Health-Related Quality of Life and Occurrence of Intestinal Side Effects After Pelvic Radiotherapy

Evaluation of Long-term Effects of Diagnosis and Treatment

Asta Bye, Claes Tropé, Jon Håvard Loge, Marianne Hjermstad and Stein Kaasa

From the Departments of Gynaecology, (A. Bye, C Tropé) and Oncology (M. Hjermstad) Norwegian Radium Hospital, Oslo, Department of Behavioural Sciences, University of Oslo, (J.H. Loge), the Palliative Medicine Unit, Department of Oncology, Trondheim University Hospital, Trondheim (S. Kaasa) and the Unit for Applied Clinical Research, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim (A. Bye, J.H. Loge, M. Hjermstad, S. Kaasa) Norway

Correspondence to: Asta Bye, Akershus College, Ringstabekkveien 105, 1356 Bekkestua, Norway. Tel: + 47 67 11 70 95. Fax: + 47 67 11 70 08. E-mail: asta.bye@hiak.no

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Health-related quality of life (HRQOL) and occurrence of late intestinal side effects were assessed 3–4 years after pelvic radiotherapy for carcinoma of the endometrium and cervix. During 1988–1990, 143 women were included in a clinical trial to evaluate the effect of a low fat, low lactose diet on radiation-induced diarrhoea. Of 94 survivors, 79 (84%) answered the request. HRQOL was assessed by the EORTC QLQ-C36 and compared with population-based norms. The women scored lower than the general population on role functioning (81.5 versus 90.6 ($p < 0.01$)) and higher on diarrhoea (23.8 versus 9.5 ($p < 0.01$)). Compared with pre-treatment conditions, an increase in cases with pain in the lower back, hips and thighs was seen. Substantial pain and diarrhoea were associated with deterioration in HRQOL. In conclusion, few treatment and/or disease-related effects were detected 3–4 years after radiotherapy, with the exception of increased bowel frequency and pain in the lower back, hips and thighs.

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The majority of women with carcinoma of the endometrium or cervix are cured but the treatment may induce alterations in functional status, activity and family relationship and thereby affect health-related quality of life (HRQOL) (1). Retrospective studies have suggested high levels of psychological distress post-treatment (2, 3). Other studies have reported good quality of life in survivors of gynaecological cancer despite physical symptoms and late effects of treatment (4, 5). These contradictory results may have been influenced by factors such as selection of patients and use of different measures. Reference data from a non-selected normal population may contribute to better understanding of the clinical impact of the findings (6). To our knowledge, such a strategy has not been applied in survivors from gynaecological cancer.

Diarrhoea and abdominal cramps are the most frequently reported late side effects after radiotherapeutic treatment for carcinoma of the endometrium or cervix (7, 8). Gastrointestinal complications usually occur 6 to 24 months after termination of treatment (9, 10). The severity of problems is related to the total dose and dose per fraction, volume of intestine irradiated, the use of single-field treatment daily and previous abdominal surgery (7). Retrospective studies suggest an incidence of severe complications in 5–15% of the patients treated with a dose of 45–50 Gy in five weeks (7, 11). Up to 40% of patients are reported to experience chronic diarrhoea and the majority of patients may experience increased frequency of bowel movements (7, 11). Factors such as thin physique, hypertension and diabetes mellitus may increase the risk of developing gastrointestinal complications, but this is controversial (7, 12). It is also claimed that severe acute radiation enteritis may be a predecessor of chronic radiation injury (10, 11). However, absence of acute enteritis does not seem to exclude late injuries.

