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Multiple Injections of in Vitro Expanded Autologous Bone Marrow Stem Cells For Cervical Level Spinal Cord Injury - A Case Report

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BACKGROUND

Patients with complete spinal cord injury at cervical level, mostly lead a life with quadriplegia. We report a case of 22 year old male, who became quadriplegic after C4-C5 injury and has improved after five injections of in-vitro expanded autologous bone marrow mononuclear cells (ABMMNC).

MATERIALS AND METHODS

The patient developed complete quadriplegia following fall from height. MRI suggested C5 burst fracture with retropulsion of C5 vertebrae and cord contusion at C4-C5 and underwent decompression and fixation four days post injury. After surgical fixation, bone marrow was harvested twice and a portion of the MNCs were expanded in-vitro and injected and another portion was cryopreserved which were later expanded and injected through lumbar puncture. The first injection was given 13 days after surgery. The first specimen of BM had CD34 of 0.18% and was injected twice; once immediately after harvesting

(CD34:1.57%) and later after cryopreservation for 11 months (CD34: 3.33%). The second specimen had a CD34 of 0.52% and was injected thrice; twice after harvesting with CD34 of 1.28% and 6.23% respectively and later after cryopreservation for four months (CD34: 14.03%). The expansion was done in a GMP compliant clean room using autologous serum and the specimens were subjected to aerobic culture and Endotoxin tests before each administration.

RESULTS:

Investigations done (i) Post injury, (ii) Post decompression and (iii) one year (iv) One and half year after the injury have shown objective improvements with Light touch score (20-22-40-48), Pin prick score (20-20-32-40), Anal sensations (Nil-Nil-Present), Motor Score (11-11-22-26), Sensory level (C6-C6-C6-C6), Motor level (C5-C5-C6-C6), Neurological level (C5-C6-C6-C6), Spinal cord independence measure (9-12-45-50) and Barthel index (0-0-30-40). Repeat MRI show gliosis at C5. The ASIA score has improved from A to B with no adverse reactions.

CONCLUSION

Multiple intrathecal injections of in-vitro expanded ABMMNCs in cervical-spinal cord injury was found to be safe and gradual objective improvements have been observed over a year and a half without any adverse outcome.