

Fibrin 자가 유래 연골 세포 이식술을 이용한 슬관절 연골 결손의 치료

Autologous Chondrocyte Implantation Using Fibrin for the Treatment of Articular Cartilage Defects of the Knee

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서 론

Autologous chondrocyte implantation (ACI) is widely used to treat symptomatic articular cartilage defects of the knee. Fibrin ACI is a new tissue-engineering technique for the treatment of full-thickness articular cartilage defects, in which autologous chondrocytes are inserted into a three-dimensional scaffold provided by fibrin gel. The objective of this study is to document and compare mean changes in overall clinical scores at both baseline and follow-up.

재료 및 방법

Thirty patients, treated from June 2004 to October 2006 for chondral defects of the knee, were selected for study participation. Chondrocyte were harvested from each patient and all patients subsequently underwent fibrin-matrix ACI, 4 weeks later. At two years postoperatively, all patients underwent a follow-up evaluation.

There were 24 men and 6 women of median age 35 years (range; 15 to 55). The 30 knees investigated in this study had chondral lesions with a mean size of 5.8 cm² (range, 2.3~12 cm²). 28 patients had isolated single lesions: 19 lesions located on the medial femoral condyle, 4 on the lateral femoral condyle, and 5 on the trochlea, whereas 2 patients had multiple lesions 2 on the medial femoral condyle and 2 on the trochlea. 18 lesions had right-knee involvement, and 14 had left knee involvement. Defects were classified as Grade III or IV in according to the International Cartilage Repair Society (ICRS) criteria. 13 lesions (40.62%) were classified as ICRS grade IVA or IVB, 19 lesions (59.38%) were grade IIIC.

결 과

The mean modified Cincinnati knee ligament rating scores improved significantly from 45.8 (SD, 3) points preoperatively to 85.9 (SD, 3) points two years postoperatively.

Based on the scores we obtained, 10 patients had excellent results, 17 good results, two fair results, and one poor results. A significant improvement was observed between the preoperative and the two-year follow-up scores ($p=0.004$), while the median Tegner activity scores and the Lysholm knee scores improved significantly from 2 (range; 1~4) to 7 (range; 5~8) and from 38 (range; 18~57) to 82 (range; 67~97). In addition, the mean Henderson MRI scores improved significantly from 14.4 (SD, 1) preoperatively to 7.0 (SD, 2) points at the two-year follow-up ($P=0.001$).

Ten patients had second-look arthroscopy, and two had biopsies at a mean of 13 (SD, 4) months follow-up. Overall, arthroscopic evaluation of the grafted areas demonstrated good fill with some grafts having fibrillations or mild hypertrophy and with most tissue repair being well integrated into the surrounding cartilage. The ICRS classification score for overall repair assessment was used: grade II (nearly normal) in 8 patients and grade III (abnormal) in 2 patients, one of these two patients had poor functional results and a poor Cincinnati knee score. No patient developed graft delamination, infection or knee stiffness requiring manipulation under anesthesia.

결 론

Fibrin ACI offers the advantages of technical simplicity, minimal invasiveness, a short surgery time, and easier access to difficult sites than classical ACI. Based on the findings of this clinical pilot study, we conclude that fibrin ACI offers a reliable means of treating articular cartilage defects of the knee.