HIROSAKI UNIVERSITY

Radiation Emergency Medicine 2013 Vol. 2 No. 2 23-28

REM
Radiation Emergency Medicine

Regular Article

Correlation between the Symptoms and the Quality of Life in Prostate Cancer Patients Underwent Radiotherapy

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Received 10 September 2012; revised 7 November 2012; accepted 4 January 2013

The purpose of this study is to elucidate correlations between the symptoms and the quality of life (QOL) of prostate cancer patients underwent radiotherapy. In addition, this study also aims to gain insights regarding nursing interventions so that the patients could lead more comfortable lives. The subjects were 13 patients who were undergoing radiotherapy for prostate cancer at Hirosaki University Hospital. Patients were asked to record symptoms diary from the start of radiotherapy until the completion of radiotherapy. The QOL was investigated with a commercial questionnaire. In this study, fatigue and pollakisuria tended to appear at an early stage, the number of patients complaining of these symptoms increased, and the degree of symptoms worsened. The QOL did not decrease with radiotherapy. Symptom scores during irradiation were negatively correlated with QOL. It is suggested that to improve QOL of patients during radiotherapy, nursing intervention might be effective to abate symptoms.

Key words: radiotherapy, prostate cancer, quality of life, nursing intervention

1. Introduction

Many European and American elderly males suffer from prostate cancer. The rate of mortality due to prostate cancer has recently become the highest among all the cancers of the Japanese elderly males[1]. In the future, the number of patients with prostate cancer is expected to increase with aging, westernization of dietary habits and increase in discovery rate by examination for prostate-specific antigen (PSA)[2]. Radiotherapy has been widely performed as radical treatment for prostate cancer. In addition, brachytherapy and intensity-modulated radiotherapy are sometimes chosen[2].

In general, compared to conventional surgical therapies, radiotherapy as cancer treatment causes less physical damage and has a lower impact on patients' ability to function normally. Radiotherapy is effective for cancer treatment, however, acute radiation damage such as fatigue and dermatitis are accompanied by physical and mental suffering. Thus, acute radiation damages contribute to decrease quality of life (QOL) in cancer patients. The symptoms and QOL of patients undergoing radiotherapy have been investigated. However, as far as the authors investigated, there has been no study examining the relationship between symptoms and QOL. Thus, the purpose of this study was to examine symptoms and QOL of prostate cancer patients undergoing radiotherapy.

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Patient's name

Date of hospitalization

Date of irradiation starting

Site; Pelvic cavity

		Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Date		/	/	/	/	/	/	/
Irradiation days			11	12	13	14	15	
Symptoms and strength	Fatigue	None	→	Mild	→	→	→	None
	Loss of appetite	None	→	→	→	→	→	→
	Nausea	None	→	→	→	→	→	→
	Vomiting	None	→	→	→	→	→	→
	Loss of weight	None	→	→	→	→	→	→
	Skin redness	None	→	→	Mild	→	→	→
	Itching	None	→	→	→	→	Mild	→
	Pain(Site:)	None	→	→	→	→	→	→
	Urinary incontinence	Mild	→	→	→	→	→	→
	Pollakiuria	Mild	→	→	→	Strong	Mild	→
	Difficulty in urination	Mild	→	→	→	→	→	→
	Diarrhea	None	→	→	→	→	→	→
If you have troubled, please write symptoms.								

Fig. 1. Sample of symptoms diary.

2. Methods

2.1. Patient data

This study was approved by the Ethics Committee of Hirosaki University Graduate School of Medicine. The intent of the study was explained to the patients, and the study was conducted after obtaining informed consent.

Subjects were 13 prostate cancer patients who were undergoing radiotherapy from November 2010 to September 2011 at Hirosaki University Hospital. The average age of the patients was 71.7 ± 7.1 years. According to the TNM classification of malignant tumor 4th edition, 5 patients were classified as stage I, 1 as stage II, 3 as stage III, and 4 as stage IV. All patients were outpatients. All the patients treated during the data collection period were included in this study.

