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## Autologous bone marrow mononuclear cell transplantation in Autism spectrum disorders

utism spectrum disorders (ASD) are characterized by affected communication, social interaction, cognition and behavior.  ${
m A}$  The underlying pathology of ASD involves both the immune as well as the nervous system. There is evidence of immune dysregulation, neuroinflammation, neural hypoperfusion, irregular neuronal growth and increased size and number of microglia. With an alarming rise in the incidence of ASD and no treatment available, establishing a new therapeutic strategy is the need of the hour. Pre-clinical and clinical research has shown a promising outcome of cellular therapy in various incurable neurological disorders. Bone marrow stem cells have unique ability of self renewal and differentiation. Their paracrine activities such as immunomodualtion, neuroprotection and neurogenesis make them an attractive therapeutic option for ASD. To study the effect of cellular therapy in autism, we conducted a study on 149 cases of autism. They were administered autologous bone marrow mononuclear cells (BMMNCs), intrathecally and were given a personalized rehabilitation program after cellular therapy. The mean follow up period of our study was 19 months  $\pm 1$  month. It was observed that overall 134 (90%) out of 149 cases showed improvement. Symptomatically, 122 (81.87%) showed improvement in eye contact, 114 (77%) in attention, 107 (71.81%) in hyperactivity, 86 (57.71%) in social interaction, 74 (49.66%) in communication, 71 (47.65%) in stereotypical behavior, 69 (46%) in speech and aggressiveness and 51 (34.22%) in self stimulation. No major adverse events were recorded after the intervention. PET CT scan brain was used to monitor the effect of autologous BMMNCs in autism at a cellular level. On comparing the PET CT scan performed before and 6 months after the intervention, it was observed that FDG uptake was reduced in the previously hypermetabolic areas (red; frontal, parietal regions) and increased in the previously hypometabolic areas (blue; mesial temporal, cerebellar regions) exhibiting a balancing effect to achieve normalization of brain metabolism. This study opens a new therapeutic avenue for ASD by demonstrating the positive effect of autologous BMMNCs on clinical symptomatology and objective evidence of neuroimaging.





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