

4th ASPIRE

Osaka, Japan, 2012.08.31–09.02

Melatonin supplementation improves oocyte and embryo quality in women undergoing in vitro fertilization-embryo transfer

T. Nishihara¹, S. Hashimoto¹, K. Ito¹, Y. Nakaoka¹, Y. Hosoi², K. Matsumoto², Y. Morimoto¹

¹Department of Culture Environment, IVF Namba Clinic, Japan

²Division of Biological Science, Graduate School of Biology-Oriented Science and Technology, Kinki University, Japan

Introduction:

Melatonin, or N-acetyl-5-methoxytryptamine, is a hormone produced in the pineal gland at the base of the brain. Melatonin has the ability to powerfully scavenge free radicals that cause oxidative damage. Some studies have shown that oxidative stress may be a cause of poor oocyte and embryo quality. The aim of this study was to evaluate the efficacy of melatonin supplementation for approximately two weeks before ovum pick-up on oocyte and embryo quality in women undergoing in vitro fertilization and embryo transfer cycles.

MATERIALS AND METHODS:

This study used data from a total of 152 cycles in 76 patients in the IVF Namba Clinic. The

mean age of the patients was 38.4 +/- 4.6 years, and all patients were treated for at least 2 weeks with melatonin (3 mg per day) ending on the day of hCG injection. To evaluate the cumulative effect of melatonin supplementation during the study period, we compared the cycle outcomes between the first (no supplementation) and second cycles (melatonin supplementation) of the patients who completed two treatment cycles. The primary outcome measures were the maturation rate, fertilization rate, rate of good quality embryos, blastocyst rate, and rate of good quality blastocysts.

RESULTS:

There were no significant differences between the first and second cycles in estradiol levels on the day of hCG ($p=0.23$), the number of retrieved oocytes ($p=0.45$), maturation rates ($p=0.09$), fertilization rates after intracytoplasmic sperm injection (ICSI) ($p=0.58$), or fertilization rates after conventional IVF ($p=0.67$). However, limited to patients with a low fertilization rate in the first cycle ($<60\%$), the fertilization rate was increased after melatonin treatment (29.0 ± 25.8 vs. $61.3\pm 31.9\%$, respectively; $p<0.01$). The rate of good quality embryos also increased (49.0 ± 33.3 vs. $68.7\pm 26.9\%$, respectively; $p<0.05$). There were no significant differences between the first and second cycles in blastocyst rates ($p=0.30$) and the rate of good quality blastocysts ($p=0.61$).

CONCLUSION:

Regarding pre-treatment with melatonin, the fertilization rate increased after melatonin treatment in patients with a low fertilization rate, and it also resulted in a significant improvement of the embryo quality. Our data show that melatonin supplementation can have a beneficial effect on the improvement of oocyte and embryo quality probably due to reducing oxidative damage.