

ESHRE European IVF Monitoring (EIM) Trends

The unique and far reaching data collection of ESHRE's EIM consortium is now in its 12th year and on 11th September in Munich the group will celebrate the 10 year anniversary of its first publication. Ten year trends have shown a continuing increase in ART pregnancy rates, despite the transfer of fewer embryos in each cycle: from 26% to 30% for IVF and ICSI, and from 15% to 19% for frozen cycles. Although the number of egg donation cycles remains low, pregnancy rates have increased from 27% to 42%.

The data has also shown a 10 year decline in multiple delivery rates, from 29.5% when records began to 20.5% in 2005. Last year in Amsterdam, the EIM report noted European multiple rates below 20% for the first time.

The most striking trend in 10 years of EIM data has been the proportional increase in the use of ICSI, which is now double that of IVF in European practice. This is a complete reversal in trend from what was apparent a decade ago – from 65% IVF and 35% ICSI in 1997 to 37% IVF and 63% ICSI in 2005.

Near-Infrared (NIR) Analysis of Day 5 Embryo Culture Media from Cohorts of Patients Embryos

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The complication of greatest consequences in IVF treatment is the high multiple pregnancy rate. Multiple pregnancies carry a higher incidence of medical, perinatal and neonatal complications and, hence, lead to higher care costs. Single embryo transfer (SET) is the only effective way to minimize the risk of multiple pregnancies. Because only one embryo is transferred during SET, the identification of the embryo with an optimum implantation potential becomes critical. Currently this is based largely on the morphological characteristics of an embryo. Non-invasive metabolomic profiling of embryo's surrounding medium and generates a viability score. This methodology has been presented as an adjunct to morphology in improving the identification of the most viable embryo for transfer (Seli et al. 2009). The objective of this study was to assess the viability score for individual patients' cohorts of Day 5 embryos and determine whether differences in scores could have an impact on the fate of an individual embryo's chances of selection.

Embryos were group cultured in 20µl of Cook cleavage medium until Day 3 and then individually in Cook blastocyst medium. Embryos were selected for transfer or cryopreservation based on a Day 5 morphology assessment. After the transfer up to 5 embryo media samples and blank controls were assessed using the ViaMetrics-E NIR spectral analysis platform in the clinic, as part of a beta testing phase of the diagnostic equipment and procedure. This diagnostic equipment and procedure examine individual metabolomic profiles of media samples using NIR spectroscopy. Biomarkers indicative of viability have been previously identified by examining the NIR spectra of the negative and positive FCA outcome groups. Partial Least Squares, a multivariate regression, proprietary bioinformatic and leave-one-out cross validation were used to develop a predictive algorithm that generates the viability score. In total, 439 embryos were assessed from 114 patients. The metabolomic profile of the embryo culture media samples were expressed as a viability score which reflects the implantation potential of an embryo.

Results: A mean 3.9 Day 5 embryos (range 1-5) were assessed for each patient. Analysis of all 439 embryo media yielded viability scores ranging from 0.2 to 1.03. The mean (+SD) viability score was 0.52 ± 0.16 . Within an individual patient's cohort of embryos, the average variability in the viability score was 0.29 ± 0.17 . In this study, there was no significant difference found among mean viability scores across blastocyst morphology grades: Grade 1 (n=66: 0.52 ± 0.15), Grade 2 (n=87: 0.50 ± 0.15), Grade 3 (n=171: 0.53 ± 0.17). However, the embryos which ranked highest by viability score were selected for transfer only 26% of the time (31/119). This indicates that in 74% of the cases another embryo may have been indicated for selection using the viability score.

Conclusion: The current study shows that Day 5 embryos of varying morphology display a wide variation in their metabolomic viability scores. The data further show that the Day 5 embryo with the best morphology within the cohort also had the best viability score in only 26% of cases. Based on the published literature to date regarding the value of metabolic and or metabolomic profiling, this study supports the concept that choosing embryos with the best metabolic and or metabolomic profile within a cohort, in addition to morphology could have a significant impact on the identification of the best embryo for SET. Prospective trials are in process where this technology is used to select the most viable embryo within a cohort.

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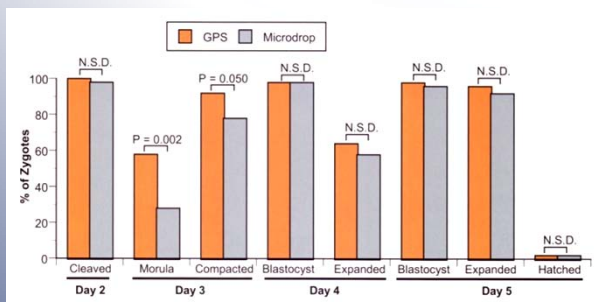
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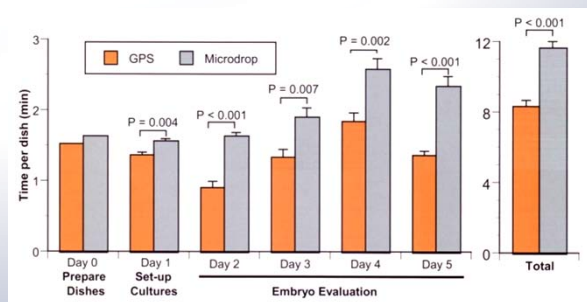
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