Original Article

Effectiveness of Rehabilitation Intervention in Cancer Patients at Home: A Preliminary Verification

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Abstract

The purpose of this study was to conduct a preliminary study to examine the effect of rehabilitation with a combination of exercise and nutritional therapy for cancer patients at home. Seven cancer patients (2 males and 5 females) living in the community, with a mean age of 81.6 ± 8.3 years, were included in the study. Body weight, grip strength, and leg circumference were measured. Measurements were taken before and one month after the intervention. Results of this study showed that the combined intervention of exercise and nutritional therapy for cancer patients living in the community resulted in a significant improvement in lower leg circumference. Therefore, the intervention in this study may be an intervention that recognizes a certain level of effectiveness.

Introduction

The survival rate of cancer patients has been improving due to early detection and advances in treatment techniques. We found that, even after minimally invasive specoscopic surgery, postoperative lung cancer patients were discharged from the hospital with insufficient improvement in physical and pulmonary functions compared to preoperative conditions [1)]. In postoperative patients with breast cancer, including those who underwent chemotherapy and radiotherapy, the range of motion of the shoulder joint and upper limb function gradually improved by 3 months after surgery, but quality of life and mental status problems remained [2-4)]. In addition, postoperative patients with pancreatic cancer have weight loss, decreased skeletal muscle mass, and decreased grip strength by 3 months compared to preoperative patients due to decreased physical activity and food intake [5)].

Cancer patients at home in Japan have difficulty receiving outpatient rehabilitation in hospitals because it is difficult to calculate outpatient rehabilitation fees. Therefore, cancer patients at home are required to receive rehabilitation when their physical functions or activities of daily living decline. However, there have been few reports examining the effectiveness of rehabilitation for cancer patients at home, and effective intervention methods have not been clarified. In this preliminary intervention study, verification of the effectiveness of rehabilitation at home could be developed into future research.

The purpose of this study was to conduct a preliminary study to examine the effect of rehabilitation with a combination of exercise and nutritional therapy for cancer patients at home.

Methods

Seven cancer patients (2 males and 5 females) living in the community, with a mean age of 81.6 ± 8.3 years, were included in the study.

The cancer types were uterine cancer in one patient, osteosarcoma in one patient, lung cancer in two patient,

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breast cancer in one patient, hematologic tumor in one patient, and colon cancer in one patient.

This study was approved by the Ethics Committee of Kochi Professional University of Rehabilitation (R5-2).

Measurements

Physical and occupational therapists administered a combined exercise and nutritional therapy intervention to the subjects. The intervention period was 1 month.

Body weight, grip strength, and leg circumference were measured. Measurements were taken before and one month after the intervention.

Grip strength was measured twice on each side using a grip strength meter (Grip-D: TKK5401), and the maximum value was adopted. Leg circumference was measured at the largest part of the lower leg.

Rehabilitation

Exercise therapy included muscle strengthening exercises, balance exercises, stretching, and ADL exercises. Exercises were performed 1-2 days a week for 20-40 minutes per session.

Nutritional therapy consisted of dietary supplements provided to the subjects. Subjects were taken once daily. This study used dietary supplements containing protein (BCAA) and vitamin D.

Statistical Analysis

Statistical analysis was performed using Wilcoxon's signed rank test for pre- and post-intervention comparisons, with a significance level of 5%. Statistical analysis software used was IBM SPSS Statistics 29.0.

Results

The results before and after the intervention are shown in Table. The median right lower leg circumference improved significantly from 30.5 cm before the intervention to 32.0 cm after the intervention (p=0.042).

Grip strength (left side) showed a median value of 16.3 kg after the intervention from 14.2 kg before the intervention, showing a trend toward improvement, although no significant difference was observed (p= 0.091).

No patients with adverse events were observed.

Discussion

The results of this study showed that the combined intervention of exercise and nutritional therapy for cancer patients living in the community resulted in a significant improvement in lower leg circumference. Therefore, the intervention in this study may be an intervention that recognizes a certain level of effectiveness.

In a study of healthy elderly subjects, resistance exercise for 12 to 24 weeks increased lean body mass, muscle hypertrophy, and muscle strength[6]. We implemented a combined exercise and nutritional therapy intervention in hospitalized patients without cancer, which resulted in improvements in ADL and grip strength[7]. In this study, a combined exercise and nutritional therapy rehabilitation program for cancer patients at home resulted in a significant improvement in leg circumference after the intervention. Combined

Table. Changes in body weight and physical function before and after intervention

	Before	One month later	P value
Body weight（kg）	42.5(40.0-63.0)	42.5(40.5-64.0)	0.174
Grip strength of right（kg）	17.5(9.7-27.8)	16.5(8.2-37.1)	0.671
Grip strength of left（kg）	14.2(6.5-27.2)	16.3(8.2-33.8)	0.091
Leg circumference of right（cm）	30.5(27.0-34.5)	32.0(27.5-34.5)	0.042
Leg circumference of left（cm）	30.5(27.5-34)	30.6(27.5-35.3)	0.345

Median (minimum-maximum)

exercise and nutrition interventions are effective in stimulating muscle protein synthesis and improving sarcopenia through low-intensity strength training and intake of BCAAs, leucine, essential amino acids, whey protein, and vitamin D[8, 9]. Cancer patients may have improved lower leg circumference due to the positive effects of exercise therapy on muscle strength and mass, combined with nutritional therapy because of the problems of weight loss and malnutrition. Grip strength showed a trend toward improvement after the intervention, suggesting that the effect of the intervention will become clearer with an increase in the number of patients in the future.

No patients of adverse events due to the intervention were observed in this study. The exercise therapy was selected based on the patient's condition, and the nutritional therapy used dietary supplements, but the subjects did not experience any adverse events, suggesting that the intervention could be safely implemented.

Limitations of this study are discussed. First, this study was insufficient to examine the effects of the intervention because there was only an intervention group and no control group. Establishing a control group in the future will clarify the intervention effect. Second, the number of patients was 7, which is a small number of patients, limiting the ability to demonstrate the effect of the intervention. In examining the intervention effect, the intervention effect may become clearer by increasing the number of patients. Third, the number of measurement items is small and insufficient to verify the effectiveness of the intervention. Further studies are needed.

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