To our knowledge, most studies on the subject of HRQOL in gynaecological cancer have assessed heterogeneous groups, various modes of treatment and have had short follow-up periods (3, 4, 13, 14). This paper describes HRQOL and gastrointestinal complications in a relatively homogeneous group of women with carcinoma of the endometrium or cervix. From May 1988 to May 1990 they were included in a randomized clinical trial to evaluate the effect of a low fat, low lactose diet in order to prevent

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acute radiation-induced diarrhoea. During radiotherapy 23% of the women in the intervention group reported diarrhoea compared with 48% in the control group (15). After one year's follow-up there were no signs of severe diarrhoea in any of the groups. The diet intervention did not interfere with the patients' HRQOL assessed by the EORTC Core Quality of Life Questionnaire, 36-item version (EORTC QLQ-C36) (16).

The first aim of the present paper was to assess the occurrence of late intestinal side effects in the two groups 3–4 years after treatment and to evaluate whether the diet intervention during radiotherapy had an impact on the occurrence of late effects. Late diarrhoea was expected to correlate with acute radiation-induced diarrhoea. Secondly, we wanted to evaluate the patients' HRQOL and compare this with data from a random sample of women of similar age from the Norwegian population.

MATERIAL AND METHODS

Between May 1988 and May 1990, 143 women were included in a randomized clinical trial to evaluate the effect of a low fat, low lactose diet to prevent acute radiation-induced diarrhoea. The inclusion criteria were primary diagnosis of carcinoma of the endometrium, ovary or cervix; external pelvic radiotherapy at a minimum dose of 44 Gy or 40 Gy if combined with intracavitary treatment; age ≤ 75 years and WHO performance status of ≤ 2. Patients with the diagnosis of inflammatory bowel disease or ulcerative colitis were not included.

Seventy-one women were assigned to the intervention diet and 72 to the control group, and all were followed for one year. The intervention group was on the diet during radiotherapy and 6 weeks after termination of treatment. Eleven patients died or experienced progression during the clinical trial and 17 declined the study. Patients who experienced progression or refused to participate at one time-point were not considered as eligible at later follow-up.

Fifty-two of the women included in the study had carcinoma of the endometrium and cervix (stage IA). One had ovarial cancer stage I. They all received postoperative external pelvic radiotherapy at a total dose of 48–52 Gy in 2 Gy per fraction, 4 fractions per week. Anterior–posterior fields were used with a field diameter of 17 cm. The upper field margin was between L4 and L5, and the lower margin was along the centre of the obturator foramen. Ninety of the included women had carcinoma of the cervix (stage IB–IIB). They received external radiotherapy at a total dose of 40–46 Gy in combination with either radium application (26 Gy) or high dose-rate brachytherapy. More detailed information about eligibility criteria, staging and treatment regimens is presented elsewhere (15, 16).

According to the Population Register of Norway and the hospital files, 94 of the women who completed the clinical trial were alive and without known relapse on November 1, 1993. The women were contacted by mail and asked to complete a questionnaire package similar to the one they completed during the clinical trial. Seventy-nine women (84%) returned the questionnaires after one reminder. One woman had relapsed before she received the questionnaires. Two women had moved to an unknown addresses. Three women replied that they did not wish to participate, one because of a new disease. The other reasons for non response (9 women) are not known. The characteristics of the respondents are presented in Table 1.

The women were asked to record the number and consistency of bowel movements and the use of antidiarrhoeal medication (loperamide) daily for one week. A diary card was used and bowel movements were classified as hard, normal, soft or watery. The bowel movements were scored according to Table 2. Diarrhoea was defined as a scale score ≥ 2. Significant late radiation injury was defined as bowel complications requiring hospitalization and/or surgery. Information of this kind was collected from the hospital files. The women were asked to record their present weight. Body mass index (BMI) (weight (kg)/height (metres)^2) was calculated and a BMI < 20 was used to identify thin physique (17).

