Regenerative therapy for osteoarthritis

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Osteoarthritis (OA) is the most common type of arthritis and causes a significant deterioration in patients’ quality of life. The high prevalence of OA as well as the current lack of disease-modifying drugs led to a rise in regenerative medicine efforts. The hope is that this will provide a treatment modality with the ability to alter the course of OA via structural modifications of damaged articular cartilage (AC).

Regenerative therapy in OA started with the concept that administered cells may engraft to a lesion site and differentiate into chondrocytes. However, recent studies show that cells, particularly when injected in suspension, rapidly undergo apoptosis after exerting a transient paracrine effect. If the injected stem cells do not lead to structural improvements of a diseased joint, the high cost of cell therapy for OA cannot be justified, particularly when compared with other injection therapeutics such as corticosteroids and hyaluronic acid.

Long-term survival of implanted cells that offer prolonged paracrine effects or possible engraftment is essential for a successful cell therapy that will offer durable structural improvements.

Also, several endotypes and/or phenotypes of OA have been reported although there overlaps in the proposed endotypes/phenotypes and the eventual appearance of advanced disease are quite similar. While inflammation is known to negatively influence the effectiveness of cell therapy in OA, it has not been discussed or investigated which endotypes/phenotypes of OA are good targets of cell therapy.

Likewise, there is a controversy which stage of OA are candidates for cell therapy even though most people agree that far-advanced OA (KL4) should be excluded for consideration.

In this perspective session, current status of regenerative therapy in OA along with the conceptual strategy and future directions will be discussed.