Costal Chondrocyte-Derived Pellet-Type Autologous Chondrocyte Implantation for Treatment of Articular Cartilage Defect: Five-Year Follow Up of a Prospective Randomized Trial

Jae-Young Park[1], Do Young Park[2], Won Chul Choi[3], Dae Keun Suh, Kyoung Ho Yoon[4]
[1]CHA Bundang Medical Center, [2]Ajou University School of Medicine, Department of Orthopaedic Surgery, [3]CHA University, CHA Bundang Medical Center, [4]Kyung Hee Univ Hospital

INTRODUCTION: Costal chondrocyte-derived pellet-type autologous chondrocyte implantation (CCP-ACI) has been introduced as a new therapeutic option for treatment of articular cartilage defect. We had previously conducted a randomized controlled trial comparing CCP-ACI versus microfracture at 1 year. The purpose was to compare the efficacy and safety results at 5 years after treatment with CCP-ACI with microfracture for repair of articular cartilage defects of the knee.

METHODS: This article describes the mean follow up of 5-years of a previous prospective clinical trial that compared the results of CCP-ACI versus microfracture at 1-year follow up. Of the 30 patients from the CCP-ACI group that were described in the previous study, 25 were followed up. Patients were evaluated based on clinical outcomes scores (Lysholm score, International Knee Documentation Committee score, Knee Injury and Osteoarthritis Outcome Score (KOOS), and visual analog scale (VAS) pain score), magnetic resonance imaging, and treatment failure at last follow up.

RESULTS:

MOCART scores improved significantly from baseline to 5 years postoperatively only in the CCP-ACI group ($P < 0.0001$). MOCART scores in the CCP-ACI group was significantly greater than that in the MFx group at 5 years (70.9 vs. 26.7, $P < 0.0001$). Lysholm score and KOOS score in the CCP-ACI group was significantly greater than that in the MFx group at 5 years (84.5 vs. 64.9 and 78.2 vs. 60.6, $P = 0.023$ and $P = 0.038$, respectively). One treatment failure occurred in the Mfx group.

DISCUSSION AND CONCLUSION:

The results of the randomized controlled trial indicated that CCP-ACI was effective in achieving a satisfactory repair of cartilage defects. The MRI evaluations conducted at 1 year and 5 years after surgery revealed a good structural integration with the native cartilage tissue.