

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

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Twenty five adult Beagle dogs were classified to 5 groups (5 dogs in each group); G1- healthy normal dogs, G2- no MSC transplantation after SCI (2 weeks alive), G3- MSC transplantation after SCI (2 weeks alive), G4- no MSC transplantation after SCI (5 weeks alive), and G5- MSC transplantation after SCI (5 weeks alive). Seven days after spinal cord injury, prelabeled allogenic 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 MSC transplantation. Behavioral analysis revealed that the locomotor functions of dogs in G5 were improved than dogs in G4. However, CSF analysis revealed mild monocytic pleocytosis in G3 and 5, and migrated prelabeled MSCs were decreased in G5 compared to that of G3. Furthermore, the levels of neurotrophic factors were significantly decreased in G5. The present study demonstrated that allogenic MSC transplantation might have potential as a therapeutic strategy for treating spinal cord injury compared to no treatment group. However, this study suggested that immune response to transplanted allogenic MSCs interference neuro-regeneration on injury site and promote reduction of nerve growth factor expression.

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