Dry versus humidified incubator: impact on embryo morphokinetics and pregnancy rates using sibling donor oocytes.

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Objective

To investigate if dry versus humidified culture conditions within the same time-lapse incubator impact embryo morphokinetics and pregnancy rates in donor cycles.

Material and Method

A prospective interventional study was performed between December 2022 until April 2024 in a tertiary referral center. Sibling donor oocytes of each patient were randomly split after intracytoplasmic sperm injection into group A (dry culture arm) and into group B (humidified culture arm) among the same time-lapse incubator (GERI®,Genea Biomedx). Embryo culture was carried out from day 0 to day 6. Sequential media was used and refreshed on day 3 for both groups.

Gardner embryo scoring system was converted into a numerical embryo quality scoring index (NEQsi) for statistical analysis. NEQsi scores for day 5 and day 6 embryos were based on expansion, inner cell mass, and trophectoderm quality. PGT-A cycles were excluded. Mean timings were compared using a student's t-test, with $p < 0.05$ significant.

Results

A total of 275 sibling donor oocytes were included in the study (n= 31 patients, average age 26.94±5.21), n=136 in group A (49.45%) and n=139 in group B (50.55%); p=0.788. Morphokinetic parameters were assessed as mean±standard deviation (SD) values per hour post insemination (hpi) in a total of 210 blastocysts from fertilized oocytes (2PN) (76.36%) [70.89-81.26]; 104 group A (49.52%) and 106 group B (50.48%). No significant differences were found in morphokinetic parameters between blastocyst from group A versus group B (Table 1).

Blastocyst quality, based on NEQsi score, for group A versus B was not statistically significant on day 5 (8.0±1.6 versus 8.2 ±1.7, p=0.619) and day 6, (6.1±1.7 versus 6.5±1.8, p=0.619), respectively.

The blastocyst usable rate was 62.50% (95%CI: 52.47-71.80) vs 64.15% (95%CI: 54.26 - 73.23) for group A and B, respectively (p=0.916), with a total of 29 blastocysts transferred (13 from group A and 16 from group B).

In a univariate model, pregnancy, miscarriage and live birth rates between blastocysts transferred from groups A versus B were not significantly different (OR=1.752[0.511-6.006] p=0.373), (OR=1.810[0.363-9.033] p=0.47) versus (OR=0.596[0.156-2.277] p=0.449).

Parameter	Group A (Mean ± SD, hpi)	Group B (Mean ± SD, hpi)	p-value
tPNA	7.3 ± 1.6	7.3 ± 1.8	0.846
tPNf	22.7 ± 5.4	22.4 ± 4.4	0.714
t2	25.8 ± 4.9	25.2 ± 4.5	0.437
t3	34.3 ± 6.9	33.9 ± 5.8	0.643
t4	37.3 ± 7.6	37.4 ± 7.9	0.916
t5	46.1 ± 10.4	45.9 ± 9.5	0.843
t6	49.5 ± 9.5	50.7 ± 12.6	0.440
t8	58.2 ± 12.1	57.4 ± 12.2	0.674
tSC	84.0 ± 9.9	84.7 ± 12.5	0.691
tM	90.1 ± 9.6	90.7 ± 10.4	0.694
tSB	97.8 ± 7.5	98.4 ± 8.2	0.645
Tb	104.6 ± 6.2	104.7 ± 7.1	0.921

Table 1. Comparison of Comparison of Morphokinetic Parameters Between Group A and Group B

Conclusion

Dry and humidified culture conditions within the same time-lapse incubator have no significant effect on embryo morphokinetics or clinical outcomes using sibling donor oocytes. This might offer flexibility in laboratory protocols without compromising developmental consistency or clinical success rates.

Poster number: P-

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