Cell therapy in Stroke

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Stroke is the second leading cause of death and the leading cause of adult disability world-wide, and increasingly so in developing countries. There are two main types of stroke - Ischemic and hemorrhagic. Acute ischemic stroke (IS) is the most common type of stroke. Only few therapeutic options are available for IS such as the use of tissue plasminogen activator, aspirin, surgical decompression and stroke rehabilitation units, nevertheless many patients with stroke have enduring deficits. Thus, there is a clear need for exploring new therapeutic strategies to reduce neurological deficits caused by stroke. Cell-based therapy is a new investigational approach that holds promise to enhance recovery from ischemic stroke. There are more than 33 published human studies of cell therapies in stroke, with a total of more than 418 treated patients. Twenty five studies were in ischemic stroke, two in hemorrhagic stroke and six studies for both the types of stroke. There are more than 31 completed (but unpublished) or ongoing studies which are projected to recruit approximately 1420 patients in which: intravenous, intracerebral, intraarterial, intrathecal and intracarotid routes have been used by 16, 8, 4, 2 and 1 studies respectively. Preliminary clinical trials on stem cell therapy in stroke with substantial limitations have indicated that stem cell therapy is feasible, safe and potentially efficacious. However, first randomized controlled trial published by our group with 120 patients indicates that intravenous infusion of bone marrow derived stem cell therapy is safe, but there is no beneficial effect of treatment on stroke outcome.

However, there is still a need to examine and evaluate the mechanism of action of stem cells, ideal type of stem cells to be used, optimal route, timing of intervention, dose of intervention and optimal protocol which can show maximum efficacy. Currently ongoing studies, some with low risk of bias are designed to determine the efficacy of cell therapy for stroke and to translate the preclinical findings into clinical practice.