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CHANGE IN EMBRYO SCORE POST CRYOPRESERVATION AND EMBRYO TRANSFER SUCCESS RATES

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OBJECTIVE:

The day of blastocyst biopsy, expansion, and grade of trophectoderm (TE) and inner cell mass (ICM) are associated with the likelihood of embryo implantation. However, the extent of expansion and grading can change after warming. The objective of this study is to assess whether the change in embryo morphology post thaw is associated with embryo transfer success rates in single euploid embryo transfer (SEET) cycles.

MATERIALS AND METHODS:

Patients who underwent SEET cycle September 2016 – April 2022 were included. A decision support tool was used to assign each embryo a reproductive potential score based on the day of biopsy, expansion, and grade of TE and ICM at the time of cryopreservation and post thaw. (1) Embryos were divided into 4 groups: Group 1 included embryos with the same score post thaw (reference), Group 2 higher score, Group 3 lower score, and Group 4 embryos that did not re-expand post thaw. Primary outcome was live birth rates per embryo transfer (LBR). Secondary outcomes were pregnancy, biochemical loss, clinical pregnancy, and clinical pregnancy loss. Comparative statistics and univariate analyses were performed using Kruskal-Wallis and chi-square tests. Multivariate logistic regression fitted with generalized estimating equation was performed to compare the odds of live birth between groups.

RESULTS:

A total of 7750 patients met inclusion criteria: 5331 in Group 1, 486 in Group 2, 1726 in Group 3, and 207 in group 4. On univariate analysis, there was a statistically significant difference in LBR between groups 1, 2, 3, and 4. Logistic regression controlling for oocyte age, AMH,

BMI, baseline antral follicle count and endometrial thickness showed significantly lower odds of LBR when the embryo is downgraded (OR 0.731, CI 0.644-0.829, p=<.0001) or does not re-expand (OR 0.256, CI 0.18-0.366 p=<.0001), compared with no change. There was no statistically significant difference in LBR between embryos that had improved score versus those without a change (OR 0.985, CI 0.782-1.241, p=0.8989). There was no significant difference in biochemical or clinical pregnancy loss between the groups.

CONCLUSIONS:

The change in quality of the embryo post thaw is an important factor in embryo transfer success. The pregnancy, implantation, and LBR per embryo transfer are all significantly decreased in embryos that were downgraded or did not expand on the day of SEET.

IMPACT STATEMENT:

A change in grade post thaw may reflect the innate quality of the embryo and its reproductive potential.

REFERENCES:

1. Friedenthal, J. et al. Clinical implementation of algorithm-based embryo selection is associated with improved pregnancy outcomes in single vitrified warmed euploid embryo transfers. J Assist Reprod Genet. 2021 Jul;38(7):1647-1653. doi: 10.1007/s10815-021-02203-3. Epub 2021 May 1.