P-145 usefulness of morphokinetic data to predict pregnancy rates of day-6 blastocyst transfers

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Study question: Can a scoring model based on morphokinetic data developed to predict pregnancy rates of day-5 blastocyst transfers (KIDSCORE™D5) predict pregnancy rates of day-6 blastocyst transfers?

Summary answer: KIDSCORE™□D5 was able to predict the clinical pregnancy rates of embryo transfers done on day 6 with an area under the curve (AUC) of 0.72.

What is known already: KIDSCORE™□D5 is a scoring model based on morphokinetic data developed to predict the pregnancy rates of day-5 blastocysts. In 2019, Regnier et al. reported that the AUC of KIDSCORE™□D5 for predicting clinical pregnancy rates of day-5 blastocyst transfers was 0.6. However, as KIDSCORE™□D5 is constructed based on morphological characteristics and developmental dynamics of day-5 blastocysts, it is unclear whether KIDSCORE™□D5 can predict pregnancy rates of day-6 blastocyst transfers. Since there are many cases of day-6 blastocyst transfers, it is important to know if KIDSCORE™□D5 can predict pregnancy rates of day-6 blastocyst transfers.

Study design, size, duration: This retrospective single-center study, which included 162 day-5 and 72 day-6 blastocyst transfers, respectively, was conducted at Takahashi Women's clinic from January to December 2019. Blastocysts derived from 146 patients who underwent intracytoplasmic sperm injection. All blastocysts were cryopreserved and were transferred singly.

Participants/materials, setting, methods: We used EmbryoScope+™□ (Vitrolife) for *in-vitro* culture and calculated KIDSCORE™□D5 (ver.3) using Embryoviewer™□ (Vitrolife). Blastocyst scoring was done from 1.0 to 9.9. Clinical pregnancy was defined as the presence of a gestational sac confirmed by transvaginal ultrasonography. Statistical analysis was performed with JMP Pro 15.00 (SAS). The relationship between KIDSCORE™□D5 and clinical pregnancy was evaluated by the AUC using ROC curve analysis and multivariate analysis adjusted for patient age.

Main results and the role of chance: The mean KIDSCORE™□D5 of day-5 and day-6 blastocysts was 7.1±1.7 and 3.7±1.5, respectively. KIDSCORE™□D5 of day-6 blastocysts was significantly lower than that of day-5 blastocysts ($p< 0.0001$, Wilcoxon test). ROC curve analysis showed that the KIDSCORE™□D5 could predict clinical pregnancy rates with an AUC of 0.62 for day-5 blastocysts and 0.72 for day-6 blastocysts. The cut-off values for KIDSCORE™□D5 were 5.7 and 4.9 for day-5 and day-6 blastocysts, respectively. Blastocysts above the cut off value on both day-5 and day-6 had a significantly higher pregnancy rate than those below the cut off value (day-5: 61.9% vs. 33.3%($p=0.0023$), day-6: 47.4% vs. 7.6%($p=0.0003$)). Multivariate analysis adjusted for patient age showed that KIDSCORE™□D5 correlated with clinical pregnancy rates of days 5 and 6 of blastocyst transfer with AUCs of 0.66 and 0.73, respectively.

Limitations, reasons for caution: This study had a small sample size, and it was a retrospective single-center study. In addition, the relationship between KIDSCORE™□D5 and clinical pregnancy rates may vary among facilities. Therefore, a prospective multicenter validation is necessary.

Wider implications of the findings: Our study results indicated that KIDSCORE™□D5 predicted clinical pregnancy and that morphokinetic parameters related to clinical pregnancy were similar between day-5 and day-6 blastocysts. Hence, morphokinetic evaluation can serve as a criterion for deciding which of multiple day-6 blastocysts can be transferred.

Trial registration number: Not applicable