



TITLE- Morphokinetic selection of embryos among women undergoing IVF: A prospective cohort study

Dr Supriya Kumari, Dr Neeta Singh, Dr Maroof Ahmad Khan, Dr Monika Saini, AIIMS, New Delhi, India



INTRODUCTION

- Current techniques available for embryo selection: PGT, proteomics, secretomics, embryo morphology, and Time lapse monitoring
- Invasive methods: Not preferred due to the risk of embryo damage, potential loss & issue of mosaicism.
- Unmet need for the potential non-invasive bio-markers for selecting the embryo with the maximum implantation potential.
- Morphokinetics based embryo selection is a evolving techniques on which this present work is focused.

METHODOLOGY

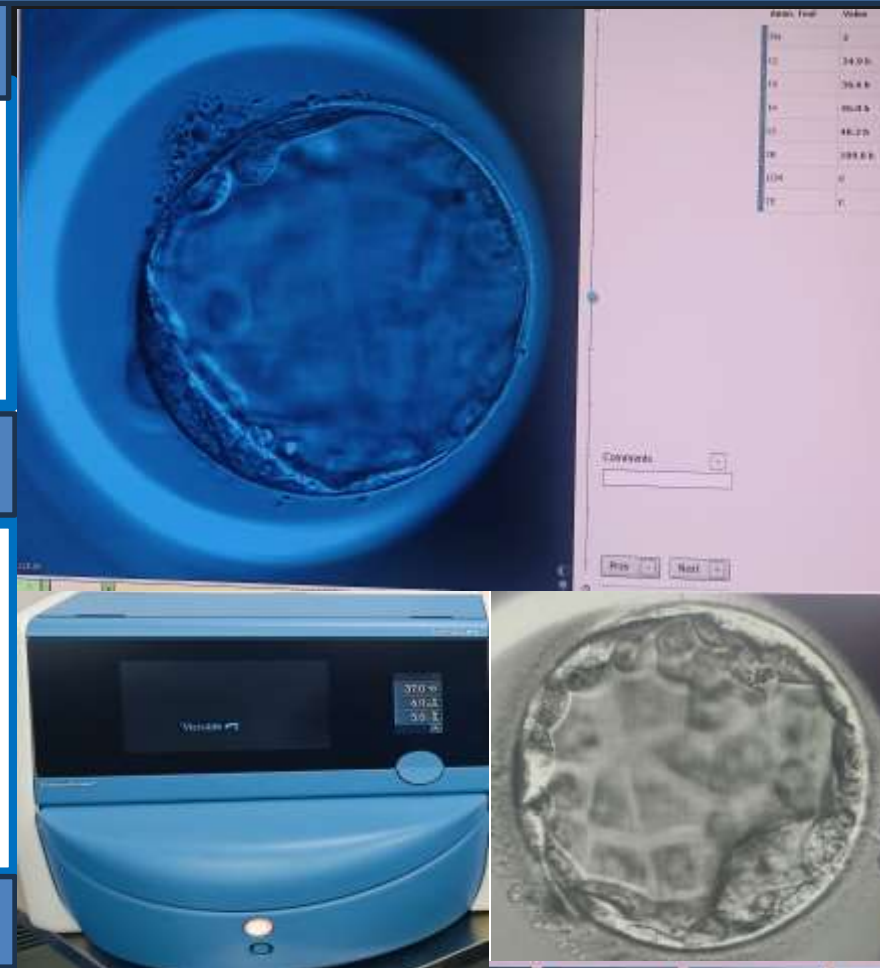
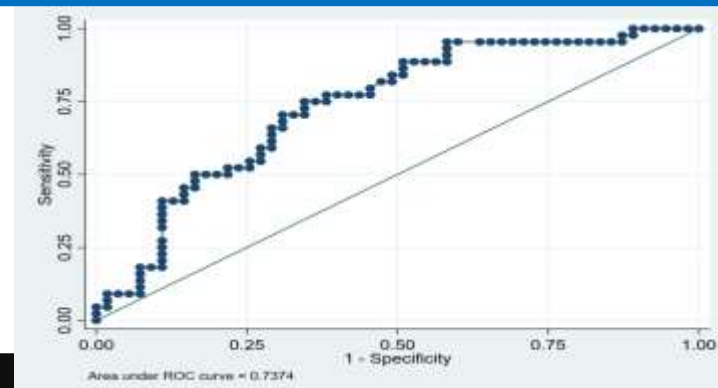
- Research question:** Do morphokinetic parameters play a role in embryo selection and affect reproductive outcomes?
- Study Design & Duration :** Prospective cohort study conducted at AIIMS, New Delhi, India June 2022-2024
- Subjects:**99 IVF/ICSI cycles undergoing fresh single blastocyst transfer.
- 99 Embryos in Time-lapse imaging system (Embryoscope⁺) uninterrupted culture until D-5. All the embryos were annotated and selected for single blastocyst transfer.

