البحث الرابع

Pretreatment with erythropoietin of stem cell therapy in cyclosporine A induced nephrotoxicity: Histological, biochemical and pharmacological study.

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Abstract:

Background: Cyclosporine A is one of the most commonly used immunosuppressant drugs in transplantation medicine in order to prevent graft rejection. However, it is highly toxic drug especially to kidney and pancreas. Stem cell therapy especially if preceded by erythropoietin administration could improve the adverse effects of cyclosporine A found to occur in renal tissue. Aim of work: is to elucidate the therapeutic effect of stem cells, especially pre-treated with erythropoietin, on cyclosporine A - induced nephrotoxicity in adult male albino rat and to demonstrate the limited role of spontaneous recovery in renal tissue repair.

Material and methods: This research uses fifty adult male albino rats weighing 180-220 g. Ten rats were divided into five groups each: Group I (Normal control): The rats received olive oil at a dose of 1 ml/kg/ day subcutaneously once daily for one month. Group II (Cyclosporine A administration): The rats received cyclosporine A. Group III (Cyclosporine A administration with spontaneous recovery): The rats received cyclosporine A and left for a month following the last dose of Cyclosporine A for spontaneous recovery. Group IV (Cyclosporine A and stem cells administration): The rats received cyclosporine A. Stem cells were injected intravenously (dose: 1x106 stem cells labelled with PKH26 dye in 1 ml phosphate buffer saline into the tail vein) 24 hours following the last dose of cyclosporine A. Group V (Cyclosporine A, stem cells with erythropoietin pre-administration): The rats received cyclosporine A. Stem cells were injected intravenously 24 hours following the last dose of cyclosporine A. 48 hours before stem cell therapy, rats were injected intravenously, into the tail vein, with 1 ml of erythropoietin. The dose of cyclosporine A 15 mg/kg/ day subcutaneously once daily for one month. Rats of groups I, II were sacrificed after one month, III, IV and V after two months. The kidneys were removed and processed for histological and biochemical studies.

Results: Light microscopic examination of rat kidney specimens, of rats the received cyclosporine A, stained with haematoxylin and eosin showed extensive degeneration of lining epithelial cells in renal cortex and medulla, cytoplasmic vacuolation, and haemorrhage. Treatment with mesenchymal stem cells, especially pre-treated with erythropoietin greatly ameliorated these histological alterations much more than the effect of spontaneous recovery.