AMERICAN SOCIETY FOR REPRODUCTIVE MEDICINE
2024 SCIENTIFIC CONGRESS & EXPO

IS TROPHECTODERM GRADE ASSOCIATED WITH BIRTH WEIGHT IN PATIENTS UNDERGOING SINGLE EUPLOID EMBRYO TRANSFERS?

Sarah Roger, Samantha Lauren Estevez, Kerry S.J. Flannagan, Arthur Arcaz, Atoosa Ghofranian, Lucy Greenwald, Jamie Frost, Jiarui Wang, Joseph A. Lee, Phillip A Romanski, Kathleen Devine, Alan B. Copperman, Jerrine Morris

1. Reproductive Medicine Associates of New York, New York, NY
2. Icahn School of Medicine at Mount Sinai, New York, NY
3. US Fertility, Rockville, MD
4. Shady Grove Fertility, Rockville, MD
5. Shady Grove Fertility, Baltimore, Baltimore, MD

OBJECTIVE:

Fetal placenta is derived from trophectoderm (TE) cells. Abnormal placentation can lead to growth restriction in utero. This may increase the likelihood of small for gestational age (SGA) neonates at birth, defined as weight below the 10 percentile for the gestational age. Morphologic assessment of quality is used to prioritize transfer of embryos with greater reproductive potential. Limited research has explored the relationship between TE grade and obstetric outcomes such as neonatal weight at time of delivery. This study evaluates the relationship between TE grade prior to single euploid embryo transfer (SEET) cycles and rates of SGA, aiming to examine the possible association between this placental precursor and birth weight.

MATERIALS AND METHODS:

This retrospective cohort study was conducted at two private fertility clinics and included patients who underwent a programmed SEET from 2016 to 2021. Only SEETs that used vitrified-thawed blastocysts and achieved a live, singleton, term delivery were included for analysis. Demographic data, including patient age, sperm age, reproductive history, and infertility diagnosis were collected.

The Gardner embryo grading system was used to assess trophectoderm quality. There were 6,597 embryos that met inclusion criteria. Nearly all embryos had a TE Grade A or B (n=6,576, 99.7%). The remaining 21 SEETs (0.3%) had a TE Grade C and thus were excluded from analysis. All inner cell mass (ICM) scores and expansion grades were included. The primary outcome was

the risk of SGA. Secondary outcomes included the risk of large for gestational age (LGA) neonates and mean birth weight.

Risk ratios (RR) were estimated for each outcome comparing cohorts using Poisson regression models fitted with generalized estimating equations (GEE), adjusting for patient age and body mass index (BMI).

RESULTS:

A total of 6,576 embryos met final inclusion criteria: Grade A included 4,381 embryos and Grade B included 2,195 embryos. The risk of SGA was similar between groups, 5.8% for Grade A and 5.9% for Grade B. The risk of LGA was similar between groups, 15.4% in Grade A and 13.7% in Grade B.

After adjusting for confounders, the risk of SGA for Grade B was similar to that of Grade A (RR 1.02, 95% CI 0.83–1.25) and risk of LGA was similar between groups (RR=0.89, 95% CI 0.78–1.01). Mean birth weight (3455.7g +/- 471.2 vs 3428.5g +/- 460.2) was similar between groups as well (Mean ratio 0.99, 95% CI 0.986–0.999). Expansion grade and ICM grade were significantly different between groups, with Grade B having overall poorer scores ($p<0.001$).

CONCLUSIONS:

The variance in TE grade within SEET cycles does not seem indicative of abnormal placentation or neonatal birth weight, given that the clinical outcome showed no association with SGA or LGA. Further research into the relationship between morphology on early placental tissue and neonatal outcomes is warranted.

IMPACT STATEMENT:

While the risk of SGA is multifactorial, TE grade in a SEET cycle does not appear to be indicative of early placental tissue development or term delivery birth weight.

REFERENCES:

1. Hertig, AT. The placenta: some new knowledge about an old organ. Obstet Gynecol 20:859, 1962