ORIGINAL

Psychological Adjustment and Related Factors in Patients with Recurrence/Metastatic Lung Cancer after Curative Surgery

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Abstract : The purpose of study was to clarify the psychological adjustment and related factors in lung cancer patients with recurrence/metastasis after curative surgery. Forty-one with lung cancer who were informed of a recurrence/metastasis after curative surgery completed a questionnaire comprised of the Mental Adjustment to Cancer Scale (MAC), Psychological Adjustment scale for Cancer Survivors (PACS), and information pertaining to demographic variables. When healthcare providers intervene in patients with lung cancer that has recurred/metastasized after curative surgery, it is necessary to assess patients' psychological adjustment based on demographic information, such as age, sex, marital status, and employment status, and to provide effective support promptly. Factors associated with psychological adjustment with recurrent/metastatic lung cancer after curative surgery were 1) female, 2) having a job, 3) over 65 years of age, 4) having a spouse, and 5) advanced-stage cancer. There was no difference in psychological adjustment between treatment and the period from cancer incidence to recurrence/metastatic. J. Med. Invest. 70 : 200-207, February, 2023

Keywords **:** *lung cancer, surgery, psychological adjustment, recurrence/metastasis*

INTRODUCTION

Despite advances in medical diagnoses, treatment, and care, cancer is the leading cause of death in Japan (1). Advances have recently been achieved in the development of cancer treatments, such as surgery, chemotherapy, and radiation therapy ; however, there are still two distinct types of cancers : those that are curable and those that are intractable. Lung is classified as refractory, with a predicted 5-year overall survival rate of 25% or less (1). Lung cancer does not respond well to treatment, recurs after curative surgery, and has a poor prognosis despite anticancer drug treatment. Patients who relapse after curative surgery have a greater range of treatment options, such as surgery, radiotherapy, and chemotherapy, including cytotoxic anticancer drugs, molecular targeted agents, and immune check point inhibitors. However, fear of recurrence is one of the most commonly reported problems (2), and recurrence has been reported to be more upsetting than the initial diagnosis (3).

To assess psychological adjustment in cancer survivors, Watson *et al*. (4) developed the "Mental Adjustment to Cancer Scale (MAC)", which is now used as a scale of psychological adjustment worldwide. MAC has been developed as a tool for coping research in cancer care and is used for assessing survivors of various types of cancers. Ueta and Onishi (5) investigated psychological adjustment in cancer survivors and noted that MAC only had one positive psychological state, namely, "Fighting Spirit (FS)", but 2 negative psychological states, "Helplessness/Hopelessness (H/H)" and "Anxious Preoccupation (AP)". They added 3 positive psychological states and developed a new scale called the "Psychological Adjustment Scale for Cancer Survivors (PACS)". They investigated psychological adjustment in cancer survivors using 2 scales, MAC and PACS. The findings obtained revealed that three out of the four components of PACS reflecting a good psychological state were associated with "Fighting Spirit [FS]", indicating a positive psychological state in MAC, while one component reflecting a poor psychological state was associated with the two components "Helplessness/Hopelessness (H/H)" and in MAC. MAC and PACS is a supplemental relationship.

Psychological adjustment in cancer patients have been attracting increasing interest, and research is progressing on the effects of QOL and factors affecting psychological adjustment (6-11). Although patients with breast cancer have been extensively examined, few studies have been conducted on patients with lung cancer, and there is currently no information on psychological adjustment in patients with recurrent or metastatic lung cancer after curative surgery. The recognition that surgical treatment, which has a strong image as a curative treatment for lung cancer patients has led to the possibility of survival of the patient's own life, suggests that the mental burden of patients with recurrence or metastasis after curative surgery is significant. Clarifying the psychological adjustment of patients in such a difficult situation is important in improving patient understanding.

Therefore, the aim of the present study was to clarify the psychological adjustment and related factors in lung cancer patients with recurrence/metastasis after curative surgery.