We made a "symptom diary" (Fig. 1), and the patients were requested to record their symptoms daily from the start of irradiation until the completion of irradiation. The recorded symptoms were classified into Grade 1 to Grade 5 by the physicians, according to the Common Terminology Criteria for Adverse Events v3.0, Japanese translation JCOG/JSCO[3].

The SF-8™ standard version was used to determine patient QOL. The SF-8™ is widely used surveys, and consists of 8 concepts: physical functioning (PF), role limitations because of physical health problems (role physical, RP), bodily pain (BP), general health (GH), energy/fatigue (vitality, VT), social functioning (SF), role limitations due to emotional problems (role emotional, RE), and psychological distress and well-being (mental health, MH). Two summary measures were produced: the physical component summary (PCS) and mental component summary (MCS). The scores of these were calculated out of a total of 50 points, as a nation standard level. QOL was considered to be high if this score was high. The survey was conducted 3 times: before irradiation, immediately after completion of irradiation, and 4-6 weeks after irradiation. We decided 4-6 weeks after irradiation because acute radiation damage was considered to reduce with time.

2.2. Radiotherapy

Each patient character is shown in Table 1. Radiotherapy was performed by linear accelerator using 10MV X-ray. The total target dose was 64.8 Gy in 36 fractions or 74 Gy in 37 fractions, with a conventional fraction schedule. The method of irradiation was conformal radiotherapy employing two rotational arcs or four-field box technique radiotherapy. One patient underwent surgical treatment before radiotherapy, and 6 underwent the combination therapy of hormone and radiation.

2.3. Statistical analysis

All data were analyzed using SPSS 16.0J for Windows software. The analysis was performed using the Friedman test, signed rank test and Pearson's product-moment correlation coefficient. $P < 0.05$ was considered significant.

3. Results

3.1. Symptoms during irradiation

Figure 2 shows the appearance of symptoms. Fatigue,

Table 1. Patient characteristics

Case	Age	Irradiation						
		Target	Method	Energy of X-ray	Period (days)	Fraction number	Fraction size	Total fraction dose
A	75	Prostate	Conformal radiotherapy employing two rotational arcs	10MV	58	37	2 Gy	74 Gy
B	73	Prostate	Conformal radiotherapy employing two rotational arcs	4MV*1+10MV*24 4MV*2+10MV*10	54	37	2 Gy	74 Gy
C	78	Prostate	Conformal radiotherapy employing two rotational arcs	4MV*1+10MV*24 4MV*2+10MV*10	56	37	2 Gy	74 Gy
D	76	Prostate	Conformal radiotherapy employing two rotational arcs	4MV*1+10MV*24 4MV*1+10MV*11	60	37	2 Gy	74 Gy
E	84	Prostate	Conformal radiotherapy employing two rotational arcs	10MV	52	37	2 Gy	74 Gy
F	64	Prostate	Four-fields box technique radiotherapy	10MV	51	36	1.8 Gy	64.8 Gy
G	61	Prostate	Conformal radiotherapy employing two rotational arcs	10MV	53	37	2 Gy	74 Gy
H	70	Prostate	Conformal radiotherapy employing two rotational arcs	10MV	56	37	2 Gy	74 Gy
I	76	Prostate	Conformal radiotherapy employing two rotational arcs	10MV	58	37	2 Gy	74 Gy
J	71	Prostate	Four-fields box technique radiotherapy	10MV	56	36	1.8 Gy	64.8 Gy
K	69	Prostate, sacrum and left pubis	Conformal radiotherapy employing two rotational arcs	10MV	56	37	2 Gy	74 Gy
L	76	Prostate	Conformal radiotherapy employing two rotational arcs	10MV	51	37	2 Gy	74 Gy
M	59	Prostate	Conformal radiotherapy employing two rotational arcs	10MV	52	37	2 Gy	74 Gy
M ± SD	71.7 ± 7.1				54.8 ± 2.9			

