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Clinical benefits of single vs repeated courses of mesenchymal stem cell therapy in epilepsy patients

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Epilepsy is defined as "refractory" when existing anti-epileptic drugs (AED) are found to have minimal to no effect on patient's condition. Therefore the search and testing of new treatment strategies is warranted. The "two-hit" strategy using autologous mesenchymal stem cells (MSC) was offered to patients with symptomatic drug-resistant epilepsy within a Phase I/II open-label registered clinical trial NCT0247443. The patients received either standard treatment with AEDs (control group, n=33), or AEDs supplemented with one or two courses of therapy with autologous bone marrow-derived MSCs, expanded in vitro (MSC group, n=34). MSC therapy courses were 6 months apart, and each course consisted of two cell injections: an intravenous infusion of MSCs, followed within 1 week by an intrathceal administration of neurally differentiated MSCs. MSC injections proved safe without any severe side effects. In MSC group, 61.7% patients responded to therapy at 6 months timepoint (p<0.01 vs control), and the number rose to 76.5% by 12 months timepoint. Decrease in anxiety and depression scores and paroxysmal epileptiform activity was observed in MSC group based on HADS and EEG, respectively, and MMSE score has also improved. Concomitant administration of levetiracetam, but not other AEDs, correlated with the success of MSC therapy. Second course of MSC therapy facilitated further reduction in seizure count and epileptiform EEG activity (p<0.05 vs single course). Application of autologous MSC based therapy in patients with pharmacoresistant epilepsy demonstrated significant anticonvulsant potential. This effect lasted for at least one year, with repeated administration of MSCs conveying additional clinical benefit.

Biography

Doctor of Medical Sciences, Deputy Director for Research in Republican Scientific and Practical Center of Mental Health (Minsk, Belarus). The sphere of scientific and practical interests is clinical neurophysiology, neurology and psychiatry. The founder Anti Epileptic League of Belarus, of the Belarusian Scientific School of Modern Clinical Digital Electroencephalography, Pharmacjgenetic Direction in Personalized therapy for neurological and mental diseases. The author of more than 100 scientific papers, including five monographs.