Influence of delivery method on neuroprotection by bone marrow mononuclear cell therapy following ventral root reimplantation with fibrin sealant.

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Abstract:

The present work compared the local injection of mononuclear cells to the spinal cord lateral funiculus with the alternative approach of local delivery with fibrin sealant after ventral root avulsion (VRA) and reimplantation. For that, female adult Lewis rats were divided into the following groups: avulsion only, reimplantation with fibrin sealant; root repair with fibrin sealant associated with mononuclear cells; and repair with fibrin sealant and injected mononuclear cells. Cell therapy resulted in greater survival of spinal motoneurons up to four weeks post-surgery, especially when mononuclear cells were added to the fibrin glue. Injection of mononuclear cells to the lateral funiculus yield similar results to the reimplantation alone. Additionally, mononuclear cells added to the fibrin glue increased neurotrophic factor gene transcript levels in the spinal cord ventral horn. Regarding the motor recovery, evaluated by the functional peroneal index, as well as the paw print pressure, cell treated rats performed equally well as compared to reimplanted only animals, and significantly better than the avulsion only subjects. The results herein demonstrate that mononuclear cells therapy is neuroprotective by increasing levels of brain derived neurotrophic factor (BDNF) and glial derived neurotrophic factor (GDNF). Moreover, the use of fibrin sealant mononuclear cells delivery approach gave the best and more long lasting results.