Using Artificial Intelligence to automatically annotate time-lapse videos: saving precious embryology time

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Background and Aim

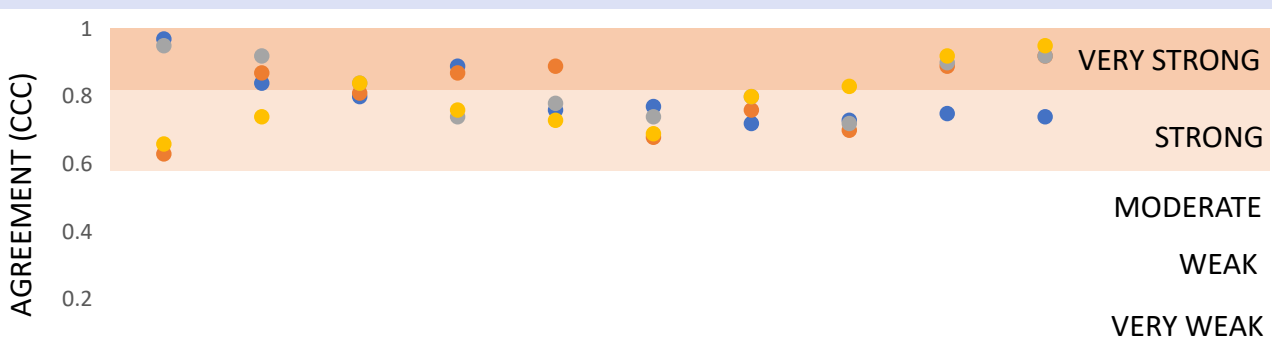
- Manual annotations for embryo grading and selection are time-consuming.
- These annotations are subjective and prone to inter/intra operator variation.
- There is a need to automate annotations to bring consistency to this process.
- Automatic annotations will save precious embryology time which can be used doing other tasks.
- **The aim of this study was to determine the correlation of the AI automatic annotations from CHLOE-EQ against the manual annotations performed by embryologists.**

Methods

- Retrospective video timelapse footage was collected from 8368 embryos over 4 UK clinics (n=362, 5591, 653, 1762).
- The embryos were from fresh ICSI/IVF cycles cultured from 2021 to 2022.
- Lin's concordance correlation coefficient (CCC) was calculated between CHLOE-EQ and embryologist annotation times for each of the morphokinetic parameters assessed using two-way model for agreement.
- Five categories of agreement were determined based on CCC score; very weak (0-0.20), weak (0.21-0.40), moderate (0.41-0.60), strong (0.61-0.80) and very strong (0.81-1.00).

Results

The CCCs for each morphokinetics parameter, across all 4 clinics, show strong agreement between CHLOE-EQ and human embryologists.



	tPNf	t2	t3	t4	t5	t6	t7	t8	tSB	tB
Clinic 1	0.97	0.84	0.8	0.89	0.76	0.77	0.72	0.73	0.75	0.74
Clinic 2	0.63	0.87	0.81	0.87	0.89	0.68	0.76	0.7	0.89	0.92
Clinic 3	0.95	0.92	0.84	0.74	0.78	0.74	0.8	0.72	0.9	0.92
Clinic 4	0.66	0.74	0.84	0.76	0.73	0.69	0.8	0.83	0.92	0.95

Conclusion

- CHLOE-EQ automatic annotation is equivalent to the annotation by experienced embryologists at all 4 clinics.
- Automatic annotations have the potential to help save embryologists a lot of time, improving efficiency.

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