EMBRYO DEVELOPMENT RATE, EUPLOIDY AND PREGNANCY OUTCOMES
BIRGIT WAGER

Original presenters:
Laura Francesca Rienzi
Justin Tan
TIME OF MORULATION AND TROPHECTODERM QUALITY ARE ASSOCIATED WITH LIVE BIRTH AFTER EUPLOID BLASTOCYST TRANSFER: A MULTICENTER STUDY


Time of morulation and trophectoderm quality are associated with live birth
Introduction and overview

Study Question:

• Does the morpho-dynamic characterization of human euploid blastocysts’ preimplantation development increase the prognostic value upon their reproductive competence?
• In Phase 1, 511 SETs, FET Cycles (N=147 center 1; N=364 center 2; training set) from 1069 PGT-A cycles were retrospectively recruited. A **predictive model** of LB was defined.

• In Phase 2, this model was tested in a validation set including 319 consecutive SETs from 546 PGT-A cycles performed in 3 IVF centres.

• The ongoing pregnancy rate (OPR) was defined as primary outcome
Main Results

• The average LB rates was 40%
• The euploid blastocysts resulting in a LB showed concordant significantly faster development than non-implanted/miscarried ones for tPB2, t4, t5, t8, s3, cc3, tM and tSB
• High-quality ICM and the TE at tB were concordant as positively associated with a LB
• However, the multivariate logistic regression outlined only tM and TE quality as putative predictors
• A model was then created based on TE quality (high or low) and tM (<80hr or ≥80hr) (SAUC of 0.65 from the ROC curve analysis)
• High-quality TE at tB and a tM <80hr resulted in an OPR of 61.2% (N=41/67)
• Low-quality TE at tB and a tM≥80hr resulted in an OPR of 30.0% (N=15/50; p<0.01) (ROC curve showed a poorly clinically-significant AUC of 0.59)
Conclusions

• The TE Quality at tB was the only parameter deriving from a static morphological evaluation associated with euploid blastocysts reproductive competence. The ICM in a multivariate analysis was not.

• TM was the only parameter deriving from morpho-dynamic evaluation associated with euploid blastocysts reproductive competence
SLOW EMBRYO DEVELOPMENT PREDICTS HIGH ANEUPLOIDY RATES AMONG HIGH GRADE BLASTOCYSTS BUT DOES NOT INFLUENCE PREGNANCY OUTCOMES IN EUPLOID BLASTOCYST TRANSFER CYCLES

Justin Tan, MD MPH
Rahana Harjee, Chen Jing, Arohumam Kan, Gary Nakhuda
University of British Columbia & Olive Fertility Centre, Vancouver, BC, Canada

Slow embryo development predicts higher aneuploidy rates among high grade
Introduction and Overview

Study Question:

• Is there a relationship between day of blastocyst expansion and embryonic ploidy status?

• In euploid SET cycles, does earlier blastocyst development correlate with improved pregnancy outcome?
Study Description

- Retrospective cohort study
- 4761 embryos were biopsied on day 5 (n=3871) or day 6 (n=890)
- **Euploid rate** was the primary outcome of interest and was calculated according to the day of biopsy and stratified by morphologic grading (good: 5/6AA-BB, average: 5/6BC-CC, poor: 3/4BB-CB) and patient age
- Secondary outcomes included implantation (IR) and ongoing pregnancy rate (OPR) in subsequent euploid transfer cycles
- **Implantation rate** was calculated based on a positive pregnancy test after ET
- **Ongoing pregnancy rate** was defined by the presence of a viable fetal heart rate >7 weeks’ gestation
Results

- A higher euploidy rate was observed among day 5 compared to day 6 blastocysts overall (53.01% vs. 39.75%, p<0.0001).

- Aneuploidy rates ↑ with maternal age and no difference in euploid rates was observed among day 5 vs. 6 blastocysts in women 41-years-old (33.33% vs. 23.17%, p=0.22).

- Significantly ↑ euploid rate was also observed among high grade embryos compared to low grade embryos (47.43% vs. 28.23%, p<0.0001);
Results Continued

• Day 5 biopsied blastocysts demonstrated a significantly ↑ euploid rate compared to day 6 biopsied blastocysts among high grade embryos (55.15% vs. 44.87%, p=0.0002),

• No difference in euploid rates was observed among lower grade embryos (23.68 vs. 28.64%, p=0.64).

• Overall, no significant difference in IR or OPR between day 5 and day 6 blastocysts was observed (72.41 vs. 70.91% and 71.42 vs. 65.63%, respectively).

• High grade embryos demonstrated improved IR compared to lower grade embryos (73.20 vs. 62.50%, p=0.047) but OPR were not significantly different (69.35 vs. 55.00%, p=0.10).

• High grade embryos biopsied on day 5 yielded similar IR and OPR compared to day 6 (72.29 vs. 73.47%, p=0.87, and 71.67 vs. 68.06%, p=0.57, respectively).
Conclusion

• Euploid Rates decreased with increasing maternal age and lower morphological grading.
• These results demonstrate that early blastocyst formation is only associated with higher euploidy rates among high-grade embryos in women <40-years-old.
• This supports the selection of day 5 over later developing embryos as they are more likely to be euploid.
• Early embryo development does not predict improved pregnancy outcomes in PGT-A cycles, but may be a useful embryo selection adjunct to morphologic grading in non-biopsied cycles.
• Differences in pregnancy outcomes between day 5 and day 6 blastocysts may be the result of higher aneuploidy rates; once this is eliminated the pregnancy outcomes are the same