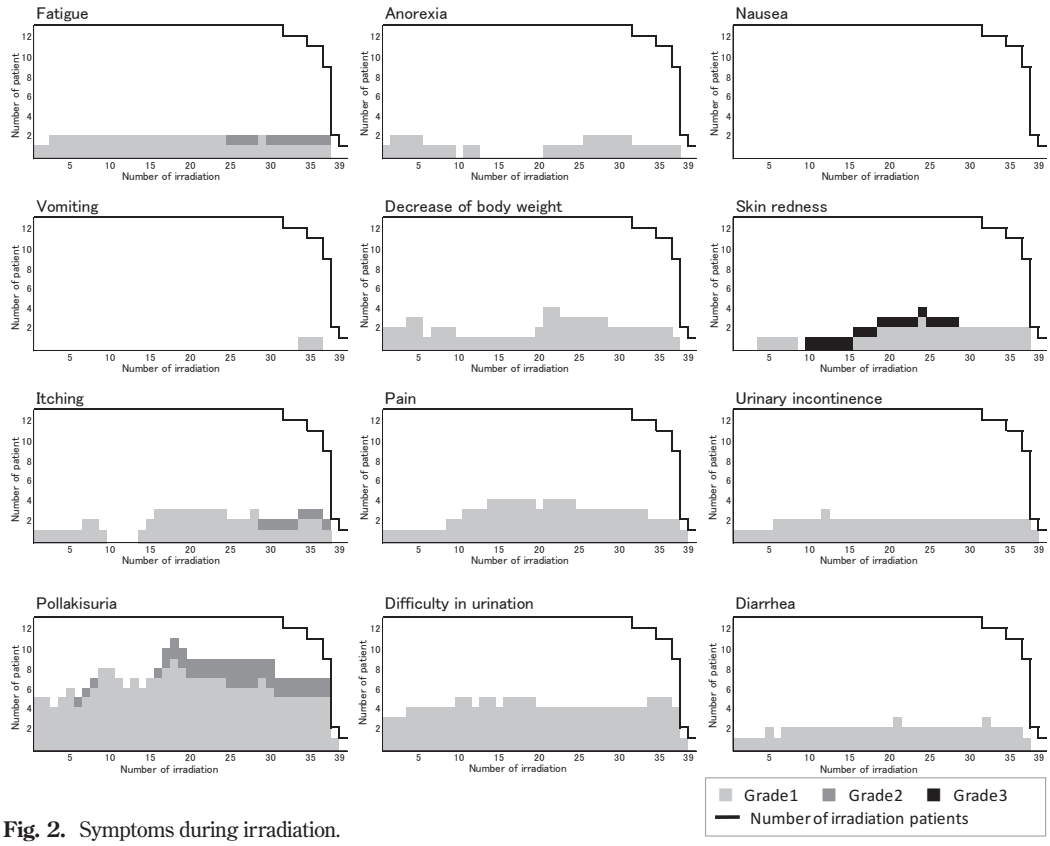

Fig. 2. Symptoms during irradiation.

Table 2. Correlation of symptom scores during irradiation with QOL

	After the completion of irradiation		Four to six weeks after irradiation	
PF：Physical Functioning	-0.698	**	-0.762	**
RP：Role Physical	-0.650	*	-0.644	*
BP：Bodily Pain	-0.401		-0.558	*
GH：General Health	-0.565	*	-0.438	
VT：Vitality	-0.637	*	-0.260	
SF：Social Functioning	-0.755	**	-0.785	***
RE：Role Emotional	-0.716	**	-0.676	*
MH：Mental Health	-0.593	*	-0.668	*
PCS：Physical Component Summary	-0.626	*	-0.563	*
MCS：Mental Component Summary	-0.700	**	-0.589	*

Pearson's product-moment correlation coefficient
*** $P<0.001$ ** $P<0.01$ * $P<0.05$

