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P-261   **Morphokinetics-oriented embryo selection for day 2 transfers: adapting transfer strategy to the times of Covid-19**

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Study question: Can embryo selection oriented by a morphokinetic algorithm developed for day 2 transfers provide pregnancy rates similar to those achieved by elective frozen blastocyst transfers?

Summary answer: Transfers on day 2 of embryos selected by a morphokinetic algorithm can provide pregnancy rates similar to those achieved with elective frozen blastocyst transfers.

What is known already: The comparative efficacy of cleavage stage fresh transfers in relation to blastocyst fresh transfers remains controversial. On the other hand, elective transfers of frozen blastocysts have been found to provide satisfactory implantation and delivery rates, which may result from favourable embryo quality and/or endometrial receptivity associated with freeze-all cycles. The covid-19 pandemic has imposed changes to the ICSI laboratorial routine, particularly pushing for a reduction in embryo culture time. In this context, we developed an algorithm based on fertilization and cleavage morphokinetic parameters, aiming to optimize embryo selection for day 2 transfers.

Study design, size, duration: This study aimed to assess the performance of a morphokinetic algorithm to select cleavage stage embryos for day 2 transfers, using as a parameter the outcomes from elective frozen blastocyst transfers. A retrospective analysis of data generated in our clinic during pandemia was performed, comparing patient profiles and clinical outcomes of day 2 transfers following algorithm-oriented embryo selection (n $=$ 128), with those of contemporary elective transfers of frozen blastocysts (n $=$ 230) from freeze-all patients with OHSS risk.

Participants/materials, setting, methods: Patients were in their first ICSI cycle, 128 of which underwent a day 2 transfer of a single embryo selected by an algorithm based on fertilization (tPNf) and cleavage (T2 e T4) parameters. The remaining 230 patients had a elective frozen blastocyst selected by morphology transferred after endometrial preparation. Cycle characteristics and outcomes were compared using Fisher's and Wilcoxon sum rank tests. A multivariate analysis tested the association of treatment and cycle variables with pregnancy.

Main results and the role of chance: Patients providing embryos transferred on day 2 after algorithm-oriented selection presented lower maternal age (35.5 $\pm$ 4.1 vs. 36.4 $\pm$ 4.4; p $=$ 0.02), higher basal FSH (8.3 $\pm$ 3.6 vs. 6.9 $\pm$ 2.1 IU/L; p $<$ 0.001) lower AMH (2.3 $\pm$ 2.0 vs. 5.7 $\pm$ 6.3 ng/mL; p $<$ 0.0001), different distribution of infertility factors (p $<$ 0.001; male factor: 64.1% vs. 39.6%, tubal: 3.1% vs. 11.3%, unexplained: 15.6% vs. 29.1%, for day 2 and frozen blastocyst transfers, respectively) and lower oocyte yield (6.9 $\pm$ 4.0 vs. 17.2 $\pm$ 6.5) as compared to patients providing frozen blastocysts.

Beta-hCG, clinical pregnancy, ongoing pregnancy and miscarriage rates (assessed until the 12th week of pregnancy) did not differ between algorithm-oriented day 2 and frozen blastocyst transfers (53.1% vs. 50.9%, 40.6% vs. 45.7%, 33.6% vs. 36.5% and 17.3% vs. 20.0%, respectively).

The multivariate analysis indicated maternal age as the only variable significantly and independently associated with ongoing pregnancy achievement [OR $=$ 0.89 (0.84-0.94); p,0.001)].

Limitations, reasons for caution: Our study is subjected to the limitations of a retrospective analysis and the data may be affected by variables not controlled for that are heterogeneous between groups such as different endometrial conditions and the use embryo cryopreservation.

Wider implications of the findings: Our findings indicate that morphokinetic algorithms can be successfully applied to improve outcomes of day 2 transfers to a level similar of that achieved with elective frozen blastocyst transfers. Our data represent a valuable parameter for the improvement or adaptation of ICSI practice in the face of logistic constraints.

Trial registration number: not applicable