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Stem cell-based cartilage repair in isolated articular cartilage lesions and arthritic conditions

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In this study we aimed to introduce biological approach as the new treatment module in cartilage lesions. Mesenchymal stem cells (MSCs), no hematopoietic progenitor cells found in various adult tissues, are characterized by their ease of isolation and rapid growth in vitro while maintaining their differentiation potential, allowing culture expansion to obtain large quantities for therapeutic use. These properties make MSCs an ideal cell type as building blocks for tissue engineering efforts to regenerate tissues and repair damaged structures encountered in isolated cartilage lesions and arthritic conditions. Promising results have been introduced in animal experiments about treatment of cartilage defects with autologous MSC implantation (AMSCI) but there are only a few case reports in humans. The purpose of this study was evaluating the effect of AMSCI on cartilage healing, in patients with isolated cartilage lesion or degenerative joint disease as a cell based treatment. We had applied MSC (mesenchimal stem cell) cultures obtained from two different sources (bone marrow and synovium) from each patient with their written consents. The study was approved by the university ethical committee and Health Ministry and supported by Industrial Ministry. We had applied MSC cultures by two techniques; either as MSCs impregnated collagen scaffolds directly into the defects or in another group of patients we injected MSCs into the joint of knee, ankle or hip. Bone marrow originated MSC impregnated collagen scaffolds were implanted into the defects in 2 patients (1 knee, 1 ankle). Where as in 9 patients, bone marrow MSC cultures are injected into the intraarticular space (7 knees, 2 ankles). In another group of patients MSC cultures derived from synovium are injected in 6 patients (5 knees, 1 ankle) and synovium cultured MSC impregnated collagen scaffolds were implanted in 12 patients (5 knees, 5 ankles, 2 hips). The total 29 patients applied MSC cell cultures was clinically fallowed by KOOS, HOKKAIDO, HSS, LYSHOLM and VAS scores and fallowed up to 22 months in 8 cases and 12 months by 21 cases. Functional and radiographic evaluation revealed moderate and good results at short to midterm follow up. The study revealed that autologous MSC is a promising method for stem cell-based cartilage repair.

Biography

Prof. Isık Akgun is the presenter; who has already more than 30 manuscripts printed in international journals. He has been experienced in cartilage surgery more than 15 years. His recent interest is on cartilage and chondrocyte stem cell culture, PRP and bone marrow stem cell culture applications on cartilage defects.

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