

CLINICAL CHARACTERISTICS SHOULD NOT BE OVERLOOKED WHEN SELECTING EMBRYOS CULTURED IN A TIME-LAPSE INCUBATOR SYSTEM

OBJECTIVE

Single embryo transfers (SETs) have become indispensable to maximize live birth rates while avoiding multiple pregnancies. The development of a non-invasive embryo implantation predictor has become crucial for reproductive medicine. Time-lapse imaging systems (TLS) allow for the mapping of morphological changes or events with the exact time-point of occurrence. Analysis of implantation-related morphokinetic characteristics has facilitated the development of algorithms for implantation prediction. The main drawback of most studies is that each embryo is treated as an individual, and clinical and stimulation-related confounding factors are ignored. The aim of this study was to investigate the influence of morphokinetic events and patients and cycles characteristics on embryo implantation.

MATERIALS AND METHODS



Recorded kinetic markers

- Timing to pronuclei appearance (tPNa)
- Timing to pronuclei fading (tPNf)
- Timing to two cells (t2)
- Timing to three cells (t3)
- Timing to four cells (t4)
- Timing to five cells (t5)
- Timing to six cells (t6)
- Timing to seven cells (t7)
- Timing to eight cells (t8)
- Timing to blastulation (tB)
- Duration of cc2 (t3-t2) and cc3 (t5-t3)
- Timing to s1 (t2-tPNf), s2 (t4-t3), and s3 (t8-t5)

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> The effect of morphokinetic events and patients and cycles characteristics on embryo implantation was evaluated by multiple regression models

Maternal age, number of follicles, retrieved and mature oocytes, oocyte yield, presence of endometriosis, male and ovarian factors of infertility were also added to the model

To cross-validate the results, variables which significantly affected embryo implantation were included in a stepwise discriminant analysis for the prediction of grouping variable implantation outcome, defined as positive or negative. Cut-off points for the selected variables were established halfway between averages in both implantation groups

| ESULTS | | |
|-----------------|---------------------|---------|
| | | |
| | Multiple regression | Cut-off |
| Variables | Implantation | |
| Female age | OR: 0.813, p=0.041 | 37.1 |
| FSH dose (IU) | OR: 0.998, p=0.003 | 2701.2 |
| Follicles (n) | OR: 1.947, p=0.018 | 10.1 |
| MII oocytes (n) | OR: 1.133, p=0.001 | 5.4 |
| t8 (h) | OR: 0.938, p=0.040 | 56.6 |
| s3 (h) | OR: 0.922, p=0.029 | 7.8 |

 Table 1. Significant differences observed in kinetic markers
and patient's clinical characteristics from implanted blastocyst and non-implanted blastocyst

> Discriminant analysis

Correctly classified 77.8% of original cases

Best predicting negative implantation (98.8%)

CONCLUSION

Our evidences underline the importance of patient's individual characteristic for the development of any algorithm for embryo implantation. Ignoring the impact of confounder's factors, as the embryo origin, may weaken the model and its predictive value.









