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Serum anti-müllerian hormone concentrations impacts not only the quantity, but also the quality of the ovarian reserve: the importance of time-lapse imaging system

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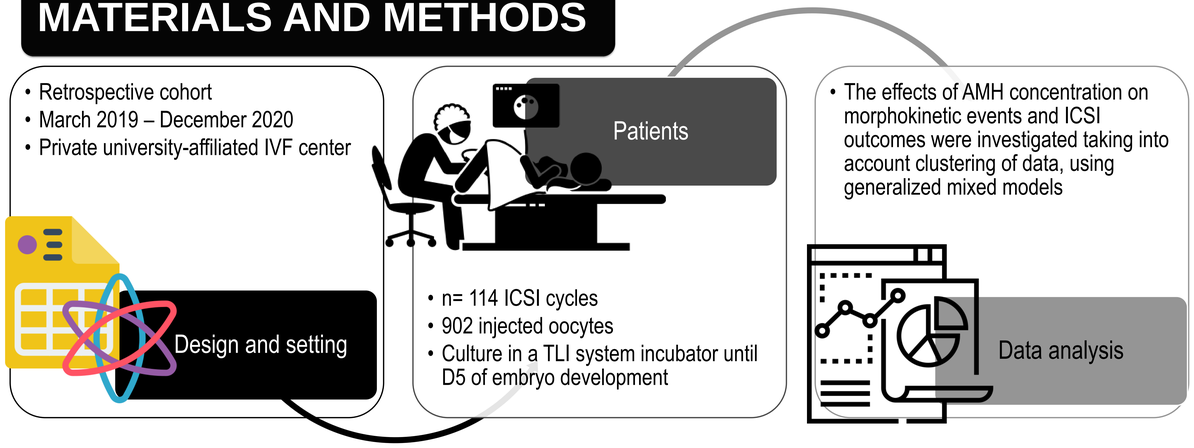
OBJECTIVE

Serum anti-müllerian hormone (AMH) concentration has been implicated as the most valuable marker of the ovarian reserve, as it correlates highly with the baseline antral follicle count. The AMH has been assigned as a marker of ovarian function mainly in the assessment of the quantitative aspect of the ovarian reserve. On the other side, the predictive value of AMH on oocyte quality and embryo developmental competence is controversial. Time-lapse imaging (TLI) systems allow for the assessment of morphological changes with the exact time-point of occurrence, and may be a valuable tool to evaluate the correlation between serum AMH concentration and the competences of both oocyte and developing embryo. The goal for the present study was to evaluate whether the serum AMH concentration impacts morphokinetic events in a TLI system.

MATERIALS AND METHODS



Evaluated kinetic markers

- Timing to:
- Pronuclei appearance (tPNa) and pronuclei fading (tPNf);
- Two (t2), three (t3), four (t4), five (t5), six (t6), seven (t7), and eight cells (t8), and to blastulation (tB);
- Durations of the second (t3-t2) and third (t5-t3) cell cycles (cc2 and cc3, respectively);
- Timing to complete synchronous divisions s1 (t2-tPNf), s2 (t4-t3), and s3 (t8-t5)

RESULTS

Inverse relationships were observed between serum AMH concentrations and specific embryo morphokinetics .

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

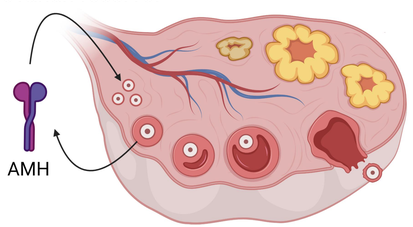
Morphokinetic events	B	CI	p-value
tPNf	-0.047	-0.071 – -0.024	<0.001
t3	-0.070	-0.102 – -0.039	<0.001
t4	-0.080	-0.114 – -0.046	<0.001
t5	-0.075	-0.123 – -0.028	0.002
t6	-0.105	-0.147 – -0.064	<0.001
t7	-0.120	-0.165 – -0.075	<0.001
t8	-0.086	-0.220 - -0.119	<0.001
tB	-0.153	-0.224 – -0.082	<0.001
cc2	-0.041	-0.062 – --0.019	<0.001
s3	-0.086	-0.129 - -0.044	<0.001

CONCLUSION

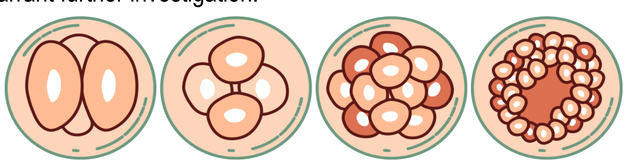
Increased serum AMH concentrations correlate with faster embryo development in a TLI incubator

IMPACT STATEMENT

These findings suggest that serum AMH play a pivotal role in human reproduction, regulating not only the quantity, but also the quality of the ovarian reserve.



The clinical implications of this effect on embryo development warrant further investigation.



In the meantime, time lapse is a useful tool for the de-selection of slower embryos in patients with low serum AMH concentrations.