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PROGNOSTIC UTILITY OF SERUM BETA HUMAN CHORIONIC GONADOTROPIN (HCG) LEVEL FOLLOWING SINGLE EUPLOID EMBRYO TRANSFER (SEET) FOR LIVE BIRTH

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Title:
PROGNOSTIC UTILITY OF SERUM BETA HUMAN CHORIONIC GONADOTROPIN (HCG) LEVEL FOLLOWING SINGLE EUPLOID EMBRYO TRANSFER (SEET) FOR LIVE BIRTH

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Preferred Presentation Type:
Oral or Poster

Study Type:
Retrospective Cohort Study (includes comparator groups)

Category - Subcategory(ies)s:
Patient Centered Care: Education & Information
Patient Centered Care: General

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Abstract Text:
OBJECTIVE: A low initial hCG level following SEET confers worse prognosis and often requires an adjustment of patient expectations. It is unknown if there is a hCG threshold below which live birth does not occur. This study describes the chance of live birth based on initial serum hCG level following SEET and evaluates whether this chance is modified by day of blastocyst biopsy.

MATERIALS AND METHODS: This single center retrospective cohort study included patients who underwent SEET resulting in a positive serum hCG (≥2.5 mIU/mL) from 9/2016 to 6/2024. Cycles were grouped by initial hCG: 2.5-10.9 (Group 1), 11-24.9 (Group 2), 25-49.9 (Group 3), 50-74.9 (Group 4), 75-99.9 (Group 5), and ≥100 mIU/mL (Group 6). The primary outcome was live birth per transfer resulting in positive hCG. Secondary outcomes included ectopic pregnancy. Subgroup analyses were performed by blastocyst biopsy day (5, 6, 7). Chi square tests were used for comparative statistics. Poisson regression with a log link fitted with generalized estimating equations (GEE) was used to estimate relative risks (RRs) and 95% CIs for the association between initial hCG and live birth, adjusted for age, body mass index, and treatment year.

RESULTS: 6,410 SEET cycles with initial positive hCG were included. Overall live birth was 70.9% (n= 4,544 of 6,410). Initial hCG ≥100 (Group 6) had the highest chance of live birth, with similar outcomes across biopsy days in all hCG groups except Group 3 (25-49.5) (Table 1). Group 5 (75-99.9) had a lower chance of live birth than Group 6 (≥100) (RR 0.87, 0.83-0.91); Group 4 (50-74.5) had a lower chance than Group 5 (RR 0.86, 0.80-0.93); Group 3 (25-49.5) had a lower chance than Group 4 (RR 0.56, 0.49-0.63); Group 2 (11-24.5) had a lower chance than Group 3 (RR 0.32, 0.24-0.44); and Group 1 (2.5-10.5) had a lower chance than Group 2 (RR 0.17, 0.08-0.37). Ectopic pregnancy risk was higher in Groups 1 and 2 (6.9%, 6.8%) compared to Groups 3-6 (0.2-2.2%) ($p<0.01$). Six cycles in Group 1 (1.6%) led to live birth, with 4.07 mIU/mL the lowest initial hCG observed.

CONCLUSIONS: Initial serum hCG after SEET is a strong predictor of live birth, with a stepwise and linear relationship in rising hCG thresholds. While rare, live birth can occur with initial hCG <11 mIU/mL. An initial hCG <25 mIU/mL warrants close monitoring for risk of ectopic pregnancy.

IMPACT STATEMENT: Initial hCG levels demonstrate prognostic utility and may guide patient counseling following SEET.

Table 1. Live birth by initial hCG level following SEET of day 5, 6, and 7 blastocysts

Initial hCG (mIU/mL)	**Day 5 n=3769**	**Day 6 n=2443**	**Day 7 n=198**	**P value**	**Combined n=6410**
Group 1 (2.5-10.9) (%)	2.4	1.1	0.0	0.57	1.6
Group 2 (11-24.9) (%)	9.3	14.4	10.0	0.34	11.6
Group 3 (25-49.9) (%)	28.8	42.7	41.9	0.01	35.5
Group 4 (50-74.9) (%)	62.3	65.6	62.9	0.74	63.8
Group 5 (75-99.9) (%)	75.1	77.6	73.7	0.77	76.1
Group 6 (≥100) (%)	88.1	87.0	97.3	0.60	87.7

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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.
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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 Dr. Lucky Sekhon is a double board certified OBGYN and REI at RMA of New York. She is passionate about empowering people by educating them about their reproductive health and options for fertility preservation and family building.
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Biographical Sketch Phillip Romanski, M.D., M.Sc., is a Reproductive Endocrinology and Infertility physician at RMA of New York in Manhattan and is a faculty member at the National Institutes of Health. He is an expert in family-building including the evaluation and management of female and male infertility, third-party reproduction, and fertility preservation. Dr. Romanski completed his residency in Obstetrics and Gynecology at Harvard Medical School (Brigham and Women's Hospital/Massachusetts General Hospital) and his fellowship in Reproductive Endocrinology and Infertility at the Weill Cornell Medical Center/NewYork-Presbyterian Hospital. Dr. Romanski additionally serves as the Associate Research Director for US Fertility and has authored over 60 peer-reviewed research publications with a particular interest in patients with a history of unsuccessful treatment and patients with diminished ovarian reserve. In recognition of his research contributions, he has received multiple national awards and has subsequently been invited to speak at both national and international conferences to present his work.
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