

Effectiveness and safety of time-lapse imaging for in vitro fertilisation: abridged secondary publication

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KEY MESSAGES

1. Time-lapse imaging for in vitro fertilisation is claimed to provide an 'undisturbed environment' that could improve clinical outcomes.
2. We evaluated 1575 patients who underwent in vitro fertilisation to determine the efficacy of time-lapse imaging.
3. Time-lapse imaging did not lead to improved outcomes in terms of live births, clinical

pregnancies, or pregnancy losses.

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Introduction

Subfertility affects approximately one in six adults globally. In vitro fertilisation (IVF) and intracytoplasmic sperm injection (ICSI) are increasingly available, but their success rates have plateaued. Selection of embryos with the highest potential for implantation is essential for success. However, current methods of embryo selection have limitations in predictive accuracy; optimisation of embryo selection techniques is needed. Time-lapse imaging (TLI) has emerged as a promising technology for enhancing embryo selection in IVF.

TLI enables continuous monitoring of embryo development within the incubator, capturing digital images at regular intervals, typically every 5 to 15 minutes, facilitating comprehensive assessment without disturbing the incubation environment (temperature, gas concentrations, pH, and humidity). A stable culture environment may positively influence embryonic development, quality, and ultimately, live birth rates. Nonetheless, evidence regarding TLI's utility remains inconclusive. This study aimed to compare TLI with standard care in terms of live birth rates, clinical pregnancies, and pregnancy losses.

Methods

We enrolled participants undergoing either IVF or ICSI, including women aged 18 to 42 years and men aged >18 years, who received their first, second, or third IVF or ICSI cycle and had at least three 2-pronuclei embryos available. Those concurrently involved in other interventional trials, undergoing treatment with donor gametes, or intending to undergo pre-implantation genetic diagnosis or screening were excluded. Participants were randomly assigned in a 1:1:1 ratio to one of three intervention arms: (1) embryo assessment and selection using morphokinetic parameters and standard morphological embryo scoring in undisturbed culture conditions in TLI incubators, (2) conventional morphological embryo assessment and selection in undisturbed culture conditions in

TLI incubators, and (3) conventional morphological embryo assessment using a light microscope and standard embryo culture in standard incubators (controls). Randomisation was performed using a secure web-based system, stratified by fertility clinic and minimised by the female participant's age (<35 years, 35-40 years, >40 years) and the type of planned first embryo transfer (fresh or frozen).

Results

Of 390 participants, 381 (97.7%) had outcome data available. There were no significant differences among the TLI, undisturbed culture, and control groups in terms of live birth rates (34.4% vs 38.5% vs 37.6%), clinical pregnancy rates (41.4% vs 45.1% vs 40.8%), or pregnancy loss rates (41.4% vs 45.1% vs 40.8%). Three serious adverse events occurred: one in a woman in the TLI group and two in women in the control group; all were unrelated to the trial.

Conclusion

Time-lapse imaging does not lead to improved outcomes in terms of live births, clinical pregnancies, or pregnancy losses.

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Disclosure

The results of this research have been previously published in:

1. Bhide P, Chan DYL, Lanz D, et al. Clinical effectiveness and safety of time-lapse imaging systems for embryo incubation and selection in in-vitro fertilisation treatment (TILT): a multicentre, three-parallel-group, double-blind randomised controlled trial. *Lancet* 2024;404:256-65.