FROZEN EMBRYO TRANSFER OUTCOMES WITH THE RAPID i CLOSED VITRIFICATION CARRIER: IMPACT OF DELAYED BLASTULATION AND BLASTOCYST MORPHOLOGY ON CLINICAL PREGNANCY OUTCOMES

Nina Desai, Ph.D., Ankita Upadhye, Jeffrey Goldberg, M.D., Cynthia Austin, M.D. and Tommaso Falcone, M.D.

OB-GYN, Women’s Health Institute, Cleveland Clinic Fertility Center, 26900 Cedar Rd Beachwood, OH, 44122, USA Correspondence: desain@ccf.org

STUDY QUESTION
Does blastocyst morphology or day of blastulation affect clinical success rates with vitrified blastocysts?

SUMMARY ANSWER
The pregnancy potential of Day 5 vs. Day 6 vitrified blastocysts was significantly different. Delayed blastulation appeared to negatively impact embryo competence to implant. Even with high grades, expanded day 6 blastocysts, both CPR and IR were lower than with Day 5 vitrified blastocysts of equivalent grade.

WHAT IS ALREADY KNOWN

Pregnancy rates appear higher with fresh day 5 versus day 6 transfers. It is not clear if this is due to blastocyst quality or endometrial receptivity. Time lapse data suggest that the kinetics of blastocyst formation correlate to implantation potential and possible risk of aneuploidy. Frozen embryo transfer results with blastocysts vitrified on day 5 of 6, and replaced in a better synchronized endometrium may provide a better understanding of the impact of delayed blastulation on embryo competence. This study examines the implantation and pregnancy potential of blastocysts vitrified using the Rapid i carrier.

STUDY DESIGN, SIZE AND DURATION

Data was retrospectively analyzed from frozen embryo transfer (FET) cycles carried out between April 2011 and December 2013. Study group consisted of 209 consecutive transfer cycles with vitrified-warmed blastocysts (VBL). Data was stratified according to day of vitrification (DS VBL vs D6 VBL) and blastocyst grade. Survival, clinical pregnancy rate (CPR) and implantation rate (IR) were compared. Post-warming morphology was also examined.

MATERIALS AND METHODS

Blastocysts were graded using the ESHRE scoring system: Grade 1—early blastocyst, Grade 2—full blastocyst; Grade 3—expanded blastocyst and Grade 4—hatched or hatching blastocyst. Blastocysts grades 2-4 with a discernable ICM and well organized trophoderm were frozen on day 5 or 6. Blastocysts (n=394) were cryopreserved using a two step vitrification protocol. The vitrification protocol was:

- Expanded blastocysts were collapsed prior to vitrification. Vitrification of blastocysts of all grades.
- Optimal in vitro culture environment that is limited potential. This may ultimately affect the investigation with a larger data set is warranted to determine if late developing blastocysts have limited potential.

Findings / Wider Implications

Delayed blastulation on day 6 may be indicative of impaired embryonic potential. The cause of delayed blastulation could be intrinsic to the embryo (chromosomal content) or the result of a less than optimal in vitro culture environment that is negatively influencing embryonic development. Currently, limited published studies are available on the Rapid i vitrification system. Our present work demonstrates the effectiveness of the Rapid i for vitrification of blastocysts of all grades.

REFERENCES