

Parkinson's disease

Parkinson's disease(PD) represents a progressive neurodegenerative disease in which loss of dopaminergic neurons in the substantia nigra pars compacta occurs leading to the development of clinical symptoms of muscle rigidity, tremor, bradykinesia and postural instability. As the disease progresses, additional symptoms such as motor fluctuations, dyskinesias, dementia, dystonia appear[1]. In the general population the prevalence of Parkinson's disease is about 0.3% increasing to 1% in people over 60 years[2]. Development of Parkinson's disease before the age of 50 years is rare. Incidence increases dramatically after age 60. Also, it was noticed that a higher incidence of Parkinson's disease is in men than in women[3]. The combination of genetic and environmental factors it is believed to promote the development of Parkinson's disease[4].

The main features which characterize Parkinson's disease are degeneration of dopaminergic neurons in substantia nigra and the resulting biochemical deficiency of dopamine. It is important to emphasize that at the time of clinical manifestation of the disease, almost 60% of dopaminergic substantia nigra cells are lost leading to 80% depletion of striatal dopamine[5].

Currently, all available treatments of PD are only symptomatic.

Stem cells therapy of Parkinson's disease

To date the use of mesenchymal stem cells(MSCs) in the treatment of PD represents a new perspective option and alternative for conventional treatment. It is considered that the microenvironment of damaged tissues produces factors that attract stem cells to the site of injury and enhances their differentiation into desired cells. Thus, MSCs promote tissue regeneration by differentiating into the injured cells[6].

Encouraging results were obtained in clinical trial conducted by Venkataramana N.K. et al. in 2010. It was the prospective, uncontrolled pilot study in which patients with Parkinson's disease were treated by MSCs. There were seven patients. All of them received autologous bone-marrow-derived mesenchymal stem cells. No serious adverse events associated with stem cells therapy were observed. The stem cells treatment was well tolerated by all patients. The follow-up period ranged from 10 to 36 months. A steady improvement in "off"/"on" Unified Parkinson's Disease Rating Scale (UPDRS) was noticed in patients. It is important to emphasize that the mean "off" score was improved by 22.1 ± 5.8 % and the mean "on" score was ameliorated by 38 ± 19.8 %. Also, Hoehn and Yahr scale and Schwab and England score which were used for assessment of patients quality of life were improved.

Moreover, patients reported significant amelioration in symptoms such as facial expression, gait and freezing episodes, also in overall wellbeing. In addition after stem cells therapy the dosages of PD medicine were reduced significantly. It is worth noting that all patients underwent MRI examination at baseline and after stem cells treatment at last follow-up. MRI didn't reveal any parenchymal changes or evidence of tumor formation. The results obtained in clinical trial have demonstrated significant improvement in the symptoms and quality of life. Also, it proved that autologous mesenchymal stem cells therapy is safe[7].



References

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