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MORPHOKINETICS AND REPRODUCTIVE POTENTIAL OF DAY 7 EMBRYOS

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Title:

MORPHOKINETICS AND REPRODUCTIVE POTENTIAL OF DAY 7 EMBRYOS

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Preferred Presentation Type:

Oral or Poster

Study Type:

Retrospective Cohort Study (includes comparator groups)

Category - Subcategory(ies):

ART: Laboratory

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Nothing to disclose. No off-label or otherwise non-approved product use.

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Trainee: Yes

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OBJECTIVE: While embryos suitable for biopsy and cryopreservation on day 7 exhibit poorer reproductive potential than those eligible on day 5 or 6, day 7 euploid embryos can still lead to live births. It remains unknown whether morphokinetic characteristics observed on day 6, including as

expansion and inner cell mass (ICM)/trophectoderm (TE) quality, can predict the outcome of day 7 euploid single euploid embryo transfer (SEET). This study aims to evaluate whether day 6 morphological metrics are associated with SEET outcomes from day 7 embryos.

MATERIALS AND METHODS: This retrospective cohort study included patients who underwent their first SEET with a day 7 embryo between January 2016 – December 2024. Embryos were grouped by developmental stage and morphological quality on day 6: Group 1: Slow Development (Embryos that had not yet reached full blastocyst expansion on day 6, and were classified as compacted, morula, or early blastocyst (expansion 1-3)); Group 2: Poor Quality, Expanded Blastocyst (Embryos that reached full expansion on day 6 (expansion 4-6) but were assigned TE and ICM grades ineligible for biopsy). Embryo quality at the time of day 7 cryopreservation was categorized as: Good quality (ICM and TE grades of A/B); Fair quality (ICM and/or TE Grade C). The primary outcome was ongoing pregnancy/live birth (OP/LB). Secondary outcomes included pregnancy, clinical pregnancy, and clinical pregnancy loss. Descriptive and univariate analyses were performed using Wilcoxon-Ranks Sum and chi-square. Logistic regression adjusted for patient age at SEET, oocyte age, BMI, endometrial thickness, year of cryopreservation and SEET, and embryo quality at biopsy.

RESULTS:

A total of 337 SEET cycles using embryos cultured to day 7 were included. Of these, 221 embryos were classified as Slow Development (Group 1), and 116 embryos were classified as Poor Quality, Expanded Blastocysts (Group 2) based on day 6 morphology. There was no difference between groups in embryo quality at time of day 7 cryopreservation, with 49.1% of embryos in Group 1 and 50.9% in Group 2 graded as good quality ($p=0.79$). Group 1 embryos were associated with significantly higher pregnancy (58.8% vs 40.5%, $p = 0.001$), clinical pregnancy (43.4% vs 26.7%, $p = 0.003$), and OP/LB (34.4% vs 20.7%, $p = 0.009$) rates compared to Group 2. Clinical pregnancy loss rates did not differ between groups (20.8% vs 22.6%, $p = 0.84$). On multivariable analysis, Poor Quality, Expanded Blastocysts on day 6 (Group 2) remained associated with lower odds of OP/LB compared to Slow Development embryos (Group 1) (OR 0.373, 95% CI 0.203-0.684, $p= 0.001$). Similar findings were observed in the secondary outcomes.

CONCLUSIONS: The reproductive potential of day 7 embryos varied based on their day 6 morphology even when they showed comparable grades at the time of transfer. Day 7 embryos that had not yet reached expanded blastocyst stage on day 6 demonstrated better reproductive outcomes compared to those requiring extended culture to improve ICM/TE quality.

IMPACT STATEMENT: Day 6 morphology assessment offers valuable prognostic insight into the reproductive potential of day 7 euploid embryos, supporting more refined embryo selection and personalized counseling strategies.

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Biographical Sketch Jensen Reckhow is a PGY-3 Resident in Obstetrics and Gynecology at Mayo Clinic. She completed her BS in Environmental Engineering and MPH at Yale University. She conducted translational immunology research at NIH for two years prior to attending Ben Gurion University in Israel for medical school. This is her first time attending

and presenting at ASRM and she is looking forward to learning from this passionate and inspiring community.

Within the past 2 years, have you or your spouse/partner had any potential COI?

No

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Biographical Sketch Early success, marked by his first publication in CELL at Harvard Medical School, inspired Joseph to continue his research endeavors in reproductive endocrinology and infertility. Joseph has been with Reproductive Medicine Associates of New York since 2011. Joseph has authored over 400 peer-reviewed abstracts & manuscripts. Passionate about development, he cultivates relationship with investors & entrepreneurs to advance reproductive endocrinology & infertility care.

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Biographical Sketch Christine Briton-Jones, PhD HCLD serves as the Director of Laboratory Services at Reproductive Medicine Associates of New York (RMA of New York) and as a faculty member of the Reproductive Endocrinology and Infertility (REI) fellowship of Mt. Sinai School of Medicine. Prior to joining RMA in 2015, Dr. Briton-Jones trained in Australia and worked in combined research and clinical positions in Australia, Hong Kong, and directorial positions in California, Utah, Idaho and Nevada. Dr. Briton-Jones has over 20 years of experience in clinical embryology and has participated in developing and refining the laboratory techniques that have contributed to the growing success of assisted reproductive technologies with over 150 peer reviewed scientific manuscripts and abstracts published in international journals. While in Hong Kong, Dr. Briton-Jones secured over \$1 million in grants to fund research projects and developed Y-chromosome microdeletion screening services through the Hospital Authority of Hong Kong. While in California, she was the research director for ART Reproductive Center in Beverly Hills, the embryology service for UCLA and Cedars Sinai Medical Center. Dr. Briton-Jones is a frequent presenter at the American Society for Reproductive Medicine's annual conference as well as the Pacific Coast Reproductive Society annual meeting, and was an invited speaker at fertility conferences in the United States, Scotland, England, Canada, Australia, Guadalajara, Mexico; mainland China and Hong Kong. She was an Associate Editor of Reproductive Biology and Endocrinology Journal (RBEJ) from 2005 to 2016 and is an ad hoc reviewer for Fertility and Sterility; Journal of Reproductive Biology and Endocrinology, Reproductive Biology and Endocrinology Journal Online, Journal of Assisted Reproduction and Genetics,

Theriogenology Journal, and the Human Reproduction and Molecular Human Reproduction Journals.

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Organization Name	Relationship Type	Who has this Relationship?	
Progyny	Company Officer Relationship Began - Friday, August 25, 2017 Relationship Ended - Thursday, June 1, 2023 Paid Consultant Relationship Began - Relationship Ended - Direct Stockholder Relationship Began - Friday, August 25, 2017 Relationship Ended - Friday, November 1, 2024	Self	

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Biographical Sketch Richard Slifkin, MS, TS(ABB), CLT(NYS) serves as the Associate Laboratory Director at Reproductive Medicine Associates of New York. Rick is a frequent presenter and has led the development and dissemination of best practices for embryology laboratory efficiencies and how to employ emerging technologies to lower staff burnout while improving pregnancy rates and integrity of specimen identity.

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