

Improvement of Muscle Strength Through Resistance Exercise During Adjuvant Chemotherapy

Sang Hee IM^{1**}, Eun Young Han², Seungeun Park¹, Kye Hee Cho^{3†}

Department of Rehabilitation Medicine, Severance Hospital, Yonsei University College of Medicine¹,

Department of Rehabilitation Medicine, Jeju National University²,

Department of Hospital Medicine, Yonsei Severance Hospital, Yonsei University College of Medicine³

Introduction

Breast cancer patients during adjuvant therapy suffer from various complications of cancer therapy such as fatigue, myalgia, insomnia, and depression. Exercise is now known to promote cardiovascular fitness and quality of life during cancer treatment outcomes. However, exercise studies are mostly based on self-administered aerobic exercise and the effect of resistance exercise is rarely reported. Also, whether the exercise should be provided for those under adjuvant therapy still needs to be determined.

Material and methods

Breast cancer patients after surgery were referred to the rehabilitation outpatient clinic of a tertiary hospital for evaluation of physical condition and other complications. As a part of cancer rehabilitation therapy, Cybex® isokinetic resistance training was provided twice a week by a professional physical therapist. Patients trained on resistance exercise for at least 8 weeks in the outpatient rehabilitation clinic from Jun 2020 to Nov 2022 were candidates for inclusion in this retrospective review. Those with results of anthropometric, bioimpedance analysis, and functional assessments at baseline and follow-ups were included in the analysis.

To determine the effect of resistance exercise during adjuvant therapy, patients under post-op adjuvant therapy were grouped as an adjuvant group, and the others not in need of adjuvant therapy were classified as a non-adjuvant group. A total of 47 patients were eligible for inclusion, however, data were available only for 30 patients. They were grouped into adjuvant (n=17) and non-adjuvant (n=13) groups for the analysis.

Results

The baseline characteristics were not different between groups. After the resistance training, the strength of the quadriceps muscles was enhanced in both groups; however, the significance level was greater in the non-adjuvant group ($P<0.01$ vs $P<0.05$). Group differences were also significant in muscle strength gain and the Berg balance scale in the non-adjuvant group ($P<0.05$). Anthropometric measures including BMI, skeletal muscle mass, and body fat percentage were not changed after the 8-week resistance training.

The change of quadriceps peak torque and total work at 60°/sec at less than one-year postop was similar between groups regardless of adjuvant therapy. However, the amount of strength gain was relatively preserved even after one-year postop in the adjuvant group. In serial follow-up of quadriceps peak torque, the non-adjuvant group showed the greatest improvement at the first follow-up at 8 weeks and maintained the strength thereafter while the non-adjuvant group, although the degree of strength gain was the lesser, showed consistent improvement throughout the follow-up.

Discussion

The isokinetic resistance exercise significantly improved strength and function in postop breast cancer patients regardless of adjuvant therapy. This study is a good example of applying resistance exercise in patients during adjuvant therapy.