/18)	16.3% (7/43) 15.0% (6/40)	NS NS