EORTC QLQ-C36 (18) was used to measure the women's HRQOL, because this questionnaire was used in the clinical trial. The construction and response categories of the EORTC QLQ-C36 have been described elsewhere (18). Briefly, the questionnaire covers physical functioning (PF), role functioning (RF), fatigue (F), nausea/vomiting (NV), emotional functioning (EF), social functioning (SF), global health status (QoL) and physical symptoms. A diagnosis-specific module for gynaecological malignancies focusing on disease- and treatment-related symptoms was included. This module is presented in an earlier paper (16). The PF and RF scales have dichotomous response choices and the QoL scale has a modified visual analogue scale format. All other items have four response choices from 1 'not at all' to 4 'very much'. A high score for a symptom item represents a high level of problems. Response categories 3 and 4 on these items were regarded as indicators of clinically significant symptom levels and used to classify 'cases'. A similar definition has been suggested elsewhere (19). The item on diarrhoea was dichotomized. The response categories 1 and 2 were set to indicate no diarrhoea and the response categories 3 and 4 to indicate occurrence of diarrhoea. The scale reliability was satisfactory for most of the EORTC QLQ-C36 scales with a Cronbach's alpha ranging from 0.7 to 0.9. The lowest reliabilities were found in the RF and the NV scales.

The scores on the EORTC QLQ-C36 were compared with reference data from a random sample of 949 Norwegian women aged 19–80 years (6). The reference data were obtained by using the EORTC QLQ-C30 (+ 3) (20). The EORTC QLQ-C36 is an earlier version of the C-30 (+ 3)

Table 1

Main sociodemographic and clinical characteristics of the women in the intervention (43 women) and the control (36 women) group

		Intervention group		Control group	
		No	(%)	No	(%)
Age (yrs)	<50	4	(9)	8	(22)
	50–59	10	(23)	8	(22)
	60–69	16	(37)	7	(19)
	>70	13	(30)	13	(36)
Social status	Single	10	(23)	10	(28)
	Married, living with partner	33	(77)	26	(72)
Work	Working at a paying job	16	(37)	20	(56)
	Working at home, retired	27	(63)	16	(44)
BMI, pre-treatment	10–20	1	(2)	5	(14)
	20–30	36	(84)	26	(72)
	>30	6	(14)	5	(14)
BMI, 3–4 years after radiotherapy	10–20	–	–	2	(6)
	20–30	37	(86)	27	(75)
	>30	6	(14)	7	(19)
Diagnosis	Cervical cancer	23	(53)	22	(61)
	Endometrial cancer	20	(47)	14	(39)
Stage	I	14	(33)	9	(25)
	IA	1	(2)	1	(3)
	IB	9	(21)	7	(19)
	II	5	(12)	5	(14)
	IIA	1	(2)	3	(8)
	IIB	13	(31)	10	(28)
	Not specified	–	–	1	(3)
Cell type	Adenocarcinoma	22	(51)	16	(44)
	Adenosquamous	2	(5)	3	(8)
	Squamous cell carcinoma	18	(42)	16	(44)
	Other	1	(2)	1	(3)
Grade	Well differentiated	–	–	2	(5)
	Moderately differentiated	23	(53)	18	(50)
	Poorly differentiated	11	(26)	16	(49)
	Moderately to poorly	5	(12)	–	–
	Not specified	2	(5)	2	(6)
Treatment	Surgery prior to radiotherapy	25	(58)	20	(56)
	Radium application	11	(26)	10	(28)
	Brachytherapy	8	(19)	7	(19)
Other diagnosis	Hypertension	8	(19)	5	(14)
	Diabetes mellitus	2	(5)	3	(8)

questionnaire. Identical scales (RF, SF, QoL, NV) and symptom items were compared. The fatigue scale in the C-36 version included five items. Three of these items are included in the C-30 (+ 3) fatigue scale and they were used to calculate the scale scores. One item in C-36 measures pain. This item was compared with an identical item in the C-30 (+ 3) version. In the later versions of the QLQ-C30 (+ 3), the scales and single items have been transformed linearly to a 0 to 100 scale (20). In order to compare data such a transformation has been performed also for QLQ-C36. A high score for a functional scale represents a high/healthy level of functioning while a high score for a symptom scale/item represents a high level of symptoms/problems.