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METHODS

Study design

A cross sectional study

Patients

Eligible participants were included based on the following criteria : 1) they received a diagnosis of non-small cell lung cancer (NSLC) and underwent curative surgery, 2) they developed recurrence after surgery, 3) they directly obtained information from the attending doctor about the recurrence of lung cancer, 4) they agreed to therapy for lung cancer recurrence, 5) they had a stable psychological status with no history of severe anxiety or other mental illness, and 6) they were older than 20 years. Subjects who do not meet the criteria of 1) to 6) are excluded. The criteria for determining the sample size for statistical analysis were as follows : a two-tailed significance level of 0.05, a medium effect size of 0.3, and a statistical power of 0.8 (12-13). The sample size was predetermined by using a power analysis in Gpower3.1, and it was determined that 67 participants were appropriate for analysis in this study (13).

Procedure

In the outpatient department of chest surgery, a questionnaire survey was conducted in a private room for patients who provided their consent. Assessments were individually administered, and clinical data were collected from electronic medical records. Data collection was conducted between August 2016 and September 2018 using structured questionnaires.

Measures

Demographic and clinical characteristics

To investigate psychological adjustment in patients with recurrent/metastatic lung cancer undergoing treatment, we conducted a survey using a questionnaire. Information was also collected from medical records on patient characteristics, employment status, persons consulted, the site of primary lung cancer, the histological type, stage of disease at the time of the diagnosis of lung cancer, the period (days) from surgery for primary lung cancer to recurrence/metastasis, the initial treatment for recurrence/metastasis, current treatment, and the presence or absence of cancer other than lung cancer.

Psychological adjustment

We used two scales to measure patients' psychological adjustment. The Japanese version of Mental Adjustment to Cancer Scale (MAC) scale was used as one of a scale to measure psychological adjustment in patients with cancer. It was developed by Watson *et al*. (4), translated into Japanese by Akechi *et al*. (14), and its reliability and validity have been verified. The Cronbach alpha coefficient for the original MAC scale is 0.84-0.65, and that for the Japanese version is 0.78-0.60. It consists of five subscales : "Fighting Spirit [FS]", "Helplessness/Hopelessness (H/H)", "Fatalism [F]", and "Avoidance [A]", and is a four-point Likert scale of 40 items. The higher the scores, the stronger the psychological response.

Another scale used to measure patients' psychological adjustment was Psychological Adjustment scale for Cancer Survivors (PACS). It is a scale that was developed by Ueta and Onishi (5) to measure psychological adjustment in cancer survivors, and its reliability and validity have been verified. It consists of four subscales : [Accepting myself as a patient living with cancer], [Feeling personal psychological growth], [Regaining myself], and [Experiencing a lack of well-being]. The first 3 items indicate that higher scores reflect better psychological adjustment. The higher the [Experiencing a lack of well-being] scores, the less successful the psychological adjustment. This is a four-point Likert scale of 18 items. MAC was developed to measure coping in cancer patients, and PACS measures the psychological "adjustment" status of cancer survivors. Although MAC may clarify detailed negative psychological adjustment, "Fighting Spirit [FS]" is the only one with regard to positive psychological adjustment, and there are limitations in measuring such positive psychological adjustment.

Statistical analysis

Descriptive statistics on patient characteristics were obtained using SPSS Statistics 26 for Windows (IBM SPSS Statistics, IBM Corporation, U.S.) and the Shapiro-Wilk test was performed to evaluate the normality of quantitative data. The differences between the 2 groups divided by median age (< 65 vs $\geqq 65$) and between the 2 groups for sex, marital status, employment status, and treatment status were analyzed using the Mann-Whitney U test. The presence of advisers and whether they were the spouses were examined. The pathological stage of primary lung cancer was divided into 2 groups : $\leqq$ stage I vs. $\geqq$ stage II. The periods from initial surgery to relapse were divided into two groups ($<$ 700 days vs. $\geqq$ 700). The periods from cancer relapse to the current date were divided into two groups ($<$ 5 years vs. $\geqq$ 5 years). All items were evaluated using a significance level of 5% (two-tailed).

