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TROPHECTODERM CELL CYCLE LENGTH ASSOCIATED WITH THE IMPLANTATION POTENTIAL: DESCRIPTION OF NOVEL EMBRYONIC PARAMETERS THROUGH TIME-LAPSE TECHNOLOGY.

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OBJECTIVE: Time-lapse technology allows timing of the most relevant events in embryo development. This increases the probability of selecting the highest quality embryo. However, not all seemingly good quality embryos lead to implantation raising the need of defining new selection variables. A precise morphokinetic evaluation was conducted with the high optical quality incubator Embryoscope Plus_. In order not only improve the embryo selection parameters, but also to introduce new variables, which have not been evaluated so far.

DESIGN: A retrospective analysis, including 242 patients, was conducted. 253 embryos transferred were evaluated out of 530 viable embryos. Single embryo transfer (SET) was performed for 211 of them, known as KID embryos (Known Implantation Data). All of them were cultured in a time-lapse incubator (Embryoscope Plus_).

MATERIALS AND METHODS: All the embryos were evaluated with the Embryoviewer_. Drawing tools were used to measure new variables, including: the distance travelled by the pronuclei from their syngamy up to their disappearance, the speed of this migration, blastocyst expanded diameter, inner cell mass (ICM) area and the trophectoderm cell cycle length. Data obtained was assessed in terms of clinical outcome and statistically analyzed with ANOVA test and Chi-squared test (SPSS software).

RESULTS: New variables analyzed showed values associated with different clinical outcomes. Implantation rate improved significantly ($p<.05$) as the blastocyst expanded diameter increased (48.8% for 161-177mmvs. 64.4% for 178- 190mm vs. 77.80% for >190 mm). According to our data, embryos with ICM area between 2580-3264mm2 reached a better implantation rate than smaller and larger ones. The same happens with the distance travelled by pronuclei, which showed better results between 9-17mm (72.7%) than out of range (57.6%). In terms of speed of pronuclear migration, the fastest displayed highest implantation rates (70.8% for >1.6 mm/h vs. 62.3% for <1.6 mm/h). Trophectodermcell cycle length was shorter than blastomere cell cycle. Nevertheless, our data suggest, embryos with longer trophectoderm cell cycle tend to achieve higher implantation rates (68.3% for >8.27 h vs. 53.6% for <8.27h).

CONCLUSIONS: Our novel analyzed variables show a clear influence over the implantation rate. However, a larger sample size would be necessary to confirm our observations. A possible subsequent consolidation of our variables in embryo selection

could lead to the development of new algorithms improving the selection of the best quality embryo.