Histological and Immunohistochemical Study on the Possible Therapeutic Effect of Mesenchymal Stem Cells on Cisplatin-Induced Cortical Renal Injury in Mice

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ABSTRACT

Background : Cisplatin is widely used anticancer drugs. Despite its efficacy in treating solid tumors, it has many side effects including acute renal failure. Previous studies have demonstrated that mesenchymal stem cells (MSCs) had a role in promoting cellular proliferation and regeneration.

Aim of the Work: Studying the possible therapeutic effect of bone marrow-derived mesenchymal stem cells on cisplatin-induced cortical renal injury in adult male mice.

Material and Methods: Thirty six adult male mice were divided into 4 groups: group I (control group), group II (cisplatin group): received a single intraperitoneal (IP) injection of 10 mg/kg cisplatin then animals were sacrificed after 72 hours, group III (stem cell therapy group): received a single IP injection of 10 mg/kg cisplatin, then, injected with 2 x 10^6 MSCs suspended in 0.5 ml PBS in the caudal vein 72 hours after cisplatin injection and left for 4 weeks before scarification, group IV (recovery group): received a single IP injection of 10 mg/kg cisplatin and left for 4 weeks to check for spontaneous recovery. Histological (using H&E stain), histochemical (PAS reaction) and immunohistochemical (using Ki67 antibody) studies were performed. Morphometric measurement of optical density of PAS reaction and mean number of Ki67 immunoreactive cells were done followed by statistical analysis.

Results: Cisplatin only treated group showed ruptured glomerular capillaries, cytoplasmic vacuolization of tubular cells, flattening and loss of the epithelial lining cells of cortical tubules, and severe interstitial hemorrhage. Significant decrease in optical density of PAS reaction, with decrease in the mean number of Ki67 immunoexpression were found. MSCs improved the histological changes with significant increase in the optical density of PAS reaction and mean number of Ki67 immunoexpression.

Conclusion: A therapeutic effect of MSCs was detected in cisplatin-induced cortical renal damage. This was evidenced by reversing the glomerular and tubular pathological changes in adult mice.

Key Words: Histological, immunohistochemical, nephrotoxicity, cisplatin, bone marrow-derived mesenchymal stem cells.

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