Ethical consideration

The present study was approved by the Clinical Research Ethical Review Board of Tokushima University Hospital (2650). Prior to the initiation of the study, participants were informed of all necessary information regarding the publication of the study data, both verbally and in writing. Participants were also provided with the following details : their privacy will be protected, there will be no treatment-related disadvantages regardless of whether the patient participates in the study, the participant will not be identifiable from study data, and the participant may discontinue their participation at any time. During and after participation in the study, the patient's psychologic changes were carefully monitored and reacted immediately when needed. Patients who consented to these conditions were included in the present study.

RESULTS

Demographic and clinical characteristics of participants

Table 1 shows the demographic and clinical characteristics of participants. Forty-three patients participated in the present study. However, data from 41 of the 43 patients (95.3%) were analyzed in the present study. The two excluded patients had small cell lung cancer (SCLC) and had not undergone curative surgery.

Clinical characteristics and MAC in patients with recurrent/metastatic lung cancer after curative surgery

The relationships between clinical characteristics and MAC in patients with recurrent/metastatic lung cancer after curative surgery are shown in Table 2. Patients older than 65 years old had a significantly higher "Fatalism [F]" scores ($Z = -2.034$, $P = 0.042$), while female patients had a significantly higher "Fighting Spirit [FS]" scores ($Z = -1.977$, $P = 0.048$). Patients with a spouse had a significantly lower "Avoidance [A]" scores ($Z = -2.240$, $P = 0.025$). Patients with a job had a significantly lower "Helplessness/Hopelessness (H/H)" scores ($Z = -2.440$, $P = 0.015$) and those with stage II primary disease had a significantly higher "Avoidance [A]" scores ($Z = -2.072$, $P = 0.038$). No significant differences were observed in the number of patients consulted, the use of molecular targeted therapeutics, the period from initial surgery to recurrence/metastasis, or the period from recurrence/metastasis to the current date.

Table 1. Patients' demographical and characteristics

Variables	N=41	
	No. of patients	% of patients
[a)]Age (years)	73.0 (44, 88)[a)]	
Gender		
Male	22	53.7
Female	19	46.3
Marital status		
Present	35	85.4
Unmarried (including bereavement)	6	14.6
Job		
Present	12	29.3
Not present	29	70.7
Adviser		
Present	40	97.6
Spouse only	18	43.9
Spouse and others	22	53.7
Not present	1	2.4
Primary stage		
≦ stage Ⅰ	21	51.2
≧ stage Ⅱ	18	43.9
unknown	2	4.9
[b)]Treatment		
Present	22	53.7
Not present	19	46.3
Period from cancer incidence to recurrence/metastatic (days)	700 (138, 7966) [a)]	
Period after cancer recurrence /metastatic (days)	1218 (421, 3560) [a)]	

[a)]median (min, max), [b)]Treatment ; molecularly targeted therapeutics

Clinical characteristics and PACS in patients with recurrent/metastatic lung cancer (Table 3)

The median scores of the item that [accepting myself as a patient living with cancer] scores were 17.0, [Feeling personal psychological growth] scores was 8.0, [Regaining myself] scores was 8.0, and [Experiencing a lack of well-being] scores was 11.0.

The item of that [regaining myself] scores had a significantly higher in female (Z = -2.859, P = 0.004) and patients with a job (Z = -2.252, P = 0.024), and [experiencing a lack of well-being] scores had a significantly had a lower in patients with a job (Z = -3.540, P = 0.000). No significant differences were observed between other clinical characteristics and PACS.

DISCUSSION

The use of molecular targeted drugs and immune checkpoint inhibitors, the introduction of thoracoscopic and robotic-assisted surgery, and the development of radiotherapy have markedly improved the survival time of patients with lung cancer, which is regarded as an intractable cancer (15-17). However, Cristina *et al*. reported that recurrence on cancer survivors expose to face again psychosocial effects of cancer, including uncertainty and concerns about death (18). A more detailed understanding of the psychological adjustment of a patient may provide insights into the support needed under these difficult conditions. The present study used a combination of PACS and MAC to investigate the psychological adjustment and related factors in patients with recurrent/metastatic lung cancer after curative surgery.

