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BLASTOCYST MORPHOLOGY IS A POOR INDICATOR OF EUPLOID STATUS. A. Picou,[a] A. Hellmers,[b] K. Silverberg,[c] M. VerMilyea.[b] [a]Embryology, Ovation Fertility, Austin, TX; [b]Ovation Fertility, Austin, TX; [c]Texas Fertility Center, Austin, TX.

OBJECTIVE: To evaluate the importance of blastocyst morphology in known euploid blastocysts.

DESIGN: Retrospective study in a private assisted reproductive technology program.

MATERIALS AND METHODS: The euploid status of blastocysts considered to be of marginal morphology was compared to that of good morphology blastocysts following trophectoderm biopsy and preimplantation genetic screening (PGS). Over a period of 9 months, 683 blastocysts of marginal and good quality were selected for trophectoderm biopsy and aneuploidy screening. All embryos were cultured in Continuous Single Culture Media (Irvine Scientific) to the blastocyst stage. On Day 3 of embryo development, multi-cell embryos were artificially hatched by laser ablation of the zona pellucida. Hatching blastocysts with a differentiated inner cell mass and trophectoderm were biopsied on either Day 5, 6 or 7 of culture. Biopsied embryos were categorized by morphology grade. The embryo grading scheme used in our laboratory is an adaption of the Gardner Grading Scale where AA is best quality and ED is poor quality. Blastocysts that had a grade of CC or better (ie. C or better for both the inner cell mass and trophectoderm) were placed in the good morphology group (Group 1), whereas marginal quality blastocysts (Group 2) were graded as CD, EC, or ED. Biopsied samples were analyzed by comprehensive chromosomal screening (CCS) involving the use of array comparative genomic hybridization (aCGH) or next generation sequencing (NGS) technology by a reference laboratory. Biopsies which resulted in no signal were excluded from the study. All age groups were included.

RESULTS: Of the 683 embryos, 554 were categorized into Group 1, while 129 were categorized into Group 2. Group 1 embryos had a normal ploidy rate of 44% compared to 34% for Group 2 blastocysts. Statistical analysis by Chi-Square demonstrated no statistical difference ($p > .05$) between the euploid rate of Group 1 and Group 2 embryos.

CONCLUSIONS: Recent studies have suggested that all poor morphology and slower growing blastocysts should be biopsied to determine euploid status and therefore implantation potential (Capalbo, 2014). Our results indicate that marginal quality blastocysts are capable of being euploid at a comparable rate to good quality embryos and should therefore be considered for trophectoderm biopsy and PGS. Further evaluation of the implantation potential of euploid marginal and good quality blastocysts is currently ongoing. Determination of implantation rates of marginal quality euploid blastocysts will take time, as typically the best morphological grade blastocysts are prioritized for transfer. Regardless, these findings suggest that the morphologic criteria used by most IVF laboratories in determining biopsy suitability for blastocysts may need to be reassessed in order to afford patients an optimal opportunity for pregnancy per IVF retrieval.

References:

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LIVE BIRTHS AFTER TRANSFER OF REBIOPSY AND REVITRIFICATION OF BLASTOCYST THAT HAD "NO DIAGNOSIS" FOLLOWING TROPHECTODERM BIOPSY. H. Lee, D. H. McCulloh, R. Olivares, A. Goldstein-Tufaro, C. McCaffrey, J. Grifo. OB/GYN, New York University Fertility Center, New York, NY.

OBJECTIVE: Report of successful clinical outcomes and live births following transfer of re-biopsied and re-analyzed blastocysts that had yielded no diagnosis from the initial biopsy and array comparative genomic hybridization (aCGH) procedure.

DESIGN: Retrospective cohort analysis.

