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Can the implementation of morpho-kinetic assessment optimize blastocyst selection for successful implantation, thereby minimizing the number of transfer cycles required to achieve pregnancy?

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**Study question:**

Can the implementation of morpho-kinetic assessment optimize blastocyst selection for successful implantation, thereby minimizing the number of transfer cycles required to achieve pregnancy?

**Summary answer:**

There was no significant difference in the number of transfer cycles required to achieve clinical pregnancy between evaluation methods using Eeva™ Test and conventional method.

**What is known already:**

Numerous investigations have recently been conducted on the efficacy of morpho-kinetic assessment of embryos; nevertheless, these studies have solely substantiated pregnancy prediction. As there are limited reports employing it for embryo selection, clinical evidence demonstrating its utility in enhancing live birth rates and minimizing the number of embryo transfers required for pregnancy remains elusive. The timing of embryonic division and direct cleavage serve as prevalent prognostic markers for predicting blastocyst formation. The present investigative study employs the Eeva™ which appropriately incorporates these indicators.

**Study design, size, duration:**

Prospective single-center study. This study included couples who underwent their first oocyte retrievals and subsequently underwent a frozen-thawed single blastocyst transfer from March 2019 to December 2020. The participants were divided into two groups: Group G, in which the embryos were cultured in a time-lapse incubator (Geri®+), and evaluated by Gardner score and Eeva™ Test, and Group D, in which the embryos were cultured in a conventional dry incubator

and evaluated morphologically by Gardner score.

**Participants/materials, setting, methods:**

The study enrolled a total of 217 participants. We conducted a comparative analysis of clinical pregnancy, miscarriage, and live birth rates between the two groups. Additionally, in 168 clinically pregnant cases, the proportion of the cases who achieved clinical pregnancy following the first embryo transfer and the number of transfer cycles required for clinical pregnancy between the two groups were compared.

**Main results and the role of chance:**

There were no significant differences in clinical pregnancy rates (83/187, 44.4% vs. 98/203, 48.3%), miscarriage rates (12/83, 14.5% vs. 21/98, 21.4%), and live birth rates (69/187, 36.9% vs. 76/203, 37.4%) between group G and D. Among the cases of clinical pregnancy, no significant differences were observed in the proportion of cases attaining clinical pregnancy following the initial embryo transfer (55/77, 71.4% vs. 65/91, 71.4%) and the number of cycles required to achieve clinical pregnancy ( $1.42 \pm 0.78$  vs.  $1.44 \pm 0.88$ ) between group G and D.

**Limitations, reasons for caution:**

While the Eeva™ considers the timing of embryonic division and direct cleavage, other indicators are not taken into account. Consequently, it is necessary to authenticate clinical validity of morpho-kinetic assessment for blastocyst selection also via a methodology that incorporates those elements.

**Wider implications of the findings:**

No significant differences were observed between Eeva™ and the conventional method. The clinical effectiveness of the blastocyst selection based on Eeva™ scores could not be substantiated. Hence, evaluating solely blastocyst morphology is considered satisfactory at present, and morpho-kinetic assessment of cleavage-stage embryos is not necessary for blastocyst selection.

**Keywords**

embryo selection

Morphokinetics

time-lapse

Gardner score

pregnancy