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L-Carnitine improves the human blastocyst development

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Objective:

It has been shown that L-Carnitine (LC) improve the development to the blastocyst in mice and decrease the apoptosis in blastocyst. However, it remains unclear the effect of LC on the development of human embryos.

In this study, we investigated the effect of LC on the development of human embryos.

Design: Prospective clinical study.

MATERIALS and METHODS:

This study was carried out using 1,308 zygotes at pronuclear stage donated from 107 patients who were treated with controlled ovarian stimulation between April and July 2015, obtained more than five fertilized ova, and informed consent.

The zygotes obtained from each patient were randomly divided into two groups and cultured in SAGE 1-Step™(Origio) with or without 1 mM LC from Day 1 to 6.

All embryos were assessed the embryo quality on Day 3. In some cases, embryo transfer and/or vitrification were performed and the remaining embryos were continued the culture until Day 6.

To evaluate the effect of LC, the rate of good quality embryo on Day 3, the blastulation on Day 5, good quality blastocyst on Day 5 and clinical outcome after embryo transfer were analyzed. The clinical outcome was assessed in the case of single embryo transfer of fresh and frozen embryos.

Moreover, to investigate the age related effect of LC, we examined the effect of LC < 40 and ≥ 40 years groups.

Results: There was no difference in the rates of cleavage, good quality embryo on Day 3 and blastulation on Day 5 between embryos cultured with and without LC in all ages. However, the rate of good quality blastocyst of embryos cultured with LC was significantly higher than that of embryos

without LC (14.2% (74/521) vs. 8.5%(42/492), $P < 0.05$).

In the < 40 years group, the rate of good quality blastocyst was also significantly higher in LC than control (15.1% (64/425) vs. 9.6% (38/395), $P < 0.05$).

There was no difference in the implantation rate between two groups (LC: 32.7% (36/110) vs. control: 32.5%(25/77)).

Embryos cultured with LC developed to healthy babies (n = 8, April 27, 2016).

Conclusion:

LC improved the development of human embryos to morphologically-good blastocyst especially in the < 40 years group. The safety of the LC-supplementation was confirmed.

The data of the present study suggest that LC is effective in vitro culture of human embryos.

Support: None