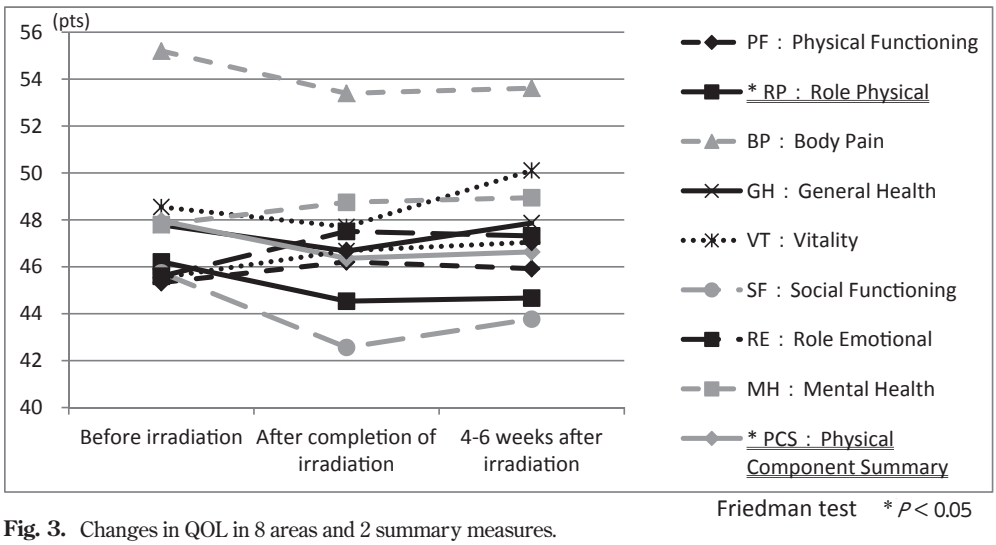

Fig. 3. Changes in QOL in 8 areas and 2 summary measures.

urinary incontinence, pollakisuria, difficulty in urination and diarrhea tended to appear at an early stage, and fatigue and diarrhea appeared in 2-3 of 13 patients. Skin redness, itching, and pain tended to appear from around the second or third week of irradiation. In addition, body weight decreased following anorexia.

3.2. Changes in QOL

Changes in QOL in 8 areas and 2 summary measures are shown in Figure 3. The QOL after completion of irradiation did not show any major changes from that before irradiation. The RP and PCS decreased 4-6 weeks after irradiation than before irradiation ($\chi^2=6.50-7.19$, df=2, $P<0.05$, Fig. 4).

3.3. Correlation of symptom scores during irradiation with QOL

Table 2 shows the symptom scores during irradiation and their relationship with QOL. The scores were calculated and 1 point was designated Grade 1, 2 as Grade 2, and 3 as Grade 3. The symptom scores were a total score of 3-5 weeks after the start of irradiation. The symptom scores during irradiation were found to be negatively correlated with QOL.

4. Discussion

Fatigue, urinary incontinence, pollakisuria and difficulty in urination tended to appear at an early stage. These symptoms were chiefly caused by the disease itself. Furthermore, as the number of irradiations increases, the number of patients complaining of these symptoms increases and the symptoms worsen. These symptoms might appear as a result that the bladder and urethra were stimulated by irradiation. This result is in accordance with a previous study indicating that post-treatment scores for urinary function and urinary bother were lower than the pre-treatment scores[4]. Fatigue and diarrhea, thought to be the side effects of the radiotherapy, appeared in 2-3 of the 13 patients. Fransson[5]

