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EXPANSION GRADE OF POST THAW EMBRYOS AND IMPLANTATION POTENTIAL

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OBJECTIVE:

Preimplantation genetic testing for aneuploidy (PGT-A) includes laser-assisted hatching which affects the rate of embryo expansion. The study evaluated the relationship between expansion grades of post thaw, euploid embryos and implantation potential.

MATERIALS AND METHODS:

This study included patients who underwent autologous single euploid embryo transfer (SEET) cycles at a single academic center from September 2016 to February 2022. All PGT-A testing was performed using next generation sequencing (NGS). All patients underwent a synthetic endometrial preparation cycle. Transfer cycles were grouped based on blastocyst expansion at cryopreservation and at subsequent thaw. Demographic and embryonic characteristics were collected. The primary outcome was implantation rate. Secondary outcomes included ongoing pregnancy and live birth, biochemical pregnancy rate, and early pregnancy loss rate. Comparative statistics were performed with ANOVA, Kruskal-Wallis, and chi-square. Data was also analyzed using a multivariate regression analysis fitted with a general estimate equation (GEE) model. A sample size of 356 patients per group was calculated in order to have 80% power to detect a 10% difference in implantation rate ($\alpha=0.05$).

RESULTS:

A total of 9,628 cycles were identified, in which 6,870 cycles included embryos frozen and thawed with an expansion of 4 or 5 (Group 1), 1,585 cycles included embryos frozen with an expansion of 4 or 5, and thawed with an expansion of 6 (Group 2), and 1,173 cycles included embryos frozen and thawed with an expansion of 6 (Group 3). After adjusting for oocyte age, BMI, endometrial thickness at transfer, number of prior transfers with PGT-A tested embryos, and embryo morphologic quality, embryos from group 1 had a higher odds of implantation when compared to group 3 (aOR 1.32, 95% CI 1.14, 1.52), while embryos from group 2 had no



difference in implantation when compared to group 3 (aOR 0.90, 95%CI 0.76, 1.06). Similarly, embryos from group 1 had a higher odds of ongoing pregnancy and live birth (OPLB) when compared to group 3 (aOR 1.29, 95% CI 1.12, 1.49), while embryos from group 2 had no difference in OPLB (aOR 0.88, 95% CI 0.74, 1.04) compared to group 3. After adjusting for the same variables, there were no significant differences among the groups in biochemical pregnancy loss and clinical pregnancy loss rates.

CONCLUSIONS:

This study showed that post thaw, euploid embryo expansion grade affects implantation and OPLB rates. Euploid embryos with post thaw expansion of 4 or 5 have increased odds of implantation and OPLB compared to euploid embryos with a post thaw expansion of 6. Our study findings suggest that euploid embryos transferred with a zona pellucida had higher implantation and OPLB rates, which may suggest protective properties to cellular integrity that may support reproductive potential throughout the vitrification and re-warming process.

IMPACT STATEMENT:

Fully hatched embryos with a post thaw expansion grade of 6 are less likely to implant when compared to embryos with expansion 4 or 5.

REFERENCES:

N/A