O-175 Tuesday, October 9, 2018 10:45 AM

EVALUATION OF SPERM MITOCHONDRIAL DNA COPY NUMBER AS A PREDICTOR OF IN VITRO FERTILIZATION/ INTRACYTOPLASMIC SPERM INJECTION (IVF/ICSI) CYCLE OUTCOMES IN A LARGE INFERTILE POPULATION.

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OBJECTIVE: Male factor accounts for approximately half of infertility diagnoses, however, few prognostic tests of sperm quality or function exist. Recent evidence suggests that sperm mitochondria may serve as a biomarker for sperm health and fertility potential (1,2). The present study sought to determine whether sperm relative mitochondrial DNA copy number (mtDNA CN) influenced fertilization, blastulation, blastocyst euploidy, and live birth rates in an infertile population.

DESIGN: Prospective cohort

MATERIALS AND METHODS: Consent was prospectively obtained for use of de-identified, otherwise discarded whole sperm material. Random sampling identified 2100 unique sperm samples used to create transferred embryos (2007-2013); 1718 cycles utilizing intracytoplasmic sperm injection (ICSI) were analyzed. Cycles using frozen sperm were excluded. mtDNA CN was evaluated using several TaqMan assays targeting different sites around the circular mitochondrial genome, and normalized to a multicopy nuclear control (ALU). Linear regression and mixed effects logistic regression models were used to explore relationships between sperm mtDNA CN and the various parameters of interest.

RESULTS: Lower relative sperm mtDNA CN was associated with increased pre-wash sperm motility ($p<0.001$). No association was identified between relative sperm mtDNA and paternal age, days of abstinence prior to sample collection, fertilization ($p¼0.40$), blastulation ($p¼0.36$), euploidy ($p¼0.10$) (preimplantation genetic testing was used in 490 cycles), or live birth rates ($p¼0.42$) when accounting for maternal age (mean 34.3 years), paternal age (mean 37.1 years) and pre-wash motility.

CONCLUSIONS: Lower sperm relative mtDNA copy number was associated with increased sperm motility, consistent with observations from other investigators. However, once a high quality euploid blastocyst was obtained, sperm relative mtDNA copy number did not add any additional prognostic FERTILITY & STERILITY_ e75 value with regard to transfer outcome in this sample of patients undergoing IVF/ICSI. References: 1. Song GJ, Lewis V. Mitochondrial DNA integrity and copy number in sperm from infertile men. Fertil Steril 2008;90:2238-44. 2. Fragouli E et al. Clinical implications of mitochondrial DNA quantification on pregnancy outcomes: a blinded prospective non-selection study. Hum Reprod 2017;11:2340-7. Supported by: Foundation for Embryonic Competence