Treatment efficiency of different routes of bone marrow-derived mesenchymal stem cell injection in rat liver fibrosis model

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Abstract:

Background/Aims: The most appropriate route for bone marrow-derived mesenchymal stem cell (BM-MSC) transplantation in the management of liver fibrosis remains controversial. This study investigated the therapeutic efficacy of intravenous and intrasplenic BM-MSC transplantation on carbon tetrachloride (CCl4)-induced rat liver fibrosis. Methods: Fifty rats were divided into 5 groups (n = 10 rats per group): healthy control group, CCl4 group, CCl4/recovery group, CCl4/BM-MSC intravenous group, and CCl4/BM-MSC intrasplenic group. BMMSCs were isolated, labeled with green fluorescent protein (GFP), and injected into fibrotic rats either intravenously or intrasplenically. Gene expression of interleukins (IL-1β and IL-6), interferon (INF-γ), hepatic growth factor, and the hepatocyte-specific marker cytokeratin 18 was estimated by quantitative real-time reverse transcription-polymerase chain reaction. Vascular endothelial growth factor and connective tissue growth factor was detected by western blot analysis and enzyme-linked immunosorbent assay, respectively. At 2 weeks after intravenous and intrasplenic BM-MSC injections, GFP-positive cells were detected in liver tissue. Results: Both routes achieved a similar enhancement of liver function, which was confirmed by histopathological examination. The intravenous route was more effective than the intrasplenic route in reducing gene expression levels of IL-1β, IL-6, and INF-γ. However, fibrotic changes were still observed in the recovery group. Conclusion: Intravenous BM-MSC injection was an efficient and appropriate route for BM-MSC transplantation for the management of liver fibrosis.

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