

HIGH OOCYTE IMMATURITY RATES IMPACT EMBRYO MORPHOKINETICS: LESSONS OF TIME-LAPSE IMAGING SYSTEM



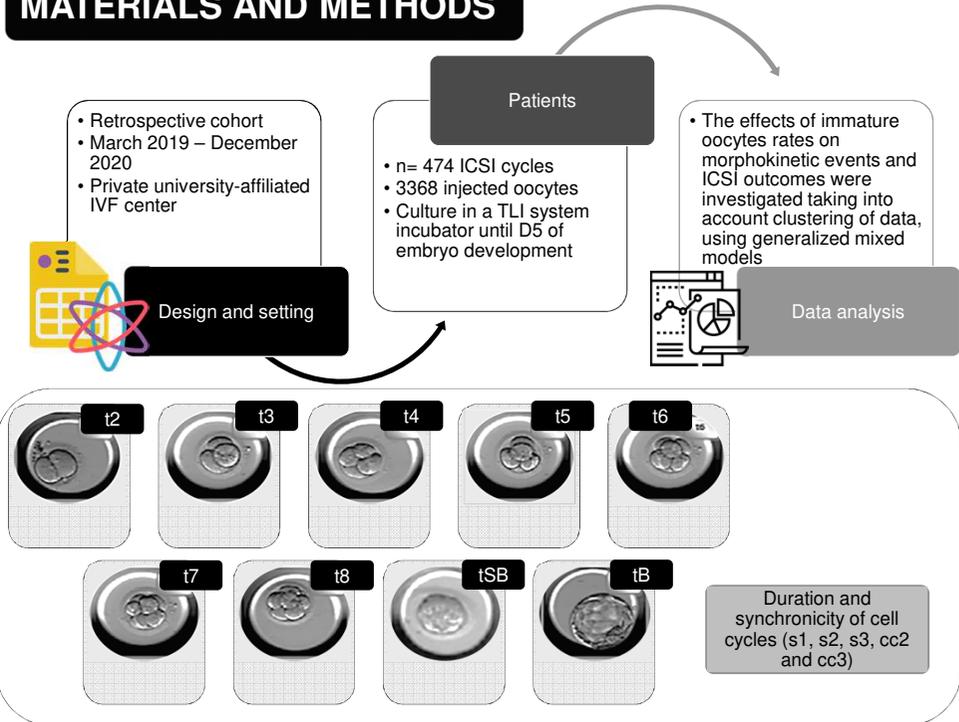
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OBJECTIVE

Oocyte maturation is defined as the resume and completion of the first meiotic division with accompanying cytoplasmic maturation, which includes storage substrates that are crucial for fertilization and early embryonic development. Up to 30% of the retrieved oocytes are still immature after controlled ovarian stimulation (COS). The ovarian asynchrony can be indicative of less responsiveness of ovarian follicles to stimulation, and the rate of oocyte immaturity may reflect the developmental competence of the mature oocytes cohort. Time-lapse imaging (TLI) systems allow for the mapping of morphological changes or events with the exact time-point of occurrence. The aim of this study was to investigate the impact of oocyte immaturity rate on morphokinetic events in a TLI system.

MATERIALS AND METHODS



RESULTS

Mean MII oocyte rate was 76.0% (median 80.0%). Mean GV and MI oocyte rates were 16.0% (median 10.0%) and 8.0% (median 6.7%), respectively. Positive relationships were observed between the rates of immature oocytes and embryo morphokinetics. No significant associations were found between oocyte immaturity rate and clinical outcomes.

Morphokinetic events	B	CI	p-value
tPNa	0.053	0.045 – 0.06	<0.001
tPNf	0.081	0.070 – 0.093	<0.001
t2	0.076	0.064 – 0.087	<0.001
t3	0.070	0.056 – 0.084	<0.001
t4	0.070	0.055 – 0.084	<0.001
t5	0.083	0.063 – 0.102	<0.001
t6	0.066	0.047 – 0.086	<0.001
t7	0.076	0.055 – 0.098	<0.001
t8	0.064	0.040 – 0.087	<0.001
tSB	0.090	0.014 – 0.165	0.020
tB	0.043	0.011 – 0.075	0.009
cc3	0.018	0.005 – 0.031	0.007

Table 1. Generalized mixed model results for the association between oocyte immaturity rates and embryo morphokinetics.

CONCLUSION

Increasing oocyte immaturity rate correlates with delayed cell cleavage and blastulation. These findings highlight the importance of TLI for the identification and de-selection of slow-growing embryos for transfer, in cycles with high oocyte immaturity rate.

IMPACT STATEMENT

Oocytes derived from a cohort with high incidence of maturation fail may have inefficient biological machinery. Significant relationships were observed between embryo development and oocyte immaturity rate, and differences that could not have been noticed if the embryos were being cultured in a conventional incubator. This study highlights the importance of TLI in the presence of high immaturity rate. We suggest that the clinical outcomes were not associated with immaturity rate because we were able to deselect embryos with unusual morphokinetic development patterns, thus allowing the best embryos, morphologic- and morphokinetically, to be transferred.