The results of the analysis show that patients over 65 years of age had higher "Fatalism [F]" scores as a psychological adjustment for lung cancer patients with recurrence/metastasis after curative surgery. In psychological adjustment for cancer, Watson *et al*. reported that "Fatalism [F]" scores increased slightly with age (4), and Lanpic *et al*. reported that the copy style of "Fatalism [F]" was significant in elderly patients (19). Building on Erikson's theory, Newman *et al*. suggest that there are three types of life's challenges development in old age, one of which is "accepting life" (20). Older people are expected to accept disappointment in their current situation and acquire an integration of their egos (integrity) based on the basic strengths they have developed at each stage of life (21). The high "Fatalism [F]" scores in patients over 65 years of age in the results of this study suggests that older patients may have acquired ego integration by accepting cancer as their own destiny. Female in patients with recurred/metastasized lung cancer after curative resction also scored higher on "Fighting Spirit [FS]" consistent with previous findings for patients with recurrent or metastatic breast cancer (9). This study also showed that female patients with recurrence or metastatic lung cancer after curative surgery had higher "Fighting Spirit [FS]" scores and [regaining myself] scores. Because women have multiple roles, including housework, child rearing, and work (22), the result of this study was suggesting that female patients may have a stronger desire to confront cancer treatment and reintegrate into society.

