Effects of autologous bone marrow—derived mesenchymal stem cell transplantation in canine experimental spinal cord injury models

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The purpose of this study is to investigate the effects and the role of autologous bone marrow-derived MSC transplantation as a clinical study in canine experimental spinal cord injury models. Twenty five adult Beagle dogs were classified to 5 groups; G1- healthy normal dogs (5), G2-no MSC transplantation after SCI (2 weeks alive; 5), G3- MSC transplantation after SCI (2 weeks alive; 5), G4- no MSC transplantation after SCI (5 weeks alive; 5), and G5- MSC transplantation after SCI (5 weeks alive; 5). Seven days after spinal cord injury, prelabeled autologous MSCs were transplanted into the injured lesion at a density of 1×10^7 cells through intrathecal injection at the lumbar spinal cord. Behavioral analysis with the Olby score, magnetic resonance imaging (MRI), cerebrospinal fluid (CSF) analysis, histopathological and immunohistochemical analysis, and neurotrophic factor expressions were used to evaluate the therapeutic effects after autologous MSC transplantation.

Behavioral analysis revealed that the locomotor functions of dogs in G5 were significantly improved than dogs in G4.Histopathological, immunohistochemical analysis, and neurotrophic factor expressions demonstrated that transplanted MSCs promoted neuronal regeneration on injury lesion. Based on these results, we suggested that autologous MSC transplantation might have potential as a therapeutic strategy for treating spinal cord injury.

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