ISGE
GYNECOLOGICAL ENDOCRINOLOGY
THE 18TH WORLD CONGRESS
7-10 MARCH 2018 FLORENCE, ITALY

Effect of oleic acid on in vitro maturation of oocytes collected from polycystic ovaries and subsequent preimplantation embryonic development

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Context

Impaired oocyte maturation causes infertility in women with polycystic ovary syndrome. Oleic acid is the predominant monounsaturated fatty acid in the lipid extract of human oocytes and may contribute to the acquisition of oocyte developmental competence.

Objective

To investigate effect of oleic acid on in vitro maturation rate of oocytes collected from women with polycystic ovarian syndrome and subsequent preimplantation embryonic development.

Methods

Immature cumulus-oocyte complexes retrieved from polycystic ovaries were subjected to in vitro maturation and were inseminated by standard intracytoplasmic sperm injection (ICSI) using the husband's sperm.

Patient(s)

The clinical and laboratory diagnosis were made using routine clinical assessments according to the 2003 Rotterdam guidelines. This included hormonal testing and assessment of the uterus and fallopian tubes by means of hysterosalpingography. In accordance with the approved guidelines, the cumulus-enclosed germinal vesicle-stage oocytes were collected from 30 women with polycystic ovarian syndrome during their first cycle of in vitro fertilization using ICSI in the in vitro fertilization Center at the Women University Hospital in Tabriz.

Intervention(s)

After partial denudation, a total of 60 immature sibling cumulus-enclosed oocytes were randomly allocated to a control group or oleic acid (50µM) treated group of 30 oocytes each.

Main Outcome Measure(s)

Maturation rate, rate of pronuclei formation and developmental activity were determined in sibling oocytes.

Result(s)

The maturation rate of germinal vesicle was not affected by oleic acid treatment. However, proportions of zygotes with two pronuclei or 2-cell (+19%, p=0.006) and embryos cleaved to the multi-cell stage after ICSI (+12%, p=0.02) were significantly higher in the oocytes matured in the presence of oleic acid than in its absence.

Conclusions

In vitro maturation success rate does not change with oleic acid treatment. However, oleic acid

supplementation during in vitro maturation may improve oocyte developmental competence in women with polycystic ovarian syndrome undergoing in vitro fertilization.

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