Review Article

Histological Study on The Effect of Mesenchymal Stem Cells Versus Exosomes on Chemically Induced Liver Injury in Adult Male Albino Rats

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ABSTRACT

Background and Aim of the study: Liver diseases are major global health burden which lead to a lot of complications if left untreated. The present study aimed at investigating and comparing the therapeutic effect of mesenchymal stem cells (MSCs) versus Exosomes in CCl4 induced liver injury in adult male albino rats.

Methods: Fifty four adult male albino rats were divided into: Group I (Control Group) 20 rats. Group II (CCl4 Group) 5 rats, Group III: (Recovery Group): of 5 rats, Group IV (MSCs) 12 rats, Group V (Exosomes), 12 rats. 0.1 ml/kg of CCl4 dissolved in 0.1 ml olive oil was administered intraperitoneally (IP) twice weekly for six weeks for all experimental groups. MSCs were injected in the tail vein of rats of group IV at a dose1×106 after last CCl4. Exosomes were injected in the tail vein of rats of group V at a dose 250 µg (harvested from 1 × 106 MSCs) after last CCl4. The animals of groups (I and III and IV and V) were sacrificed 10 weeks from the start of the experiment while the animals of group II were sacrificed 6 weeks from the start of the experiment. ALT and AST were measured at the end of 6th week and 10th week. Hematoxylin and eosin, Masson's trichrome stain, SMA and Caspase3 immunostaining were performed.

Results: In group II and III, hepatocytes showed cytoplasmic vacuolations with dark pyknotic nuclei. Mononuclear cellular infiltration around the congested and dilated portal vein was also observed. A significant increase in mean values of liver enzymes, mean area % of collagen, mean number of α-SMA and caspase 3 +ve cells and mean number of optical density in group II and III compared to control group and other groups.

In group IV and V Most of hepatocytes were apparently normal, few of them showed dark pyknotic nuclei, sinusoids were apparently dilated. Few cellular infiltrations could be detected in group IV. A significant decrease in mean values of liver enzymes, mean area % of collagen, mean number of α-SMA and caspase 3 +ve cells and mean number of optical density in group IV and V compared to group II and III.

Conclusion: It can be concluded that CCL4 induced liver injury, in the form of degenerative changes that progressed into fibrotic changes. MSCs therapy and Exosomes therapy proved a definite therapeutic effect by regression of degenerative and fibrotic changes, the effect was nearly the same.

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