Autologous bone marrow mesenchymal stromal cell

Cell transplantation with Autologous bone marrow mesenchymal stromal cells (MSCs) seems to be a therapeutic promise for patients with established spinal cord injury (SCI), achieving improvement in their quality of life.

Various experimental studies showed that autologous bone marrow mesenchymal stem cells (MSCs) can reach areas of SCI after being deposited in the subarachnoid space ^{1) 2) 3) 4) 5)}, an observation that must be taken into account when applying these techniques in patients. Moreover, preclinical experience with adult paraplegic pigs shows that local cell therapy for SCI requires attention to numerous technical details, such as the morphology of the lesion, an adequate cell suspension medium, caliber of the injection needle, rate of cell administration in the injured tissue, and achieving a high concentration of cells in the smallest possible volume, in order not to produce added damage to the spinal cord ^{6) 7)}.

Currently, MSCs can be tracked in vivo after labeling with superparamagnetic iron oxide nanoparticles ⁸⁾, and it is obvious that the use of these techniques can offer in the future useful data to optimize doses and routes of administration.

A clinical trial involving 12 patients with complete and chronic paraplegia (average time of chronicity, 13.86 years; SD, 9.36). The characteristics of spinal cord injury SCI in magnetic resonance imaging (MRI) were evaluated for a personalized local administration of expanded autologous bone marrow mesenchymal stromal cells (MSCs) supported in autologous plasma, with the number of MSCs ranging from 100×106 to 230×106 . An additional 30×106 MSCs were administered 1 month later by lumbar puncture into the subarachnoid space. Outcomes were evaluated at 3, 6, 9 and 12 months after surgery through clinical, urodynamic, neurophysiological and neuroimaging studies.

Cell transplantation is a safe procedure. All patients experienced improvement, primarily in sensitivity and sphincter control. Infralesional motor activity, according to clinical and neurophysiological studies, was obtained by more than 50% of the patients. Decreases in spasms and spasticity, and improved sexual function were also common findings. Clinical improvement seems to be dosedependent but was not influenced by the chronicity of the SCI.

Personalized cell therapy with MSCs is safe and leads to clear improvements in clinical aspects and quality of life for patients with complete and chronically established paraplegia ⁹⁾.

see Mesenchymal Stem Cell Allograft.

see Autologous bone marrow mesenchymal stromal cell for neuropathic pain

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