

## STAGE OF TRANSFERRED BLASTOCYST MAY AFFECT PREGNANCY OUTCOMES WHEN TIMED WITH ENDOMETRIAL RECEPTIVITY ASSAY (ERA)

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**Objective:** ERAs have become popular tests in fertility patients with recurrent implantation failure and are used to personalize the timing of the transfer of embryos based on endometrial receptivity. Our study was performed to determine if blastocyst (BL) stage, at time of transfer, influences pregnancy outcomes when transferred based on ERA recommendations.

**Design:** We performed a retrospective analysis of 200 single, euploid frozen embryo transfers (FETs) from patients who underwent ERA testing between 2018-2020. FET cycles were divided into groups based on stage of BL post thaw, early BL (B) (n=68), expanded BL (ExB) (n=56), hatching BL (HB) (n=42), and fully hatched BL (fHB) (n=34). Differences in implantation rates (IR), ongoing pregnancy rates (PR), and biochemical rates (BR) were statistically compared between groups.

**Materials and Methods:** Between January 2018 and February 2020, 200 ERA timed, single euploid FETs were performed. Cycles that resulted in the transfer of two embryos or non-tested embryos were excluded. Pictures of embryos taken post thaw, 2+ hours before transfer, were analyzed, and cycles were divided into four groups based on BL stage post thaw.

- Group I – (B), 0% hatching out of zona
- Group II – (ExB), <25% hatching out of zona
- Group III – (HB), ≥25% hatching out of zona
- Group IV – (fHB), embryo fully hatched out zona

Results were analyzed by Chi square analysis. A *P* value of <.05 was considered statistically significant.

**Results:** The synchronization between the developing embryo and endometrium is essential for successful pregnancy. Transfers were divided into groups of B, ExB, HB, and fHB, achieving IR of 44%, 71%, 55%, and 50%, respectively, and PR were as follows, 35%, 50%, 38%, 24% (Table 1). ExB did have significantly higher IR than B ( $p<0.001$ ). ExB also had significantly higher PR compared to fHB ( $p<0.05$ ). There was no significant difference in BR among groups.

Table 1:

| Blastocyst Stage | FETs<br># | Implantation Rate<br># (%) | Pregnancy Rate<br># (%) | Biochemical Rate<br># (%) |
|------------------|-----------|----------------------------|-------------------------|---------------------------|
| B (Group I)      | 68        | 30 (44) <sup>a</sup>       | 24 (35)                 | 4 (6)                     |
| ExB (Group II)   | 56        | 40 (71) <sup>a</sup>       | 28 (50) <sup>b</sup>    | 5 (9)                     |
| HB(Group III)    | 42        | 23 (55)                    | 16 (38)                 | 5 (12)                    |
| fHB(Group IV)    | 34        | 17 (50)                    | 8 (24) <sup>b</sup>     | 4 (12)                    |

<sup>a</sup> Group II implantation rate significantly different than group I

<sup>b</sup> Group II pregnancy rate significantly different than group IV

**Conclusion:** The transfer of an ExB based on ERA timing was associated with higher IR and PR compared to other BL stages. Personalized medicine has been promoted with individualized stimulation protocols and ERAs, which have improved results through identification of the optimal “window of implantation.” The embryo remains another major factor, and success can further be improved by personalizing embryo transfers based on BL stage at time of transfer. Further investigation is required to confirm these initial findings.

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**References:** None