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Editorial

Mesenchymal Stem Cell Therapy for Spinal Cord Injury from Safety to Efficacy

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These days there are a lot of research on stem cell therapy for repairing brain and spinal cord injury, among candidate cells for treatment of neurological disorders mesenchymal stem cells (MSCs) have gotten the much more interest because of their accessibility, simplicity for culture and isolation, and also their safety for injection [1,2]. Based on the data from international clinical trial database (http://www.clinicaltrials.gov/) until present there are twenty-four submitted clinical trials about using MSCs for treatment of spinal cord injury. The most common types of MSCs are autologous bone marrow MSCs, umbilical cord MSCs and autologous adipose tissue derived MSCs. There are other still not used cell types of MSCs for spinal cord injury clinical trials such as dental pulp derived MSCs which had origin from neural crest and there are some reports about their efficient neuronal differentiation inducing activity [3,4]. A growing body of evidence (from clinical studies and animal models) infers that MSCs are safe and there were not any important reported dangerous side effect after using them.

In the case of the therapeutic effects of MSC therapy, while there are some controversy about their effectiveness but the most possible mechanism of action for MSCs is the immunomodulatory mechanisms which can protect and rescue the injured neurons from further damage [5-8]. After the injury based on the intensity of the damage [9] the damaged tissue can be divided into mild, moderate and severely affected or injured zones [10,11], based on the harshness of the damage the extent of each one of these areas could be different. If we accept the immunomodulatory mechanism then it seems that the effectiveness of MSCs could be more noticeable in the mild to moderate injuries, and particularly in their acute stage. If we review the submitted clinical trials or published records, it seems that there is not any standard classification [11,12] among them based on the acuteness and severity of the injury and its future outcome. Some studies divided patients to acute (less than 1 week passed from injury) or chronic type (more than one month passed from injury) [13] while in others this is less than 6 months for acute and more than 6 months for chronic [14]. There is a published guideline for the conduct of clinical trials for spinal cord injury [15] but this guideline is not proper for stem cell therapy clinical trials because it was designed for different purposes and especially to monitor the patient progress and is not designed to determine the acute and chronic phases of the injury. It seems that for precise analysis of efficacy of stem cell therapy for different classes of spinal cord injury it is necessary to outfit a standard universal method of classification before recruiting patients into the clinical trials.

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