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Title:

DOES OVULATORY TRIGGER CHOICE INFLUENCE MATURITY AND DEVELOPMENTAL COMPETENCE OF FROZEN-THAWED OOCYTES?

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Objective:

The luteinizing hormone (LH) surge stimulates resumption and progression of meiosis in oocytes from prophase to metaphase in preparation for fertilization. Given that oocyte maturity is a developmental continuum, it is unclear whether changes in the duration or level of the LH surge can have downstream effects on the microenvironment of the cumulus-oocyte complex, leading to variations in the integrity of oogenesis and early chromosomal segregation. Studies have investigated the effects of different oocyte maturation triggers—human chorionic gonadotropin (hCG), GnRH agonist (Lupron), or a combination of the two (dual)—on IVF outcomes. Some evidence has suggested pregnancy rates are lower with Lupron triggers, possibly due to the shorter duration of the LH surge. Use of oocyte cryopreservation has increased, but most patients have yet to utilize these oocytes. Consequently, the effect of trigger type on developmental competence of frozen oocytes suspended in metaphase II is still unknown. The objective of this study was to determine whether rates of oocyte survival post-rewarming, maturation, fertilization, blastulation, and euploidy were affected by trigger type.

Design:

Retrospective, cohort study

Materials and Methods:

The study included patients at an academic ART center who underwent oocyte cryopreservation and subsequent re-warming for IVF/ICSI between 2010 and 2019. Patients were grouped by oocyte maturation trigger type used during their initial cycle: (1) hCG, (2) Lupron, (3) dual. Primary outcomes were thaw survival and oocyte metaphase II (MII) rates. Secondary outcomes were fertilization, blastulation, and euploidy rates. Statistical analysis was performed with the use of T-tests, chi-square tests, and multivariate linear regressions with generalized estimating equations.

Results:

A total of 182 cycles from 167 patients were included in this study. Controlling for oocyte age, AMH, and gravidity, there was no statistically significant difference in rates of thaw survival, MII, fertilization, or euploidy between groups. There was, however, a statistically significant difference in blastulation rate (Dual vs. Lupron: β=31.6, p=0.006, hCG vs. dual: β=10.5, p=0.34; hCG vs. Lupron: β=-21.2, p=0.14).

Conclusion:

Studies of the effects of oocyte maturation trigger on pregnancy outcomes are conflicting, and have focused on implantation in fresh IVF cycles. In contrast, this study examines surrogate endpoints for the efficacy of hCG, Lupron only, and dual trigger in a group of non-infertile young women. We showed that trigger type does not affect survival rates following oocyte warming, or MII rate. There appears to be an increase in blastulation rates between patients using dual trigger, compared to Lupron only. This finding is in agreement with a prior study that compared dual trigger vs. Lupron alone in high responder patients undergoing autologous IVF.4 Future studies might aim to analyze oocytes and granulosa cells from follicles triggered with dual trigger vs. Lupron alone, focusing on early molecular pathways and gene networks that are integral to embryonic genome activation.