Effect of low-intensity exercise therapy on the physical function, and mental and physical symptoms of patients with hematologic malignancy undergoing chemotherapy

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Introduction & Purpose

- Mid- to high-intensity exercise improves physical function and symptomatology in patients with hematologic malignancies. Low-intensity exercise therapy (LIET) is often adopted in cases where chemotherapeutic side effects preclude more intensive exercises. However, it remains unclear whether LIET is effective in patients with hematologic malignancies.
- The purpose of this study is to investigate the effects of LIET on the physical and mental symptoms and functions, in patients with hematologic malignancies undergoing chemotherapy.

Methods

- Study design: Longitudinal, observational study
- Participants: Patients with hematologic malignancy hospitalized for chemotherapy in Nagasaki University hospital.

Fig.1 Flow chart of the recruitment procedure and study protocol

Evaluation

Muscle function

- ❑ Muscle thickness: quadriceps at 10 cm proximal from the patella (ultrasound device, SeeMore™)
- ❑ Handgrip strength
- ❑ Isometric knee extensor strength

Physical function

- ❑ 10-meter walk test: 10MWT
- ❑ Timed Up and Go Test: TUGT

ADL

- ❑ Performance Status: PS
- ❑ Functional Independence Measure: FIM

HADS

- ❑ Hospital Anxiety and Depression Scale: HADS

QOL

- ❑ EORTC QLQ C-30

Intervention

- ❑ exercise program: resistance training and aerobic exercise
- ❑ time: 20 to 40min/day, up to 5 times/week
- ❑ exercise intensity: 40% or less the predicted maximum heart rate calculated by the Karvonen formula

Analysis

- ❑ Participants were divided into high- and low-frequency according to the mean LIET intervention frequency
- ❑ Comparison of 2 groups: two-way repeated ANOVA

Results

Table.1 Baseline characteristics of the participants

Parameters	Total (n=44)	HF group (n=22)	LF group (n=22)	P-value
Age, years	68.2±10.7	68.0±8.6	68.4±12.4	0.742
Sex, n Male/ Female	21 /23	12 /10	9/13	0.365
Body weight (kg)	54.4±11.7	56.3±13.7	52.5±9.3	0.292
BMI, kg/m ²	21.1±3.4	21.5±4.0	20.7±2.8	0.589
Cancer type, n (%)				0.061
Lymphoma	32 (72.7)	14 (63.6)	18 (81.8)	
Acute myeloid leukemia	8 (18.2)	7 (31.9)	1 (4.5)	
Acute lymphoblastic leukemia	2 (4.5)	0 (0.0)	2 (9.2)	
Multiple myeloma	1 (2.3)	1 (4.5)	0 (0.0)	
Chronic myeloid leukemia	1 (2.3)	0 (0.0)	1 (4.5)	
Days since chemotherapy	1.7±8.7	1.0±3.9	2.4±11.6	0.813
Hospital stay, days	40.5±23.3	36.7±21.0	44.3±24.8	0.162
Intervention frequency		0.93±0.06	0.66±0.14	<0.001
Exercise intensity, %	22.3±9.6.	22.5±10.5	22.0±8.2	0.948

In the HF group, muscle function was maintained, while physical function, ADLs, psychological distress, and QOL were significantly improved

In the LF group, muscle function of the lower-limb was significantly reduced and no other improvement was observed

Fig.2 Change from baseline to post-treatment in evaluation values

Conclusions

- LIET was effective in improving the physical functions and symptomatology in the high-frequency group, but not in the low-frequency group. LIET could be a potential treatment strategy for patients with hematologic malignancies undergoing chemotherapy who are unable to perform mid- or high-intensity exercise.