The Exercise Therapy Decreases the Serum Interleukin-6 Levels in Patients with Knee Osteoarthritis

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Purpose: Exercise is one of the established treatment methods for knee osteoarthritis (OA). However, the mechanisms of its action are not fully understood. Although exercise has a muscle strengthening effect that may improve the stability of the knee joint, it has been speculated that exercise may exert anti-inflammatory effects for the joint. The aim of this study was to examine whether exercise had the anti-inflammatory effects for the joint in clinical practice using biomarkers for inflammation.

Methods: This study was approved by the Ethics Committee of our university and conducted in accordance with the declaration of Helsinki. The written informed consent for this study participation was obtained from all subjects. A total of one-hundred twenty postmenopausal women with medial type of primary knee OA (K/L2-4) who first visited our outpatient clinic for knee pain were included in the study. Subjects were randomized to either the exercise therapy group or the control group. The patients in the exercise therapy group conducted three different kinds of home exercise and stretching. The patients in the control group took either the oral selective COX2 inhibitor (celecoxib, 200 mg/day for 12 weeks) or the intra-articular injection of hyaluronic acid (HA, high molecular weight 2,700 kDa HA, 5 times with one week interval). Age, body mass index (BMI), Japanese Knee Osteoarthritis Measure (JKOM) score, visual analog scale (VAS) for pain score and serum levels of biomarkers for inflammation (high-sensitivity C-reactive protein [hs-CRP] and interleukin [IL] -6) were evaluated at baseline and 12 weeks after treatment initiation. Values in each group were compared between baseline and 12 weeks using a paired t-test.

Results: The sixty-nine of 120 patients were assigned to either the exercise therapy group and the remaining fifty-one patients were to the control group. During the twelve weeks of examination, twelve patients in the exercise therapy group and the eight patients in the control group were withdrawn. No significant differences of the baseline characteristics were observed between the exercise therapy group and the control group. The JKOM score (p<0.001 and p<0.001, respectively) and VAS score (p<0.001 and p<0.001, respectively) at 12 weeks of the patients with both the exercise therapy group and the control group were significantly reduced in comparison to those at baseline. The hs-CRP levels remained unchanged in patients with both groups (p=0.267 and p=0.137, respectively). The sIL-6 levels of the patients in the exercise therapy group were significantly decreased (p=0.021) in comparison to those of the patients at baseline, but sIL-6 levels of the patients in the control group were not.

Conclusions: The serum IL-6 levels in patients with OA were significantly reduced by the exercise therapy, while sIL-6 levels were unchanged by NSAID, suggesting that exercise therapy may exert anti-inflammatory effects in knee OA.