REPRODUCTIVE POTENTIAL OF DOUBLE INNER-CELL MASS EMBRYOS: A CASE SERIES AND MATCHED ANALYSIS IN SINGLE EUPLOID BLASTOCYST TRANSFERS

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Title:
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Infertility: Outcomes

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Abstract Category:
Infertility

Abstract Text:
OBJECTIVE:
Standardization of PGT-A and elective transfer of single euploid embryos (SEET) have significantly reduced twin pregnancy outcome after ART treatment. However, the presence of monozygotic splitting
MZS) after SEET remains a possibility. Recent research about factors associated with MZS has focused on the presence of two inner cell masses (ICM) within the same blast. Yet, due to limited information, more clinical data about the reproductive potential of “double-ICM” transfers is required.

MATERIALS AND METHODS:
We analyzed patients who underwent IVF/PGT-A between 2016 and 2023. Only patients who underwent a single euploid FET with endometrial preparation were included. At the time FET, blastocysts were morphologically graded, and cohorts were selected based on the presence of a double ICM. IVF outcomes of these cohorts were compared with those of a control population consisting of normal ICM embryos. Controls were selected from a propensity score matched 10:1 population, matched by patient age, body BMI, AMH, endometrial thickness at FET, and year of treatment. Patient demographics and FET outcomes were analyzed and compared between the two groups using T-test, U-test and \( \chi^2 \) tests. A two-sided P value of < 0.05 was considered significant.

RESULTS:
18 FETs with double ICM embryos were analyzed, 17 (94.4%) had a positive pregnancy test. Of these 17, 7 (41.2%) experienced a biochemical pregnancy loss, while 10 continued to a clinical pregnancy (58.8%). Out of the 10 clinical pregnancies, all were carried to term, with 2 patients delivering twins (20%) and the rest delivering singletons (80%). In one case, 2 gestational sacs were present during early pregnancy scans, but one of the sacs was absorbed early and the other sustained development until the patient delivered one healthy baby. In 2 other cases, monochorionic diamniotic twins were observed and both pregnancies continued to delivery.

A sub analysis was conducted comparing 179 matched control SEET cycles. There were no significant differences in oocyte age, age at FET, BMI, day 3 FSH, endometrial thickness, and previous euploid embryo transfers between cohorts. However, the double ICM FETs had significantly higher positive pregnancy test rate (94.4% vs 73.2%, p=0.04) and comparable implantation (55.5% vs 60.8%, p=0.65); clinical pregnancy (55.5% vs 58.6%, p=0.04); and live birth rates (64.4% vs 47.4%, p=0.62) compared with normal ICM FETs. Furthermore, Double ICM embryos had significantly higher biochemical pregnancy loss (41.2% vs 16.8%, p=0.01) and multiple pregnancy rates (20% vs 1.2%, p=0.002).

CONCLUSIONS:
An objective assessment of the characteristics of the ICM, beyond the standard grading system, should be implemented as a standard of care. Our study findings suggest that double ICM euploid embryos have a higher risk of biochemical pregnancy loss and monozygotic splitting, but similar implantation, clinical pregnancy and live birth rates compared to single ICM embryos.

IMPACT STATEMENT: Double ICM embryos have higher risk of pregnancy loss and monozygotic splitting. Double ICM embryos should be considered for use in cases where no other viable embryos are available for transfer and with proper counseling of the patients.
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Biographical Sketch Richard Slifkin, TS(ABB), CLT(NYS) currently serves as the Clinical Embryology Associate Laboratory Director at Reproductive Medicine Associates of New York (RMA of New York). Mr. Slifkin graduated with a Bachelor’s degree in Biology from New York University in 2006 and began his career in embryology that same year. Mr Slifkin has worked at RMA of New York in many capacities, first as an assistant in the embryology laboratory before training in embryology, then as a supervisor, and now as Associate Director. During that time, Mr. Slifkin helped transition RMA of New York from day 3 biopsies to trophectoderm biopsies and now performs thousands of trophectoderm biopsies each year. He enjoys training the next generation of embryologists and has a dedication to optimizing lab operations. Mr. Slifkin holds a Technical Supervisor certification (TS) from the American Board of Bioanalysis and a Clinical Laboratory Technologist License(CLT) from New York State. In addition to his clinical work, Mr. Slifkin has coauthored multiple peer-reviewed scientific manuscripts and dozens of abstracts in the pursuit of increasing the success of assisted reproductive technologies (ART). He has
presented numerous times at the annual American Society for Reproductive Medicine (ASRM) conference and is a member of ASRM, the Society of Reproductive Biologists and Technologists (SRBT), the American Association of Bioanalysts (AAB), and the New York Metropolitan Embryology Society (NYMES).

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