Table 2. Demographical and characteristics related with MAC

Variable [range]		MAC									
		FS [16-64]		H/H [6-24]		AP [9-36]		F [8-32]		A [1-4]	
	No. of patients	Median (min, max)	a) p-Value	Median (min, max)	[a]Z/ p-Value	Median (min, max)	[a]Z/ p-Value	Median (min, max)	[a]Z/ p-Value	Median (min, max)	[a]Z/ p-Value
Score	41	47.0 (34.0-61.0)		9.0 (6.0-19.0)		22.0 (13.0-33.0)		22.0 (9.0- 29.0)		1.0 (1.0-4.0)	
Age (years)	41										
＜65	7	48.0 (44.0-58.0)	−.920/ .358	8.0 (6.0-12.0)	−.925/ .355	22.0 (13.0-30.0)	−.452/ .652	19.0 (10.0-26.0)	**−2.034/ .042**	1.0 (1.0-1.0)	−1.915/ .056
≧65	34	46.5 (34.0-61.0)		9.5 (6.0-19.0)		22.0 (14.0-33.0)		24.5 (9.0-29.0)		1.0 (1.0-4.0)	
Gender	41										
Male	22	45.0 (34.0-58.0)	**−1.977/ .048**	9.0 (6.0-15.0)	−.356/ .722	21.5 (13.0-30.0)	−1.101/ .271	21.5 (9.0-29.0)	−.052/ .958	1.0 (1.0-4.0)	−1.874/ .061
Female	19	49.0 (35.0-61.0)		10.0 (6.0-19.0)		22.0 (15.0-33.0)		23.0 (10.0-29.0)		1.0 (1.0-4.0)	
marital status	41										
Present	35	47.0 (34.0-58.0)	−.055/ .956	9.0 (6.0-18.0)	−.558/ .577	22.0 (13.0-33.0)	−1.331/ .183	22.0 (9.0-29.0)	−.222/ .824	1.0 (1.0-4.0)	**−2.240/ .025**
Not present (Including bereavement)	6	45.5 (37.0-61.0)		9.5 (6.0-19.0)		26.0 (15.0-31.0)		22.0 (18.0-29.0)		3.0 (1.0-4.0)	
Job	41										
Present	12	47.0 (42.0-56.0)	−.588/ .556	7.5 (6.0-11.0)	**−2.440/ .015**	20.0 (15.0-24.0)	−1.652/ .099	19.5 (14.0-29.0)	−.834/ .404	1.0 (1.0-4.0)	−.644/ .520
Not present	29	47.0 (34.0-61.0)		11.0 (6.0-19.0)		22.0 (13.0-33.0)		23.0 (9.0-29.0)		1.0 (1.0-4.0)	
Adviser	40										
Spouse only	18	51.0 (35.0-58.0)	−1.539/ .124	10.0 (6.0-15.0)	−.589/ .556	22.0 (13.0-33.0)	−.545/ .586	21.5 (9.0-29.0)	−.641/ .521	1.0 (1.0-4.0)	−.151/ .880
Spouse and others	22	46.0 (34.0-61.0)		8.0 (6.0-19.0)		22.0 (14.0-31.0)		24.5 (14.0-29.0)		1.0 (1.0-1.0)	
Primary stage	39										
≦stage Ⅰ	21	47.0 (34.0-57.0)	−.494/ .621	10.0 (6.0-18.0)	−.199/ .842	22.0 (14.0-30.0)	−.353/ .724	21.0 (9.0-29.0)	−.735/ .462	1.0 (1.0-4.0)	**−2.072/ .038**
≧stage Ⅱ	18	47.5 (35.0-61.0)		8.5 (6.0-19.0)		22.0 (13.0-33.0)		23.0 (14.0-29.0)		1.5 (1.0-4.0)	
[b]Treatment	41										
Present	22	47.0 (35.0-58.0)	−.052/ .958	10.0 (6.0-18.0)	−.553/ .580	22.5 (13.0-33.0)	−.891/ .373	20.5 (10.0-28.0)	−1.718/ .086	1.0 (1.0-4.0)	−.476/ .634
Not present	19	46.0 (34.0-61.0)		9.0 (6.0-19.0)		21.0 (14.0-31.0)		25.0 (9.0-29.0)		1.0 (1.0-4.0)	
[c]Period from cancer incidence to recurrence (years)	41										
＜5	35	47.0 (34.0-61.0)	−.887/ .375	9.0 (6.0-19.0)	−.142/ .882	22.0 (14.0-33.0)	−.259/ .796	21.0 (9.0-29.0)	−.888/ .374	1.0 (1.0-4.0)	.000/ 1.000
≧5	6	50.5 (36.0-58.0)		10.5 (6.0-14.0)		23.0 (13.0-28.0)		25.5 (18.0-28.0)		1.0 (1.0-3.0)	
Period after cancer recurrence (days)	41										
＜1218	20	47.0 (34.0-61.0)	−.209/ .834	8.0 (6.0-19.0)	−1.603/ .109	21.5 (14.0-31.0)	−.327/ .744	24.5 (9.0-29.0)	−1.099/ .272	1.0 (1.0-4.0)	−.428/ .669
≧1218	21	47.0 (35.0-58.0)		11.0 (6.0-15.0)		22.0 (13.0-33.0)		21.0 (10.0-28.0)		1.0 (1.0-4.0)	

[a] Mann-Whitney U-test, [b] Treatment ; molecularly targeted therapeutics, [c] divided into two groups by median