MATERIALS AND METHODS: Trophectoderm (TE) biopsy and aCGH for aneuploidy screening was performed on blastocysts generated from 1035 patients between January 2011 to 2014 at an academic based institute. All blastocysts were vitrified immediately following TE biopsy pending aCGH analysis. Forty-six patients who had at least one blastocyst that did not result in aCGH diagnosis opted to undergo warming, re-biopsy and re-vitrification of "no diagnosis" blastocyst in an effort to obtain a diagnosis second time around. Blastocysts resulting in a euploid diagnosis following the re-biopsy procedure were transferred in subsequent frozen embryo transfer (FET) cycles. The main outcome measures were euploidy, implantation and live birth rates

RESULTS: Overall, 5060 blastocysts were analyzed from 1035 preimplantation genetic screening (PGS) cycles, 155 (3%)of all biopsied blastocyst had "no diagnosis". Of these 155 blastocysts without diagnosis, 88 blastocysts were warmed, 82(93%) survived and underwent re-biopsy for re-analysis. Twenty-one re-biopsied blastocysts from a total 17 individual patients were diagnosed as euploid (26%) and were suitable for subsequent FET. Seven patients have already undergone a subsequent FET of a re-biopsied single euploid blastocyst. The survival rate for blastocysts undergoing second warming was 100% (7/7) resulting in an implantation rate of 57% (4/7) and birth of three normal healthy babies (male) to date.

CONCLUSIONS: A small percentage of TE samples fail to yield a diagnosis following PGS analysis. Our observations show that blastocysts that have undergone PGS with no diagnosis after biopsy can be safely re-biopsied, implant and result in live births despite repeated vitrification, biopsy and warming procedures.This particularly relevant in cases where no other euploid blastocyst are available for transfer.

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THE EFFECT OF EMBRYO SELECTION BY PREIMPLANTATION GENETIC DIAGNOSIS FOR ANEUPLOIDY (PGD-A) IN PATIENTS WITH ADVANCED MATERNAL AGE. A. Vereczkey, G. Teglas, L. Nanassy. Versys Clinics Human Reproduction Institute, Budapest, Hungary.

OBJECTIVE: The aim of this retrospective analysis is to compare the conventional morphology-based embryo selection (MBS) method to the use of PGD-A in case of patients with advanced maternal age.

DESIGN: Retrospective data analysis.

MATERIALS AND METHODS: Data were collected between January of 2013 and February of 2016 at our clinic. All autologous cycles were included with advanced maternal age (AMA; 37-42 years of age) and fresh embryo transfer. Patients with known chromosome rearrangement were excluded. In PGD-A group all transferred embryo(s) were known euploid, while in MBS group transferred embryos had an unidentified chromosome profile. Oocytes were fertilized using ICSI or IVF in the MBS group while in PGD-A group only ICSI was used. In case of PGD-A group blastomere biopsies were carried out and the samples were analyzed with 24sure BAC microarrays (Illumina). All embryo transfers were carried out at day 5. Chemical, clinical, ongoing pregnancy and miscarriage rates were recorded. Ongoing pregnancy was noted if pregnancy had completed at least 12 weeks of gestation. Miscarriage was noted in case of pregnancy loss after detected fetal sac.

RESULTS: In the PGD-A group 78 euploid embryos were transferred in 63 cycles with an average number of 1.24 embryos per cycle. The chemical, clinical and ongoing pregnancy rates were 50.79%, 44.44% and 36.51%, respectively. In the MBS group the average number of transferred embryos was significantly higher (1,49 vs. 1.24; $p<0.01$) compared to PGD-A group. No difference was found in chemical (47.06%) and clinical (37.65%) pregnancy rates. However the ongoing pregnancy rate was significantly lower in the MBS group (22.35% vs 36.51%, $p<0.05$) compared to the PGD-A group. A significantly lower miscarriage (14.29 vs. 40.63, $p<0.05$) and a higher sustained implantation rates (34.62% vs. 16.54%, $p<0.01$) were observed in the PGD-A than in the MBS group.

CONCLUSIONS: Here we show that PGD-A is a more efficient for AMA patients to select viable embryos for transfer than conventional morphology-based selection. PGD-A not only supported higher ongoing and sustained implantation rates but also lower miscarriage rate. With the utilization of PGD-A not only the number of embryos transferred can be decreased but the risk for miscarriage can be lowered which is a major benefit compare to conventional IVF/ICSI treatments.