

One-step treatment of full-thickness knee osteochondral lesions by arthroscopic implantation of activated mesenchymal stem cells of aspirate bone marrow: intermediate results after at least one year of a 37 cases prospective series

Short title:

One step implantation of activated mesenchymal stem cells in knee chondral lesions

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Abstract

Introduction. The target of this study of a clinical trial was to examine intermediate outcomes at one year of treatment of the full-thickness knee osteochondral defect; this study was based on a procedure involving the use in one step of non-cultivated mesenchymal stem cells (MSCs) derived from autologous bone marrow; these cells were activated by a demineralized bone matrix, mixed with a collagen scaffold, and implanted arthroscopically after micro-perforations. One step technology without culture of activated MSCs is original, economic, confirmed by preclinical animal experiments.

Materials and Methods. 37 knees with tibiofemoral osteochondral defect outer-bridge grade 4 were treated and followed prospectively, according to inclusion criteria: age from 30 to 70 years, femoro-tibia defect less than 6 cm² on each surface, lack of mechanical associated or rectified pathology. The average area of cartilage lesions was 9 cm² (3-19 cm²); 11 cases (29.7%) had a varus malalignment corrected. Follow-up results were performed by imaging and IKS, KOOS and VAS scores. Control arthroscopy was performed in 3 patients.

Results. The average clinical and functional IKS and KOOS scores were significantly improved at follow-up, respectively, 48.6, 49.7 and 49.5 points, to 94.4, 94.3 and 95 points. Pain was significantly improved from 6-9 to 0-3 of SAV. Arthroscanner or MRI images showed complete coverage of the patellofemoral cartilage defect, a complete healing of the defect condyle in 29 knees (78.3%) and partial healing of the tibia defect in 27 cases (73%), related to insufficient micro-perforations. No complication or specific risk of the MSCs. Arthroscopy showed a predominantly hyaline stable cartilage.

Discussion. This technology appears safe and effective for a one step correction of osteochondral lesions.