Abnormal Oocytes are more likely to lead to abnormal embryo divisions (Direct Unequal Cleavage, DUC), but do not compromise embryo quality as assessed using CHLOE-EQ score

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Objective

To assess if oocyte dysmorphisms lead to abnormal embryo divisions and compromised embryo quality.

Methods

Retrospective cohort analysis of 742 embryo time-lapse videos, cultured at a private fertility clinic between June and July 2022

Manual annotations of cytoplasmic and extracytoplasmic oocyte abnormalities

742 time-lapse embryo videos

AI embryologist support tool. Automatic assessment of DUCs and CHLOE EQ viability score

Chloe

Results

DUCs are **2x** more likely to come from oocytes with a thick ZP compared to a normal ZP (9% vs 3.9%, p=0.03)

DUCs are more likely to have a **non-uniform ZP** compared to non-DUCs (7% vs 17%, p=0.015)

DUCs have a **lower blastulation rate** compared to non-DUCs (1.8% vs 77%, p<0.001)

DUCs are **4x** less likely to be multinucleated at the 2-cell stage (7% vs 30%, p=0.03), but **7x** more likely to be multinucleated at the 4-cell stage compared to non-DUCs (7% vs 1%, p=0.06)

Patient age, SERs, darkness, granularity and inclusions were **not associated** with DUCs.

CHLOE-EQ score was **not affected** by oocyte cytoplasmic abnormalities

Limitations

This was a retrospective-single clinic study. Causality is not determined.

Conclusion

- **Zona abnormalities** (thickness and unevenness) tend to **lead to DUCs**, which in turn had a lower blastulation rate.
- **Using AI** to detect DUCs to **avoid critical information being missed** during embryo assessment can assist embryologists in maximising their efficacy of embryo selection.