Statistical analysis

The SPSS for Windows V8.0 program was used for the statistical analyses. Internal consistency (scale reliability) was assessed by the Cronbach's alpha coefficient (21). Values exceeding 0.70 were considered as satisfactory, a value between 0.60 and 0.70 as questionable (22). T-tests

Table 2

Diarrhoea scale

0	No change in bowel movements
1	Increase of 1–3 bowel movements a day, normal or soft
2	Increase of 4–6 bowel movements a day, all watery bowel movements
3	Increase of >6 bowel movements a day

Table 3

Occurrence of diarrhoea and use of anti-diarrhoeal medication 3–4 years after radiotherapy

	Intervention group	Control group	p-value[1]
	No. (%)	No. (%)	
Diarrhoea, scale n =	43	33	
No change	27 (63)	5 (45)	
Increase in bowel movements	16 (37)	16 (48)	
Diarrhoea	0 (–)	2 (6)	0.12
Diarrhoea QLQ-C36 item[2] n =	43	36	
No diarrhoea	40 (93)	28 (78)	
Diarrhoea	3 (7)	8 (22)	0.05
Antidiarrhoeal medication[3]	3 (7)	4 (11)	0.43

[1] χ^2
[2] Dichotomised scale.
[3] Number of patients using antidiarrhoeal medication.

and χ^2 statistics were used to perform bivariate analyses. Univariate analyses were performed by χ^2 statistics. Multivariate analyses were performed by ANOVA with multiple classification analysis (MCA) and adjusting for age. Owing to multiple comparisons, the level of statistical significance was set at 0.01. When analysing the recorded bowel movements and use of antidiarrhoeal medication, the significance level was set at 0.05.

RESULTS

Intestinal side effects

According to the hospital files four women (5%) had experienced significant late radiation injury, two in each group. One of the women in the intervention group had experienced ileus, and one had obstructions of the small intestine. In the control group one had experienced ileus and one had complications in both the rectum (WHO grade I–II) and urinary bladder (WHO grade II). No statistically significant differences between the two groups were found regarding diarrhoea and use of antidiarrhoeal medication (Table 3). None of the women in the intervention group and two (6%) in the control group were classified to have diarrhoea when using the diarrhoea scale (ns). Both had reported diarrhoea during radiotherapy and were taking antidiarrhoeal medication. Three women (7%) in the intervention group had used antidiarrhoeal medication compared with four (12%) in the control group (ns) (Table 3). Two women in the control group had used one or more tablets per day (ns).

According to the QLQ-C36 one of the most common symptoms at 3–4 years was diarrhoea. The mean scores on diarrhoea differed between the two groups, 19.4 (SD = 25.4) in the intervention group and 29.6 (SD = 27.3) in the control group, though not statistically significant ($p = 0.09$). Three women (7%) in the intervention group and eight (22%) in the control group scored 3 or 4 on the item concerning diarrhoea ($p = 0.05$) (Table 3). In Table 4 we show the impact of acute radiation diarrhoea, as measured by the QLQ-C36, on occurrence of late intestinal symptoms. In the intervention group there was no statistically significant connections between acute and late side effects. In the control group, however, a high score on the diarrhoea scale during radiotherapy was associated with a high score 3–4 years after radiotherapy ($p < 0.05$). No statistically significant connections were found with respect to the impact of diabetes mellitus, hypertension and thin physique (BMI < 20) on occurrence of late intestinal side effects.

