

CHARACTERISTICS OF PATIENTS WHOSE WALKING CAPACITY DECLINES AFTER RADICAL RADIOTHERAPY FOR NON-SMALL CELL LUNG, ESOPHAGEAL, AND HEAD AND NECK CANCER

Taro Okayama, Midori Unno, Noriko Mitsuhashi, Yuta Mochizuki, Takeshi Ishii, Yusuke Yonenaga, Ryusuke Uehara, Katsuyoshi Suzuki, Aruu Shimizu, Sho Ose, Mayu Yamamoto, Hirofumi Ogawa, Tsuyoshi Onoe, Hideyuki Harada, Hiroshi Fuseya

Division of Rehabilitation Medicine and Radiation and Proton Therapy Center, Shizuoka Cancer Center

Background

Rehabilitation for cancer patients undergoing radical radiotherapy(RT) is insufficient compared to those undergoing surgery.

Purpose

The purpose of this study is to identify patient characteristics that result in impaired walking capacity beyond the minimum clinically important difference in patients with non-small cell lung cancer, esophageal cancer, and head and neck cancer scheduled for radical RT ± Chemotherapy (CRT) in an inpatient setting.

Method

Study design: A prospective longitudinal observational study

Clinical Trial Registry No: UMIN 000044944

Eligibility criteria:

- 1) Patients with non-small cell lung, head and neck, and esophageal cancer undergoing inpatient radical RT/CRT.

Exclusion criteria:

- 1) CRT/RT as adjuvant therapy before and after surgery.
- 2) Rehab request before the start of CRT/RT due to frailty.

Timing and Detail of Assessment

Two-point assessment;

T1 within 1 week of the start of irradiation and T2 6 ± 2 weeks after T1.

Skeletal muscle index (SMI):

Bioelectrical impedance analyzer(TANITA BC-180)

Physical function:

6 minutes walk test, Handgrip strength, 5 Times Sit-to-Stand Test

Physical Activity:

Daily steps and activity time per intensity of physical activity were calculated using a pedometer(Kenz Lifecorder-GS, Suzuken).

Toxicity:

Using CTCAE5.0, Gr 1 or higher was judged to have side effects.

Analysis

We divided the participants into 2 groups according to the decline in the 6-minute walking distance between T1 and T2; **the maintained group when it was less than 40m and the decreased group when it was 40m or more** (Granger CL, Chronic Respiratory Disease,2015). The factors contributing to the decline in performance on the 6MWT were subsequently investigated.

Result

Baseline characteristics

	All Participants n=80	Maintained Group n=48	Decreased Group n=32
Age, years	69.1±10.2	67.0 ± 9.7	72.3 ± 10.2 *
Sex, n Male/ Female	60/20	35/13	25/7
Charlson comorbidity index	0.8±1.1	0.6 ± 0.9	1.1 ± 1.4
SMI, kg/m2	6.1±1.0	6.3 ± 0.9	5.9 ± 1.3
Female	7.4±0.9	7.6 ± 0.9	7.2 ± 0.9 *
Male			
Handgrip strength ,kg			
Female	22.5±7.5	22.9 ± 8.0	21.7 ± 6.9
Male	33.9±5.9	34.7 ± 5.7	32.9 ± 6.0
Five-time-sit-to-stand test ,s	7.8±2.1	7.5 ± 2.0	8.1 ± 2.4
6 min walking distance ,m	456.8±90.9	461.0 ± 86.4	450.3±98.7

Treatment information

Cancer type, n (%)			
NSCLC	27	17	10
Esophageal	26	13	13
Head and Neck	27	18	9
RT/CRT	14/66	7/41	7/25
Amount of radiation,Gy			
median(range)	62.5±6.2	63.2±6.2	61.5±6.1
Length of hospital stays, days	55.1±17.6	50.8±10.8	61.4±23.4 *

Physical Activity

Daily steps	3335±2306	3881±2387	2369±1825 *
LIPA, minutes	28.1±16.4	31.4±2.3	22.3±3.1 *
MVPA, minutes	7.0±9.6	9.0±11.0	3.4±4.7 *

Toxicity

Nausea ,n (%)	10 (13.1)	4(8.3)	6(18.7)
Fatigue	18 (23.6)	6(12.5)	12(37.5) *
Anorexia	18 (23.6)	6((12.5)	12(37.5) *
Dermatitis	51 (67.1)	35(72.9)	16(50)
Esophagitis	33 (43.4)	20(41.6)	13(40.6)
Oral mucositis	27 (35.5)	19(39.5)	8(25)
Leukopenia	16 (21.0)	7(14.5)	9(28.1)

Chi-squared test, Fisher's Exact Test, independent samples t-test, Mann-Whitney U test * p<0.05

- A total of 80 patients enrolled from Aug. 2021 to Oct. 2023.
- 32 patients out of 80 decreased walking capacity from T1 to T2.

Multivariable Logistic Regression Analysis on the decreased walking capacity (3 Variables)

	Odds	95%CI	p Value
Age			
>69 years	3.61	1.25-10.4	0.017
≤69 years	1		
Cancer type			
Esophageal	1.33	0.50-5.07	0.426
Head and Neck	1.19	0.33-4.23	0.780
NSCLC	1		
RT/CRT			
RT	1.34	0.36-4.97	0.659
CRT	1		

Multivariate Analysis Results for Individual Variables (3 Variables(Age, Cancer type, RT/CRT) + Each Individual Variable)

	Odds	95%CI	p Value
SMI			
Female			
<6.1 kg/m2	1.37	0.05-9.48	0.80
≥6.1 kg/m2	1		
Male			
<7.4 kg/m2	1.22	0.40-3.69	0.72
≥7.4 kg/m2	1		
Daily steps			
<3335 steps	4.43	1.20-16.30	0.025
≥3335 steps	1		
Fatigue			
>grade 1	7.28	1.90-26.8	0.0029
non	1		
Anorexia			
>grade 1	5.18	1.53-17.48	0.008
non	1		

Conclusion

Elderly at baseline, patients with **low activity** and side effects of **fatigue** and **anorexia** during treatment are at higher risk for decreased walking capacity.