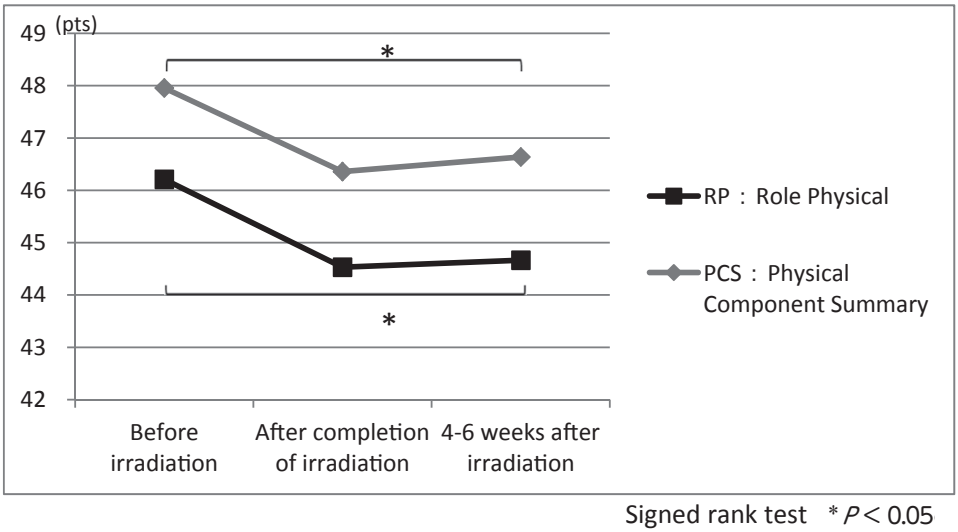

Fig. 4. Changes in QOL: RP and PCS.

reported that patients complaining of fatigue increased by 7% after irradiation compared with that before irradiation. Stone et al.[6] reported that patients receiving hormone therapy often reported fatigue. Although the precise cause was not clear only by this study, the cause of fatigue might be hormone therapy, decreased stamina and hospital visit. Skin redness, itching, and pain tended to appear from around the second or third week of irradiation. Dermatitis appears from the second to third week (20–30 Gy) after the start of radiotherapy[7, 8], and our study showed similar results. Itching tended to appear following skin redness and was suggested to be caused by drying of the skin due to radiation-induced hypofunction of sweat glands. In a previous study, 80% of the patients who received external beam radiotherapy did not report concerns about their physical condition[9], and there were relatively few adverse effects with external beam radiotherapy for prostate cancer patients[10]. However, any symptoms would distress patients. Therefore, nurses should intervene to abate symptoms of the patients.

In our study, the QOL of the patients with prostate cancer did not decrease by radiotherapy. This result, in accordance with the previous reports, shows that the QOL of patients undergoing irradiation for prostate cancer is higher than that of patients undergoing irradiation for breast or lung cancer[11], and that QOL showed a similar tendency in external beam radiotherapy cases and unirradiated cases[12]. On the other hand, at the start of radiotherapy, the participants' QOL was lower than the nation standard level, which indicates possibility of cancer and the need for cancer treatment. This study showed that RP and PCS decreased 4–6 weeks after irradiation from before irradiation. These decreased immediately after completion of irradiation from before irradiation, but there was no significant change. This could have been because of the small number of patients and dispersion in scores. It is suggested that QOL of the physical function decreased because of the influence of pollakisuria on daily life. However, future research is required because we were not able to clarify the cause that the QOL of the physical function decreased in this study. Radiotherapy has late damages, and the impact on bowel, bladder, and sexual activity may not be evident until 18-24 months after treatment[13]. Therefore it may be necessary for long-term investigation. This study showed that the symptom scores during irradiation were negatively correlated with QOL. The factors that influenced QOL were fatigue and performance status[11]. Therefore, to improve QOL of patients undergoing radiotherapy, nursing intervention might be effective to abate symptoms.

Nurses should provide treatment-related information to the patients with prostate cancer so that they can make informed treatment decisions[14]. Nurses should know symptoms appearing during irradiation, changes in QOL and correlation of symptoms during irradiation with QOL, which was clarified in this study.

Acknowledgment

We are grateful to the patients who provided us the symptoms and QOL data. This study was supported by a Grant for Co-medical Education Program in Radiation Emergency Medicine by the Ministry of Education, Culture, Sports, Science and Technology, Japan.

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