Histological study on the effect of stem cells in cisplatin induced nephrotoxicity in mice

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ABSTRACT

Background: Cisplatin is one of the 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 had a role in promoting epithelial proliferation.

Aim of work: Was to study the possible therapeutic effect of bone marrow derived mesenchymal stem cells in preventing cisplatin induced nephrotoxicity.

Materials and Methods: Thirty six adult male mice were divided into 4 groups: group I (control group), group II (cisplatin group): received a single IP injection of 10 mg/kg cisplatin and animals were scarified after 72 hours, group III (stem cell therapy group): received a single IP injection of 10 mg/kg cisplatin, then, injected with 0.5 ml of cultured stem cells in the caudal vein 24 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 and PAS reaction) and immunohistochemical (using Ki67) 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 congested glomeruli, cytoplasmic vacuolization, flattening and loss of the epithelial lining cells of proximal and distal tubules, hyaline casts, inflammatory cell infiltration and severe interstitial hemorrhage. Deccreased optical density of PAS reaction and decreased area% of Ki67 immunoexpression were found. Stem cell treated group significantly reduced these histological changes.

Conclusion: A therapeutic effect of bone marrow mesenchymal stem cell therapy was detected on acute renal failure, which was evidenced by limiting the glomerular and tubular changes.

Key Words: Acute renal failure, cisplatin, mesenchymal stem cells.