Table 3. Demographical and characteristics related with PACS

Variable [range]		PACS							
		Accepting myself as a patient living with cancer [5-20]		Feeling personal psychological growth [4-16]		Regaining myself [3-12]		Experiencing a lack of well-being [6-24]	
	No. of patients	Median (min, max)	[a]Z/ P-Value	Median (min, max)	[a]Z/ P-Value	Median (min, max)	[a]Z/ P-Value	Median (min, max)	[a]Z/ P-Value
Score	41	17.0 (10.0-20.0)		8.0 (4.0-15.0)		8.0 (3.0-12.0)		11.0 (6.0-18.0)	
Age, years									
＜65	7	19.0 (11.0-20.0)	−.230/ .818	8.0 (4.0-10.0)	−.663/ .507	9.0 (6.0-12.0)	−1.100/ .271	10.0 (6.0-16.0)	−.922/ .356
≧65	34	17.0 (10.0-20.0)		8.0 (4.0-15.0)		8.0 (3.0-12.0)		11.0 (6.0-18.0)	
Gender									
Male	22	17.0 (10.0-20.0)	−.480/ .631	8.0 (4.0-15.0)	−1.014/ .310	7.0 (3.0-12.0)	**−2.859/ .004**	11.5 (6.0-16.0)	−.565/ .572
Female	19	17.0 (11.0-20.0)		8.0 (4.0-15.0)		10.0 (6.0-12.0)		10.0 (6.0-18.0)	
marital status									
Present	35	17.0 (10.0-20.0)	−.941/ .347	8.0 (4.0-15.0)	−.260/ .795	8.0 (3.0-12.0)	−.836/ .403	11.0 (6.0-18.0)	−.685/ .493
Not present (including bereavement)	6	19.5 (13.0-20.0)		7.5 (5.0-15.0)		9.5 (4.0-12.0)		10.5 (6.0-14.0)	
Job									
Present	12	19.5 (14.0-20.0)	−1.345/ .179	9.5 (5.0-15.0)	−1.704/ .088	10.0 (3.0-12.0)	**−2.252/ .024**	8.0 (6.0-13.0)	**−3.540/ .000**
Not present	29	17.0 (10.0-20.0)		8.0 (4.0-15.0)		8.0 (3.0-12.0)		13.0 (6.0-18.0)	
Adviser	40								
Spouse only	18	17.0 (10.0-20.0)	−1.166/ .244	8.0 (4.0-15.0)	−.247/ .805	9.0 (3.0-12.0)	−.151/ .880	11.5 (6.0-18.0)	−1.243/ .214
Spouse and others	22	18.5 (13.0-20.0)		9.0 (4.0-15.0)		8.0 (3.0-12.0)		10.5 (6.0-15.0)	
Primary stage	39								
≦stage Ⅰ	21	17.0 (11.0-20.0)	−.187/ .851	9.0 (4.0-15.0)	−.298/ .766	8.0 (3.0-12.0)	−.426/ 670	11.0 (6.0-16.0)	−.495/ .620
≧stage Ⅱ	18	17.0 (10.0-20.0)		8.0 (4.0-15.0)		8.5 (4.0-12.0)		11.0 (6.0-18.0)	
[b]Treatment	41								
Present	22	16.0 (10.0-20.0)	−.934/ .350	8.0 (4.0-15.0)	−.917/ .414	9.0 (3.0-12.0)	−1.423/ .155	10.5 (6.0-18.0)	−.171/ .864
Not present	19	17.0 (13.0-20.0)		9.0 (4.0-15.0)		8.0 (3.0-12.0)		11.0 (6.0-15.0)	
[c]Period from cancer incidence to recurrence (days)	41								
＜700	21	17.0 (11.0-20.0)	−.865/ .387	8.0 (4.0-15.0)	−.171/ .864	9.0 (3.0-12.0)	−.473/ .636	11.0 (6.0-18.0)	−.537/ .591
≧700	20	17.5 (10.0-20.0)		9.0 (4.0-15.0)		8.0 (3.0-12.0)		10.5 (6.0-16.0)	
Period after cancer recurrence (days)	41								
＜5 years	29	11.0 (6.0-18.0)	−.792/ .429	17.0 (10.0-20.0)	−.088/ .930	9.0 (4.0-15.0)	−1.530/ .126	8.0 (3.0-12.0)	−1.170/ .242
≧5 years	12	10.0 (6.0-16.0)		18.0 (11.0-20.0)		7.5 (4.0-12.0)		9.0 (4.0-12.0)	

[a] Mann-Whitney U-test, [b] Treatment ; molecularly targeted therapeutics, [c] divided into two groups by median

Patients with a spouse had a significantly lower "Avoidance [A]" scores. Taniguchi *et al*. reported that married men had less psychological distress and more positive attitudes toward cancer than single male (23). Lung cancer, in particular, is common among elderly patients (1), When confirming the family background of a patient, it is necessary to confirm not only the presence or absence of a spouse but also the health condition of the spouse, as well as whether the spouse is in a situation to support the patient.

