

The Effect of Serum Estradiol Change after Ovulation Trigger on Autologous Oocyte Production and Maturation

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BACKGROUND

Serum estradiol (E2) levels are an important prognostic factor of oocyte maturation and follicular development. While serum levels of estradiol are monitored prior to egg retrieval, the clinical interpretation of these levels is controversial. Previous studies have postulated that the change in estradiol following ovulatory trigger is indicative of IVF outcomes, while other studies show no correlation.

OBJECTIVE

To determine if a change in estradiol level following ovulatory trigger is correlated with IVF outcomes, including number of mature oocytes retrieved and embryo development.

MATERIALS AND METHODS

This is a retrospective cohort study of patients undergoing IVF at a single academic institution from January to December 2018. Embryo development and cycle outcomes were collected and reviewed. Generalized linear regression models were used to determine the impact of estradiol change from the day of trigger (“pre”) to the day after trigger (“post”) on the number of mature oocytes, controlling for age, absolute pre-trigger estradiol level, AMH, number of previous cycles per patient, and type of trigger used. E2 change was analyzed as a categorical variable. The estradiol change between pre- and post-trigger was then categorized into three groups: 1) E2 increase (>20% increase), 2) E2 decrease (>20% decrease), and 3) E2 no change (within 20% higher/lower). Kruskal-Wallis tests were used to compare variables between the three groups.

RESULTS

Of the 953 retrievals, 658 had complete data for analysis. Mature oocyte count was significantly associated with patient age, AMH, and E2 change between pre- and post-trigger (p values <0.001). A 100% increase in E2 (post-E2 = 2 times pre-E2) caused the M2 counts to increase by 33%. A decrease in the E2 was not a significant predictor of the number of mature oocytes. However, an increase in E2 by 20% or more did result in significantly more mature oocytes retrieved compared to the no E2 change group p=<0.0001.

CONCLUSIONS

A > 20% increase in estradiol level following ovulation trigger increases the number of mature oocytes retrieved per cycle. Although a 20% estradiol decrease was not found to be significant, this could be a result of very small sample size. Additional studies should be performed to better understand the implications of estradiol changes following ovulation trigger, and what threshold values are important.

TABLE 1

	E2 No change (ref) (N=383)	E2 Increase (N=263)	E2 Decrease (N=11)	P value
Age (years)	36	36	36	0.5
AMH (ng/mL)	2.7	4.3	4.1	<0.001
Total oocytes retrieved	12	15	18	<0.001
MII oocytes	10	12	12	<0.001
GnRHa/HC G trigger	83 (22%)	79 (30.5%)	8 (73%)	<0.001

