

Autologous bone marrow-derived stem cell therapy in patients with Burger's disease

Shahgasempour Shapour Ph.D, Tissue Engineering and Nanomedicine Research Center, Taleghani Hospital, Shahid Beheshti University of Medical Sciences, Velenjak, Tehran, Iran. Tel: +98(21) 22439847, Fax +98(21) 22439848, email: sgasempour@yahoo.com.

Shahgasempour Shapour Ph.D, Habiballah Peyrovi MD, Arash Mohammadi Tofigh MD, Afshin Fathi MD,

Introduction: Patients suffering from Thromboangiitis obliterans (TAO) have endothelial cell dysfunction and the severity of the disease lies in the need for amputation in more than a quarter of all sufferers. This study was performed to assess whether granulocyte colony-stimulating factor mobilized autologous bone-marrow derived mononuclear cells transplantation improves endothelial dysfunction in these patients.

Materials and Methods: Four patients with Buerger's disease were enrolled for autologous peripheral blood stem cell therapy. All patients had severe claudication, rest pain with nonhealing ischemic wounds. They had already received currently available medical treatment and surgical interventions such as sympathectomy. Pulse oxymetry, O₂ Saturation, rest pain, pain-free walking, skin temperature, the size of skin ulceration, color dopler sonography and angiography were done pre- and post-implantation. The patients received subcutaneous injections of recombinant human G-CSF (Filgrastim) daily at 5µg/kg/day for six days prior to apheresis. Blood samples were collected and leukocytes were measured daily. Once the WBCs reached approximately to 25000-30000/ml, then, approximately 400-500ml suspensions of circulating peripheral blood mononuclear cells were collected using Cobe Spectra instrument. The cells were then concentrated to a final volume of 60-70ml, followed by injection of the cell suspension into the gastrocnemius muscle of affected limb under general anesthesia (70-80 sites, 0.5-1ml per site). Mononuclear cells and CD34+ cells were enumerated prior to intramuscular injection into the affected limbs.

Results: In all four patients, normalization of limb temperature in the affected area showed significant improvement after 2-3 weeks post-transplantation as observed by thermograph (an average of 1 °C). Rest pain and pain-free walking distances were significantly improved 1 to 2 months post-transplantation. O₂ saturation also improved gradually after the treatment in all four patients. In three patients complete healing of wound was noted.

Conclusion: In conclusion, the effectiveness of therapeutic angiogenesis with bone-marrow derived mononuclear cells BM-MNCs in patients with Buerger's disease has been established. Therefore, BM-MNC transplantation may provide effective, safe and a promising therapy in such patients in whom conventional medical therapy has been exhausted.