## MICSGROUP onferences Accelerating Scientific Discovery 3rd World Congress on **Cell Science & Stem Cell Research**

November 20-22, 2013 DoubleTree by Hilton Baltimore-BWI Airport, MD, USA

## Role of stem cell therapy in spinal cord injury

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 $\mathbf{S}$  pinal cord injury (SCI) often results in extensive axonal degeneration, neuronal loss, and severe functional deficits. The functional restoration is dependent on the regeneration of the damaged axons and formation of neural connections. One of the possible treatment strategies is to attempt neural repair using cellular transplants. We present two studies with an aim to determine the safety as well as efficacy of the use of intrathecal administration of autologous bone marrow mononuclear cells in patients with Spinal cord injury. The first study is a published study with a detailed analysis of thoracolumbar SCI patients who underwent cellular therapy followed by neurorehabilitation. The study sample included 110 thoracolumbar SCI patients. The other study was for 50 cervical SCI patients. The outcomes was recorded at a mean follow up of 2 years ±1 month. The outcome measures used for both the studies were Functional Independence Measure (FIM) score, American Spinal Injury Association scale (ASIA) and detailed neurological assessment. Data was statistically analyzed using McNemar's test to establish significance between the change in symptoms and the intervention. In the study of thoracolumbar SCI injury, 100 out of 110 (91%) patients showed improvements. Improvement in trunk control was observed in 95.6% cases, bladder management in 33% with respect to shift from in dwelling and condom catheter to self intermittent catheterization, partial sensory recovery in 27% and reduction of spasticity in 26%. All the patients showed improvement in postural hypotension. 38% wheelchair bound patients started walking with assistance. Functionally, 27% showed improved activities of daily living (ADLs) and 53.6% showed a positive change in FIM score. 10% cases showed a shift in ASIA scale. A statistically significant association of these symptomatic improvements with the cell therapy intervention was established using McNemar's Test. On electrophysiological studies, 2 showed improvement and 1 showed change in functional MRI. In the study conducted on cervical SCI patients, 37 out of 50 (74%) showed improvements. Sensation recovery was observed in 26% cases, improved trunk control in 22.4%, spasticity reduction in 20% and bladder sensation recovery in 14.2%. All the 50 cases had improvement in postural hypotension. 12.24% wheelchair bound patients started walking with assistance. Functionally, 20.4% patients showed improved ADLs and 48% showed a positive change in FIM score. 6% cases showed a shift in ASIA scale. A statistical analysis using McNemar's test established a significant association of these symptoms with the intervention. No major adverse effects were noted in either of the studies over the duration of 2 years. In both, thoracolumbar and cervical spinal cord injury, intrathecal administration of autologous bone marrow mononuclear cells along with neurorehabilitation demonstrates statistically significant outcomes both clinical and functional. Overall, it is a safe and feasible therapeutic strategy that improves the quality of life of the SCI patients.

## Biography

Alok Sharma is presently the Professor & Head of Department, Department of Neurosurgery LTMG Hospital & LTM Medical College, Sion, Mumbai, India and Director, NeuroGen Brain & Spine Institute, Chembur, Mumbai and Honorary Consultant Neurosurgeon, Fortis Hospital, Mulund, Mumbai. He obtained his MBBS, M.S and M.Ch from the Seth G.S. Medical College & KEM Hospital of Mumbai University. Subsequently he trained overseas in some of the most prestigious universities of the world in Sweden, UK, Germany, USA and Japan. He has authored/edited 8 books, contributed chapters to several textbooks, has 78 Scientific publications and has made over 125 International, National and zonal presentations. He is the Associate Editor of *the Indian Journal of spinal surgery* and on the editorial board of other journals. He has conducted many international and national research trials and studies, has organized numerous conferences and workshops, held many organizational positions and has been the recipient of many awards and honors in his distinguished career. He has been the pioneer in India in the field of Regenerative medicine and in particular on the use of stem cells in the treatment of incurable neurological disorders. He is the Founding President of the Stem Cell Society of India. He has set up and heads the Stem Cell-Genetic Research laboratory of the Municipal Corporation of Greater Mumbai at the LTMG Hospital & LTM Medical College. He founded the NeuroGen Brain and Spine institute that is dedicated to stem cell therapy and neurorehabilitation. He is Chairman of the seventh annual conference of the International Association of Neurorestoratology being held in Mumbai in 2014. His other special interests include Surgery for ischemic Stroke , Neurotrauma, Spinal Reconstructions, Stereotactic & Functional Neurosurgery including Psychosurgery and Neuroendoscopy.

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