Two cases (2%) of significant constipation were reported in the intervention group, but none in the control group (ns). One woman (2%) in the intervention group

Table 4

Impact of diarrhoea during radiotherapy as measured by the EORTC QLQ-C36 on occurrence of diarrhoea 3–4 years after radiotherapy

		Diarrhoea during radiotherapy									
		Intervention group n = 42				p-value	Control group n = 36				p-value
		Not at all	A little	Quite a bit	Very much		Not at all	A little	Quite a bit	Very much	
		n (%)	n (%)	n (%)	n (%)		n (%)	n (%)	n (%)	n (%)	
Diarrhoea, 3–4 years after radiotherapy	Not at all	2 (100)	11 (44)	8 (62)	2 (100)		4 (100)	5 (36)	3 (21)	1 (25)	
	A little	–	13 (52)	4 (31)	–		–	8 (57)	6 (43)	1 (25)	
	Quite a bit	–	–	1 (8)	–		–	1 (7)	5 (36)	1 (25)	
	Very much	–	1 (4)	–	–	ns	–	–	–	1 (25)	<0.05
	n (%)	2 (5)	25 (59)	13 (31)	2 (5)		4 (11)	14 (39)	14 (39)	4 (11)	

Table 5

Mean scores of the EORTC Core Quality of Life Questionnaire scales and items 3–4 years after start of treatment

	Intervention group (n = 43) Mean	Control group (n = 36) Mean	p-value	Gyn. cancer (n = 79) Mean[5]	General population (n = 949) Mean[5]	p-value
Functional scales						
Physical (PF)[1]	76.9	81.5	ns	79.2	–	
Role (RF)[1]	77.4	76.5	ns	81.5	90.6	<0.01
Emotional (EF)[2]	74.9	77.2	ns	76.0	–	
Social (SF)[2]	86.8	81.4	ns	86.0	83.5	ns
Global health status (QoL)[3]	73.0	74.3	ns	75.8	71.7	ns
Symptom scales/items[4]						
Fatigue	24.5	22.8	ns	22.5	32.9	<0.01
Nausea and vomiting	4.6	5.1	ns	4.5	5.3	ns
Appetite loss	7.7	8.3	ns	7.6	9.5	ns
Diarrhoea	19.4	29.6	ns	23.8	9.5	<0.01
Constipation	11.6	10.5	ns	8.4	14.9	ns
Pain	19.4	21.3	ns	17.5	27.2	<0.01
Insomnia	17.8	29.6	ns	19.2	26.0	ns
Financial difficulties	11.6	15.7	ns	12.5	10.9	ns

[1] Score range 1–2, high scores represent a high/healthy level of functioning.
[2] Score range 1–4, high scores represent a high/healthy level of functioning.
[3] Score range 1–7, high scores represent a high/healthy level of functioning.
[4] Score range 1–4, high scores represent a high level of symptomatology/problems.
[5] Adjusted for age by MCA.

experienced substantial nausea and vomiting compared with none in the control group (ns).

Health-related quality of life

No statistically significant differences between the intervention group and control group were found with respect to HRQOL. As no differences between the two groups were found and both groups were small, they were combined when comparing with data from the general population. The means of the subscales and single items are presented in Table 5. The scores for cancer patients were lower than those for the general population on the role-functioning scale (RF). Seventeen (22%) of the cancer patients reported limitations in ability to perform work or household tasks. This was not associated with age and retirement. The former radiotherapy patients had more diarrhoea than in the general population, 23.8 versus 9.5 ($p < 0.01$). At the same time, they felt less fatigue, 22.5 versus 32.9 ($p < 0.01$), and reported less pain, 17.5 versus 27.2 ($p < 0.01$). The scores on the social functioning (SF) and the global health/quality of life (QoL) scales were similar to those in the general population.

Disease- and treatment-related symptoms

Frequent urination was reported by 8 women (19%) in the intervention group and 5 (14%) in the control group (ns). Ten (23%) women in the intervention group and 7 (19%) in the control group (ns) reported substantial pain in the lower back. This was an increase compared with pre-treatment registrations where respectively 6 (15%) and 3 (9%) women reported pain in the lower back ($p < 0.01$). Seven women in each group (16% and 19%) reported pain in other sites of the body (ns), mainly pain in the hips and the thighs. This was also an increase compared with pre-treatment ($p < 0.01$) when 3 women (7%) in the intervention group and 2 (6%) in the control group reported such pain. Eighteen patients (42%) in the intervention group and 7 (19%) in the control group were taking analgesics ($p < 0.05$). Respectively, 12 women and 4 women reported no help or little help from the medication.