The "Avoidance [A]" scores were slightly higher in patients with advanced lung cancer in more stage II in this study. The 5-year overall survival rate for patients with stage II or higher NSCLC was 23 ~ 50%, while that for stage I or lower was approximately 80% (24). Patients with recurrent cancer are anxious about their future and depressed, and the emotional toll is immense (25). The progression of cancer may increase the psychological burden of patients and lead to avoidance psychology. For these reasons, it is necessary to understand the psychological adjustment of patients when assisting patients with recurrent/metastatic lung cancer after curative surgery.

Patients with working lung cancer patients, negative "Helplessness/Hopelessness (H/H)" and [experiencing a lack of well-being] were lower, and positive [regaining yourself] was higher. Fasano and colleagues (26) reported that coping style in women breast cancer was a predictor of anxiety, distress, depression, or health-related quality of life (HRQOL). In addition, Roick reports that low-income cancer patients had impaired quality of life, specifically physical, emotional and role functioning (27). If lung cancer patients with recurrence/metastasis after curative surgery continue to work and accept social roles after recurrence, they may have financial security, better QOL, and psychological adjustment. The significance of work varies from person to person, but it is important not only for financial reasons but also for supporting one's existence. It is important to look to social reintegration to maintain psychological adjustment because cancer has a significant economic impact on patients and can lead to significant changes in work values and attitudes after recurrence (28). Previous studies from overseas have reported on the psychological adjustment of breast cancer patients who had relapsed for the first time (29). Psychological adjustment for recurrent/metastatic lung cancer after curative surgery was lower scores for "Helplessness/Hopelessness (H/H)" scores and "Anxious Preoccupation (AP)" score than breast cancer patients who had a first-time recurrence (29). As the median of 1218 days have passed since the recurrence of cancer in the subjects of this study, acceptance of cancer recurrence/metastasis may have increased over time. It is important to need further research that determine whether there are differences in psychological adjustment between patients with lung cancer and those with other cancers, as well as differences in psychological adjustment over time.

LIMITATIONS

Because of the characteristics of lung cancer, there are many elderly patients, and the study was conducted at only one hospital, there are limits to the generalization of results. However, the results obtained suggest that a more detailed understanding of psychological adjustment in patients with recurrent or metastatic lung cancer after curative surgery may be obtained by using MAC-based PACS. Patients with cancer recurrence or metastasis may revert after the indication, and some patients are in the process of recovery rather than the resulting condition. In the future, it is important to know at what stage each patient receives intervention from a nurse. The development of better coping techniques to manage for recurrent and metastatic disease may benefit long-term cancer survivors. Further studies are needed to investigate psychological adjustment in patients with recurrent or metastatic cancer and examine individual psychological intervention methods.

CONCLUSIONS

Factors associated with psychological adjustment with recurrent/metastatic lung cancer after curative surgery were 1) female, 2) having a job, 3) over 65 years of age, 4) having a spouse, and 5) advanced-stage cancer. There was no difference in psychological adjustment between treatment and the period from cancer incidence to recurrence/metastatic.

CONFLICT OF INTEREST STATEMENT FOR ALL AUTHORS

There are no conflicts of interest to declare.

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Psychological Adjustment of Cancer Survivors : PACS

1	I'm gradually recovering
2	I'm back to my normal life (or I'm getting back to normal)
3	I feel more fulfilled now
4	I have grown as a person with cancer
5	I don't know what to do about my symptoms
6	I'm able to be myself, even with cancer
7	I'm out of balance between what I want to do and what I can't
8	I accept myself as having cancer
9	I realized I have inner strength that I hadn't noticed before
10	It's up to me how I deal with cancer
11	I'm lonely
12	I receive treatment as part of my life
13	I find meaning in having cancer
14	I lost my charm because of my illness
15	I am regaining my role in society and home
16	I'm unable to regain my purpose in life
17	I'm in control of my feelings
18	I'm heart broken because of an uncertain reality