Effects of Alpha-lipoic Acid and Myoinositol Supplementation on the Oocyte Environment of Obese Infertile Women.

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INTRODUCTION

Obesity is characterized by increased inflammation and oxidative stress, resulting in adverse effects on women reproductive potential.

Antioxidant supplementation may exert a positive effect on the obese ovarian environment. Indeed, we preliminarily observed a reduction of mitochondrial (mt) DNA content, a marker of oxidative stress, in granulosa cells of obese infertile women supplemented with Sinopol® (Laborest SpA), composed by alpha-lipoic acid (ALA) 800 mg, myoinositol (MYO) 2 g, folic acid (FA) 400 ug. This suggested a potential role of Sinopol® in reducing oxidative stress in the obese ovarian environment.

Here we analyzed Total Antioxidant Capacity (TAC) in follicular fluid and mtDNA levels in granulosa cells, in a larger population of infertile women undergoing *in vitro* fertilization (IVF).

METHODS

19 normal weight (NW) and 24 obese (OB) infertile women were enrolled in our IVF center. Infertility was investigated and a non-ovarian diagnosis was made. Patients did not present any additional pathology.

All women were provided with FA and among them 15 OB (OB-SIN) were also supplemented with ALA and MYO, for 2 months before ovarian stimulation.

Follicular fluid (FF) and granulosa cells (GC) were collected after oocyte retrieval. TAC was measured in FF by enzymatic assay, mtDNA levels evaluated in GC by Real-time PCR.

Results were compared by ANOVA and correlations assessed by Pearson's correlation (SPSS; IBM).

RESULTS

OB groups had similar BMI (OB patients supplemented with only folic acid (OB-F): 30.2 ± 0.7; OB-SIN: 32.7 ± 1.1 kg/m^2). Women age was similar in all groups (NW: 36.7 ± 0.6; OB-F: 37.6 ± 1.7; OB-SIN: 35.9 ± 1.1 years).

Among OB women, antioxidant capacity was significantly higher in OB-SIN than in OB-F.

mtDNA levels showed an opposite trend, being decreased in OB-SIN and increased in OB-F compared to NW, though not reaching statistical significance. mtDNA levels were significantly and inversely correlated with the number of total oocytes and metaphase II (mature) oocytes.
Pregnancy rate was similar in NW (36.8%) and OB-SIN (33.3%) women, while it was lower in OB-F patients (11.1%).

CONCLUSION

We analyzed molecular markers in granulosa cells and follicular fluid as indicators of oocytes oxidative state. Our results suggest that supplementation with a compound of ALA -a natural antioxidant, cofactor in the mt respiratory chain- and MYO -an insulin-sensitizer- might increase antioxidant defenses and reduce oxidative stress in the obese ovarian environment, possibly contributing at restoring physiological conditions. This might improve IVF pregnancy rates in obese infertile women. Further studies are needed to clarify the synergic action of ALA, MYO and FA on the oocyte oxidative environment.

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