King's Fertility

Fairtility

Validating CHLOE-EQ as a tool to support embryo assessment automatically

Mania, Anastasia[1]; Sarris, Ippokras[1]; Zepeda, Alexa[2]; Bergelson, Noam[2]; Brualla, Adriana[2]; Hickman, Cristina[2]

[1]Kings Ferlity, United Kingdom
[2]Fairlity, Israel

Background

⊛ Annotating embryos allows embryologists to quantify information from raw time-lapse videos
⊛ But, annotating is a time-consuming, administrative process, open to subjectivity
⊛ Artificial Intelligence is ideally suited to automate administrative tasks in the IVF lab, such as annotating
⊛ **To assess the agreement between automated annotations and annotations by embryologists**
⊛ **To assess the ability of AI based algorithms to predict embryo viability**

Methods

⊛ Embryos were selected for transfer based on morphology and KIDSCORE (routine practice)

⊛ CHLOE BLAST and CHLOE-EQ are AI-based tools to designed to predict blastulation and implantation respectively. CHLOE RANK orders embryos for transfer based on CHLOE-EQ

⊛ Efficacy of prediction at 68hpi of blastulation and embryo utilisation (transferred or cryopreserved) was assessed using binary logistic regression (AUC)

⊛ Level of agreement in annotation between embryologists and CHLOE-EQ (Inter Correlation Coefficient, ICC) of 0.6 or above was considered strong agreement

1762 inseminated oocytes were cultured to blastocyst

Chloe

DAILY MANUAL PROSPECTIVE ANNOTATIONS

BLIND, AUTOMATIC RETROSPECTIVE ASSESSMENT USING CHLOE EQ , CHLOE BLAST & CHLOE RANK

Results

⊛ CHLOE-EQ was predictive of embryo utilisation(AUC=0.96), blastulation (AUC=0.98) and selection for transfer (AUC=0.81).

⊛ CHLOE BLAST was predictive of blastulation (AUC=0.92) and CHLOE RANK was predictive of ulisaon (AUC=0.81).

⊛ The level of agreement between embryologists and CHLOE-EQ was

Strong
for tPNf, t2, t4-t6

Very strong for t3, t7, t8, tsB, tB.

	Agreement between CHLOE annotation with embryologist (ICC)
tPNf	0.66 STRONG
t2	0.74 STRONG
t3	0.84 VERY STRONG
t4	0.76 STRONG
t5	0.73 STRONG
t6	0.69 STRONG
t7	0.8 VERY STRONG
t8	0.83 VERY STRONG
tSB	0.92 VERY STRONG
tB	0.95 VERY STRONG

Conclusion

⊛ There was overall strong agreement between embryo viability assessment by human embryologists and CHLOE-EQ
⊛ CHLOE-EQ has the benefit over manual annotation of being completely automatic and objective, saving precious embryology time and increasing embryo assessment consistency