In order to illustrate a possible clinical impact of frequently reported symptoms (diarrhoea, frequent urination, pain) on the functioning scales and fatigue, a comparison between scores among cases and non-cases was made (Table 6). The women who reported substantial pain in other parts of the body scored lower on the functioning scales, the global QoL scale and fatigue than the women regarded as non-cases. Substantial pain in the lower back was associated with deteriorated QoL and fatigue and substantial diarrhoea with deteriorated SF and fatigue. Frequent urination was not associated with deteriorated HRQOL.

DISCUSSION

This paper describes occurrence of late intestinal side effects and HRQOL in a relatively homogeneous group of women with carcinoma of the endometrium and cervix 3–4 years after the initial diagnosis and successful radiotherapy. The women had participated in a randomized clinical trial to evaluate the effect of a low fat, low lactose diet to prevent acute radiation-induced diarrhoea. During radiotherapy the intervention group had less diarrhoea than the control group (15). If diarrhoea during treatment should be a risk factor for late reactions, one should expect statistically significant differences between the two groups after 3–4 years.

No difference was found between the two groups with respect to occurrence of severe late complications such as intestinal obstruction and injury to the rectum. The incidence was about 5%, which is in accordance with other studies (7). In the control group there was a tendency towards more diarrhoea than in the intervention group, though not statistically significant. There was also a connection between acute and late diarrhoea in the control group, which was not found in the intervention group. This might indicate that the intervention group has benefited from the low fat diet and less diarrhoea during radiotherapy. One other possible explanation for the differences between the two groups may be that the women in the intervention group still used the low fat diet to regulate their bowel movements. Measurements of small intestine dysfunction have suggested that about 50% of former radiotherapy patients experience increased bowel frequency and have abnormal bile acid absorption (11). Metabolic studies have shown that a reduction in dietary fat from 100 g to 40 g per day may correct bile salt malabsorption (23).

Despite few symptoms of late intestinal side effects, the women had a higher level of bowel frequency than the general population. This was not reflected in deteriorated HRQOL at the group level. However, the subgroup of women with substantial diarrhoea rated their SF as low and reported more fatigue. This finding is not surprising, since persistent diarrhoea can influence the ability to maintain a normal social life, and fluid loss and malabsorption may produce fatigue. The presence of diarrhoea did not produce more emotional distress. Information may be important to reduce emotional distress (24), and the women joining this study were well informed about the possible side effects of radiotherapy.

Since the groups were small and late diarrhoea relatively rare, a statistically significant difference between the two groups would be difficult to detect. However, the tendency is interesting and may be of clinical importance. A new study with a greater statistical power could detect significant differences, if they exist.

The women seemed to have few emotional and physical problems and their HRQOL did not differ much from the population-based norms (6). This is consistent with other studies where the mental health in cancer survivors is evaluated (5, 25). The mean score on the RF scale was lower than that obtained from the general Norwegian population. Limitations in performing work and household tasks were reported by 22% of the women. This finding is consistent with others, indicating that health-related limitations in work and daily activities are common among cancer survivors (3, 25). Compared with a normal population, cancer survivors seem to experience limitation in the number of hours that they are able to work and in the ability to do strenuous activity (25). From this, one could expect a higher level of fatigue than in the general population, but this was not found.

Survivors of cervical and endometrial cancer suffer from poor partner relations and a poor body image (2). Sexual dysfunction is prevalent after gynaecological cancer (3, 26–28). Reports of overall evaluation of QoL are often good despite these losses (27). Since the scales in the EORTC-QLQ C-36 did not focus on body image and partner relations, these hypothesis were not examined.

