

# Transplantation of allogenic mesenchymal stem cell promotes functional recovery in patients with traumatic brain injury

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## Abstract

Traumatic brain injury (TBI) is a global public health concern including both urban and rural population. Individuals with severe TBI endure life-long impairment and disability, consequently placing phenomenal socioeconomic burden (day-to-day activities, survival and income). Till date there is no effective treatment that improves neural structural repair and functional recovery. To this end, there has been a growing interest in the potentials of mesenchymal stem cell (MSC) transplantation as therapy for brain injuries. The mechanistic action of mesenchymal stem cells will target the period of evolution of secondary injury, which is the actual window of opportunity for therapeutic intervention. We conducted a randomized study to evaluate the safety and feasibility of Wharton's jelly (WJ) derived MSCs (WJMSCs) transplantation in patients with TBI (GCS 3-8). Investigated the recovery using neurological clinical parameters [Fugl-Meyer Assessments (FMA), Functional Independence Measures (FIM) and Radiological imaging] and infusion related Serious Adverse Events (SAEs) post-transplantation. TBI patient arm (n=4) received standard-of-care + WJMSC treatment; Control arm (n=4) received only standard-of-care. Patients followed up at days 90 and 180. Locomotion (p=0.025), communication ability (p=0.013) and social cognition (p=0.008) improved (FIM score range 3-6) as early as 3 months. Further improvements included bladder/bowl management (p=0.032) and bed/wheelchair/bathing (p=0.011) at 6 month post-transplantation. Mann-Whitney test showed significant functional improvement in emotional status/adjustment to limitation (p=0.008) as well as in cognition functions (p=0.008). Self-care and swallowing ability improved (p=0.011) (FMA score range 5-6) by 6 months. No infusion related adverse events occurred. Thus, demonstrating the effect of allogeneic mesenchymal stem cells transplantation (WJMSCs) in repair processes and functional recovery in TBI patients. On-going studies are being carried out to assess the ability of WJMSCs in reducing inflammation/apoptosis post injury and amelioration of neurodegeneration after TBI.

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## Biography

Poonam Yadav is a PhD scholar, working in Department of Research, Sir Ganga Ram Hospital and Amity University, Noida. She has 10 years of experience in the field of stem cell biology. Her main expertise are isolation, characterization, cell cell interaction assays of stem cells and tumor cells. Different sources like Bone marrow, Umbilical cord, Adipose tissue and Dental pulp has been used to isolate & culture Mesenchymal Stem Cells(MSC).She is also in charge of Good Manufacturing

Practices (GMP) facility in Sir Ganga Ram Hospital. Her previous experience has been in the corporate (Cryoviva Biotech Pvt. Ltd. Gurugram) for 4 years and was responsible for quality maintenance of stem cell processing and storage. She has also published paper in International peer reviewed journal and attended conference and workshop in the area of clinical stem cell research. Presently her focus area is on pre-clinical stem cell transplant research and working on two human models to study the efficacy of stem cell transplant for Critical Limb Ischemia (CLI) and functional recovery in Diffused Traumatic brain injury (TBI).