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HUMID VS. DRY EMBRYO CULTURE CONDITIONS ON EMBRYO DEVELOPMENT: A CONTINUOUS EMBRYO MONITORING ASSESSMENT.

R. Del Gallego,[a] C. Albert,[a] J. Marcos,[b] Z. Larreategui,[c] L. Alegre,[a] M. Meseguer.[a] aIVIRMAValencia, Valencia, Spain; bIVIRMA Murcia, Murcia, Spain; cIVIRMA Bilbao, Leioa, Spain.

OBJECTIVE: Advances in embryo culture strategies seeking to mimic in vivo conditions raise questions regarding the adequacy of the current use of dry incubators combined with oil covered media systems. The aim of the present study is to determine the effects of atmospheric humidity on embryo development by performing a continuous embryo monitoring assessment and an oxidative stress profiling.

DESIGN: Prospective randomized controlled trial including a total of 1,734 embryos from 176 patients.

MATERIALS AND METHODS: Embryos were cultured in the time-lapse incubator Geri_ (Genea Biomedx, Australia) with 6 patient-individual chambers. 3 chambers worked under humid conditions (HC) and 3 under dry conditions (DC), 83 and 93 patients respectively. Geri dishes with 80 mL of culture media were covered with an oil overlay, and cultured for 5-6 days. The effects of humidity were assessed retrospectively with regard to blastocyst, pregnancy and miscarriage rates. Its influence over morphokinetic parameters was evaluated by using the time-lapse system. Additionally, a preliminary study regarding the oxidative status of the spent embryo culture media was conducted using the TCL (Thermochemiluminescence) Analyzer TM.

RESULTS: Odds ratios were adjusted for patient's age, body mass index, fresh sperm concentration, number metaphase II oocytes, fertilization rate and number of transferred and vitrified embryos. A significantly higher blastocyst rate ($p<.05$) was found in embryos cultured under HC (HC ¼ 74.5% vs. DC ¼ 69.2%). Although no statistical differences were found in pregnancy and miscarriage rates, due to the reduced sample sizes, a clear trend was observed towards a higher number of pregnancies (HC ¼ 83.3% vs. DC ¼ 66.7%) and less miscarriages (HC ¼ 16% vs. DC ¼ 26.5%) in the HC group. Regarding the morphokinetic parameters, embryos cultured under HC reached the 5-cell stage significantly earlier ($p<.05$) than DC incubated embryos (HC ¼ 46.3h vs. DC ¼ 49.7h). Finally, the preliminary assessment of the culture media's oxidative status showed higher oxidative stress levels in media cultured under DC.

CONCLUSIONS: Our results suggest a clear improvement on embryo development and subsequent IVF outcome when embryos are cultured in a humidified atmosphere, replicating an in vivo state. Additionally, oxidative status profiling proved a potential impact of humidity on culture media e362 ASRM Abstracts Vol. 110, No. 4, Supplement, September 2018 with lower oxidative stress levels in humid culture conditions. This could be explained by culture increased stability in a humid environment, directly affecting

osmolarity and pH levels. Further studies with larger sample sizes are required to confirm our findings.