Table 6

Relationship between treatment-related symptoms and mean score on functioning scales (emotional functioning (EF), role functioning (RF) social functioning (SF), physical functioning (PF) and global health status/quality of life (QL)) and fatigue and malaise (F)) 3–4 years after treatment. Response categories 3 and 4 on the items concerning treatment-related symptoms were used to classify cases. Levels of statistical significance between cases and non-cases are indicated with an asterisk ($p < 0.01$); t-test. Numbers in parentheses are standard deviation

	Diarrhoea		Frequent urination		Pain in the lower back		Pain in other sites of the body	
	Cases (n = 11)	Non-cases (n = 68)	Cases (n = 13)	Non-cases (n = 65)	Cases (n = 17)	Non-cases (n = 61)	Cases (n = 14)	Non-cases (n = 62)
PF	75.7 (19.1)	79.7 (22.1)	72.6 (21.5)	80.7 (21.6)	70.5 (19.8)	81.1 (21.7)	62.6 (21.5)*	83.6 (20.2)*
RF	77.3 (34.4)	76.9 (38.6)	73.1 (43.8)	78.2 (36.9)	50.0 (50.0)	84.4 (29.9)	28.6 (42.6)*	89.0 (26.4)*
EF	68.6 (19.2)	77.1 (12.9)	73.7 (19.1)	76.2 (13.1)	71.6 (15.3)	77.1 (13.8)	66.7 (19.1)*	78.2 (12.2)*
SF	62.1 (25.9)*	88.0 (19.8)*	75.6 (27.7)	87.0 (20.2)	79.4 (22.5)	86.1 (22.6)	71.4 (24.0)	87.7 (21.5)
QL	59.1 (23.4)	76.0 (25.6)	57.7 (26.0)	77.3 (24.6)	48.5 (23.6)*	80.5 (22.1)*	45.2 (27.1)*	81.7 (18.4)*
F	39.2 (16.1)*	21.2 (16.8)*	31.8 (20.0)	21.5 (16.9)	37.1 (20.7)*	19.7 (15.0)*	45.6 (22.1)*	18.6 (12.5)*

However, in forthcoming studies assessing QoL in gynaecological cancer, sexuality ought to be measured.

The women with substantial pain in the lower back and in other parts of the body rated their global QoL as low. This is in accordance with other studies showing that patients experiencing a heavier symptom burden tend to rate global QoL lower (19, 29). Presence of pain in other parts of the body, mainly the hips and thighs, was associated with more emotional distress, fatigue and deteriorated functioning. Since pain clearly was associated with deterioration in HRQOL, it was worrying that as many as 64% of the women who took analgesics reported little or no relief from pain, which indicates inadequate or inappropriate medication. However, when looking at the general pain item in the QLQ C-36, the former radiotherapy patients experienced less pain than the general population. This finding conflicts with the patients' report on the site-specific pain measured in the disease-specific module. Such a finding might be interpreted as a problem related to the measures, thereby invalidating either the general pain item or the site-specific item. However, it could also indicate that patients interpret the general pain question "Have you had pain?" differently from the site-specific question. Our clinical experience indicates that the latter is true. However, more research is necessary to investigate how pain following treatment can be optimally measured. Compared with pre-treatment, an increase in pain in the lower back and other parts of the body was seen. It is reported that radiation-induced insufficiency fractures of the female pelvis are a frequent complication of standard radiation therapy for cervical carcinoma (30). The reported localization of pain could indicate the presence of such fractures, but Norwegian population data show that low back pain and hip symptoms are common among middle-aged to elderly women (31).

In conclusion, as a group, women with carcinoma of the endometrium and cervix suffered from few treatment and/or disease-related side effects 3–4 years after radiotherapy. However, increased frequency of bowel movement was common. Presence of substantial diarrhoea affected HRQOL negatively and may interfere with nutrient absorption. Since our data indicated that the women who had followed a low fat diet during radiotherapy had less diarrhoea, nutritional guidance may be of importance. Pain in the lower back, hips and thighs was common, and a considerable proportion of these women did not seem to receive optimal pain treatment.

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