RESULTS

- Mean age & BMI of participants 31.3 ± 3.6 years and 26.4 ± 3.8 kg/m², respectively.
- Total 99 single-D-5 blastocyst transfers were performed and the morphokinetic parameters between the implanted and non-implanted embryos were compared.
- The mean of time events t2, t3, t4, t5, and cc2 were significantly different between the implanted and non-implanted embryos. Some of the time events: t2, t3, t4 and cc2 were significantly associated with clinical pregnancy.
- An ROC Curve was plotted combining morphokinetic parameters with clinical pregnancy, AUC: 0.737.
- The timing for each morphokinetic event was divided into four quartiles, and compared with the pregnancy rate in each quartile, the clinical pregnancy rates were seen to be higher in Q2 and Q3



Area under ROC Curve for the combined timing parameters including t2, t3, t4, t5, cc2



DISCUSSION

- Morphokinetics is the timing of events occurring during embryo development.
- Various time points have been developed and literature recently has been heavily focused on the association of these timelines with a good embryo quality, blastulation rates and improved pregnancy outcomes.
- In our study, the role of these morphokinetic parameters in embryo selection has been demonstrated.
- Similar to our study, in the study by Cruz et al., it was found that embryos with a t5 time frame of 48.8–56.6 hours had higher implantation potential.[1]
- However, Kirkegaard et al., showed no significant differences in the morphokinetic parameters between the implanted and non-implanted embryos.[2]
- The study by Meseguer et al., identified three key predictive parameters for embryo development namely t5, s2 and cc2 and the study bt Storr et al., identified eight significant predictive parameters for top-quality blastocysts: s3, t6, t7, t8, tM, tSB, tB, and tEB.[3,4]
- In coherence with the timings of our study, the study by Shioya et al demonstrated improved pregnancy rates with the use of morphokinetics and its algorithms.[5]
- Another study linked s3, t8 and tPB2 as potential predictors of successful clinical pregnancy.[6]

CONCLUSION

- Morphokinetics based on Time Lapse plays a crucial role in selecting the best embryo for transfer and significantly affecting the implantation and clinical pregnancy rates.
- The AUC of 0.737, suggests their potential utility in embryo selection.

REFERENCES

- Cruz M, Garrido N, Herrero J, Pérez-Cano I, Muñoz M, Meseguer M. Timing of cell division in human cleavage-stage embryos is linked with blastocyst formation and quality. Reprod Biomed Online. 2012 Oct;25(4):371–81.
- Kirkegaard K, Kesmodel US, Hindkjer JJ, Ingerslev HJ. Time-lapse parameters as predictors of blastocyst development and pregnancy outcome in embryos from good prognosis patients: A prospective cohort study. Human Reproduction. 2013;28(10):2643–51.
- Meseguer M, Herrero J, Tejera A, Hilligsøe KM, Ramsing NB, Remoh J. The use of morphokinetics as a predictor of embryo implantation. Human Reproduction. 2011;26(10):2658–71.
- Storr A, Venetis CA, Cooke S, Susetio D, Kilani S, Ledger W. Morphokinetic parameters using time-lapse technology and day 5 embryo quality: a prospective cohort study. J Assist Reprod Genet. 2015 Jul 13;32(7):1151–60.
- Shioya M, Kobayashi T, Sugiura T, Fujita M, Takahashi K. The morphokinetics algorithm based on data from day 5 blastocyst transfer (KIDScoreD5 version 3) is also useful for embryo selection in day 6 blastocyst transfer. Reproductive Medicine and Biology. 2022 Jan;21(1):e12484.
- Jiang R, Yang G, Wang H, Fang J, Hu J, Zhang T, Kong Y, Wu Z, Huang X, Qi L, Song N. Exploring key embryonic developmental morphokinetic parameters that affect clinical outcomes during the PGT cycle using time-lapse monitoring systems. BMC Pregnancy and Childbirth. 2024 Dec 28;24(1):870.