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Mesenchymal stem cell therapy in knee osteoarthritis: the way forward

Keywords: osteoarthritis, mesenchymal stem cells, cellular therapies, stem cells

Abbreviations: OA, osteoarthritis; MSC, mesenchymal stem cell; PRP, platelet rich plasma; UCB- MSCs, umbilical cord blood-derived mesenchymal stem cells; BPD, broncho-pulmonary dysplasia; VAS, visual analogue scale; MRI, magnetic resonance imaging

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Introduction

Osteoarthritis (OA) is a cartilage degenerative process, involving the immune system, producing local inflammatory reactions, with production of pro-inflammatory cytokines and metalloproteinases.[1] Whatever the cause of cartilage degeneration the healing process is slow and where damage repair is not possible, a secondary fibrosis process occurs. As a result, the process of degeneration gradually continues. Unfortunately, no treatment is available to improve or reverse the process.[1]

Mesenchymal stem cell (MSC) transplantation along with autologous platelet rich plasma (PRP) has shown promising results for knee OA. MSCs, due to their multilineage potential, immunosuppressive activities, limited immunogenecity and relative ease of growth and expansion in culture are a popular choice for clinical use.[1] MSCs promote tissue repair by differentiating into the injured cell types, compensating their lost and secreting trophic factors.[1] The therapeutic effect of PRP is attributed to the abundance of various growth factors in its alpha granules such as transforming growth factor beta and vascular endothelial growth factor.[2] When administered along with MSCs it provides a biological scaffold that increases the proliferation and differentiation of progenitor or stem cells.[2]

Human umbilical cord blood-derived mesenchymal stem cells (UCB-MSCs) have emerged as a favored cellular source because they offer several advantages, such as non-invasive collection, hypo-immunogenicity, superior tropism and differentiation potential. Several pre-clinical trials with UCB-MSCs have been conducted in the contexts of Alzheimer's disease, myocardial infarction, stroke and broncho-pulmonary dysplasia (BPD). However, the effects of UCB-MSCs on cartilage repair have not been fully evaluated.[3]

Several authors have reported promising results with intra-articluar injection of MSCs. They observed (i) the number of cells to be given in each injection (ii) The number and the timing of injections (iii) Mode of delivery reduction in pain on a visual analogue scale (VAS) and improvement in the range of motion. Magnetic resonance imaging (MRI) showed a significant growth of articular cartilage and the regeneration of meniscus.[1] Although direct intra-articular injection is considered a technically simple approach to treatment of advanced OA, whether this approach can elicit beneficial effects (such as minimizing further cartilage damage) in human OA joints needs further evaluation.[4]

Though beneficial effects of PRP activated MSCs have been observed theoretically and in animal models, further investigations are necessary. Large scale studies are needed to ascertain: (i) the adequate dose (iv) the stage of the disease to select for therapy (v) objective quantification of benefit, and (vi) a non-invasive way for labeling and tracing MSC cells after injection.

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Conflict of interest

The author declares no conflict of interest.

References

1. Davatchi F, Abdollahi BS, Mohyeddin M, et al. Mesenchymal stem cell therapy for knee osteoarthritis. Preliminary report of four patients. *Int J Rheum Dis*. 2011;14(2):211–215.
2. Mishra A, Tummala P, King A, et al. Buffered platelet–rich plasma enhances mesenchymal stem cell proliferation and chondrogenic differentiation. *Tissue Eng Part C Methods*. 2009;15(3):431–435.
3. Chung JY, Song M, Ha CW, et al. Comparison of articular cartilage repair with different hydrogel–human umbilical cord blood–derived mesenchymal stem cell composites in a rat model. *Stem Cell Res Ther*. 2014;5(2):39.
4. Nöth U, Steinert AF, Tuan RS. Technology Insight: adult mesenchymal stem cells for osteoarthritis therapy. *Nat Clin Pract Rheumatol*. 2008;4(7):371–380.