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Poster Presentations

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Impact of co-administration of bone marrow stromal cells and l-carnitine on rat damaged ovaries due to chemotherapy

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Background: Despite the great benefits of chemotherapy in treating cancer patients, it has some side effects on ovaries. Cyclophosphamide is one of the most used chemotherapy drugs which directly damages ovaries. It has been observed that transplantation of bone marrow stromal cells (BMSCs), a type of mesenchymal stem cells, may treat ovarian damage after chemotherapy. On the other hand, L-carnitine (LC), as a flavonoid antioxidant, appears to play an essential role in fatty acid metabolism and has beneficial effects on damaged ovaries. In addition, LC has beneficial effects on differentiation and reduction of apoptosis in BMSCs.

Objective: The aim of this study was to investigate the effects of co-administration of BMSC + LC on ovarian function, structure and apoptosis after creating a chemotherapy model with cyclophosphamide in rat.

Materials and Methods: Forty female Wistar rats were intraperitoneally injected with cyclophosphamide for 14 days for chemotherapy-induced ovarian destruction. Then, the rats were randomly divided into four groups: I. control group, 25 µl of culture medium was directly injected into the bilateral ovaries, II. BMSC group, 2×10^6 BMSCs suspended in 25 µl of culture medium were directly injected into the bilateral ovaries, III. LC group, 200 mg/kg of LC was injected intraperitoneally one day before until seven days after chemotherapy, IV. Co-administration of BMSC + LC group, injection of BMSCs, and LC were performed together. Four weeks later, the function of the ovaries was evaluated by measuring the levels of serum estradiol (E_2) and follicle-stimulating hormone using the enzyme-linked immunosorbent assay kit, the structure of the ovaries was evaluated by counting the number of ovarian follicles at different stages using hematoxylin and eosin staining, and apoptosis was investigated by evaluating the expression of ovarian B-cell lymphoma 2 (Bcl-2) and Bcl-2-associated X protein (Bax) proteins using western blot were assessed.

Results: Co-administration of BMSC + LC was more effective in repairing damaged ovaries than the effect of their separate administration. Co-administration of BMSC + LC increased E_2 and decreased follicle-stimulating hormone levels compared to the control group ($p < 0.001$). The number of follicles was higher in the co-administration of BMSC + LC group compared to the control group ($p < 0.001$). Co-administration of BMSC + LC increased Bcl-2 protein level, decreased Bax protein level and increased Bcl-2/Bax ratio ($p < 0.001$).

Conclusion: The effect of co-administration of BMSC + LC is probably more effective than the effect of their separate administration on the recovery of damaged ovaries by chemotherapy with cyclophosphamide in rat.

Key words: *Bone marrow stromal cells, Carnitine, Chemotherapy, Ovary, Regeneration.*

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