

## ORIGINAL ARTICLE

# The evaluation of sexual functions of prostate cancer patients receiving radiotherapy

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## Summary

**Purpose:** To evaluate the sexual function of prostate cancer patients receiving radiotherapy (RT) with curative intent.

**Methods:** Fifty patients with low-risk prostate cancer who responded to the international index of erectile function (IIEF) questionnaire before and after RT were included in the study.

**Results:** Statistically significant decline was observed in sexual functions by the end of RT. While the average sexual desire scores of the patients before RT was 6.24, it decreased to 3.62 ( $p=0.001$ ) after RT. The average of sexual satisfaction

scores dropped from 8.94 to 4.6 ( $p=0.001$ ), the average of erection function scores dropped from 20.14 to 11.76 ( $p=0.001$ ), orgasmic function scores dropped from 9.6 to 3.9 ( $p=0.001$ ) and the average of overall satisfaction scores dropped from 7.48 to 4.36 ( $p=0.001$ ).

**Conclusions:** Sexual functions evaluated by the IIEF questionnaire decrease by the end of RT.

**Key words:** prostate cancer , radiotherapy , erectile dysfunction

## Introduction

Prostate cancer is the second most common malignancy after lung cancer among men. According to the patient's age, the disease stage and risk factors, the most appropriate treatment (active surveillance, surgery, radiotherapy (RT), hormone therapy, or combined treatment) is selected [1]. The primary goal in prostate cancer treatment is to provide tumor control, as in any cancer treatment, and to preserve urinary, sexual and intestinal functions [2,3].

The most common side effects of prostate cancer RT are gastrointestinal and genitourinary system disorders. The frequency and severity of side effects of RT may be affected by factors related to the patient (age, comorbid diseases, obesity, etc.)

and factors related to RT (RT technique, RT dose, RT volume, etc.) [4-7].

Side effects, especially sexual side effects, of prostate cancer treatment influence the quality of patient life [8]. A study reported that men give importance to preserving erectile function while evaluating prostate cancer treatment methods. Moreover, in that study, 2/3 of men said they would not prefer a treatment method that can provide a survival advantage of 10% in 5 years because it is more likely to damage the erectile function [9].

This study aimed to evaluate the sexual function of patients who had received RT for prostate cancer.

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## Methods

Fifty patients diagnosed with low-risk prostate cancer (T1-T2a, Gleason score  $\leq 7$ , PSA  $\leq 10$ ) and planned RT between May 2020 and March 2021 were included in this prospective study. Patients that used hormone-therapy and were operated for prostate cancer were excluded from the study. The characteristics of patients are summarized in Table 1.

Computed tomography (CT) was performed in supine position with Philips Brilliance CT Big Bore Oncology tomography device with 3 mm slice intervals for RT planning. Before the planning tomography, each patient was asked to empty the bladder and rectum; then, a CT scan was performed after drinking 500 ml of water after 30 min. During the planning tomography, it was ensured that the bladder was full and the rectum was empty. In contouring, the prostate was determined as the clinical target volume (CTV). Because it is a low-risk disease, the entire pelvis was not included in CTV. 6-8 mm margin was given to CTV for planning target volume (PTV). The bladder, rectum, bowel and right/left femoral heads were contoured as critical organs. Planning was done with the helical tomotherapy planning system. RT (78-80 Gy) was planned for PTV with a daily fraction dose of 2 Gy. It was ensured that the PTV dose was between 95% and 105% of the scheduled dose, while evaluating critical organ doses recommendations of the international guidelines [10-13]. All of the patients were treated with image-guided RT in Hi\_Art Tomotherapy device.

This study used mixed-method design to evaluate the sexual function of prostate cancer patients receiving RT with curative intent. The international erectile function form (IIEF) was performed to participants before RT and on the last day of RT. Erectile function, orgasmic function, sexual desire, sexual satisfaction, and general satisfaction were evaluated with IIEF. The erectile function between 1-30 points (0-10 severe erectile dysfunction, 11-16 moderate erectile dysfunction, 17-21 mild-moderate erectile dysfunction; 26-30 no erectile

dysfunction); orgasmic function between 0-10 points; sexual desire between 2-10 points; sexual satisfaction were scored between 0-15 points, and general satisfaction was scored between 2-10 points. High score in IIEF was evaluated as good sexual function [14].

Ten of the 50 patients participating in the study agreed to be interviewed. These 10 participants answered verbally open-ended questions about the reasons for the change in sexual functions. Each interview lasted 25-35 min on average. Interviews were audio-recorded and then transcribed. Finally, the texts were given to the participants, and it was confirmed that the records were correct. In this way, the reliability of the data has been taken to a higher level.

For the study, necessary permissions were obtained from the Clinical Studies Ethics Committee of the University of Health Sciences Dr. Abdurrahman Yurtaslan Oncology Health Application and Research Center with the date 20/05/2020 and the number 2020-05 / 269. All patients were informed in detail about the study, and they filled in the informed consent form.

This study aimed to evaluate early sexual function in patients with low-risk prostate cancer who underwent RT.

### Statistics

The quantitative analysis was conducted using SPSS 22.0 software (SPSS Inc., Chicago, IL). T-test was used to evaluate the effect of RT on sexual function and p values less than 0.05 were considered as statistically significant.

The qualitative analysis was organized into 5 steps; (1) transcription, (2) reliability analysis, (3) coding, (4) establishing themes and categories, and (5) writing up and interpreting the results. Firstly, the researchers transformed the collected data into a written format and then subjected it to content analysis to examine the common codes and thus categories. Later, two transcripts were randomly selected, and the selected transcripts were coded independently by two coders to explore the consistency among the codes emerging and find inter-rater reliability. Then, all transcripts were coded by the researchers. Categories and themes were later established based on the codes and their similar characteristics. Finally, the emerged codes and established categories and themes were interpreted and the quotation taken from the transcripts.

## Results

### The results of quantitative analysis

The mean age of 50 patients participating in the study was 68.6 years, and the median was 71 (minimum 54-maximum 83). RT dose was 78 Gy in 30 patients and 80 Gy in 20 patients.

There was a significant decrease in sexual desire after RT compared before RT (mean sexual desire score before RT 6.24, 3.62 after RT;  $p=0.001$ ).

There was a significant decrease in sexual satisfaction at the end of RT compared before RT (sexual satisfaction score 8.94 before RT, 4.6 after RT;  $p=0.001$ ).

**Table 1.** Patient characteristics (n=50)

Characteristics	
Mean age, years	68.6 (range 54-83)
Mean pre-biopsy PSA value	5.7 ng/ml (range 3-9.8)
Bioptic Gleason score, n (%)	
5, 6 or 7	50 (100)
8	-
9-10	-
Clinical stage, n (%)	
T1c	42 (84)
T2a	8 (16)
T2b or higher	-
Radiotherapy dose (Gy), n (%)	
78	30 (60)
80	20 (40)

PSA: prostate-specific antigen

There was a significant decrease in erection function after RT compared before RT (erection function score 20.14 before RT, 11.76 after RT;p=0.001).

There was a significant reduction in orgasmic functions. While the average score of orgasmic function scores before RT was 9.6, it decreased to 3.9 after RT (p=0.001).

There was a significant decrease in the patient general satisfaction; while the average general satisfaction scores before RT was 7.48, it decreased to 4.36 after RT (p=0.001).

The results of quantitative analysis are summarized in Table 2.

*The results of qualitative analysis*

When asked ‘What could cause the change in sexual functions at the end of RT?’ to 10 patients

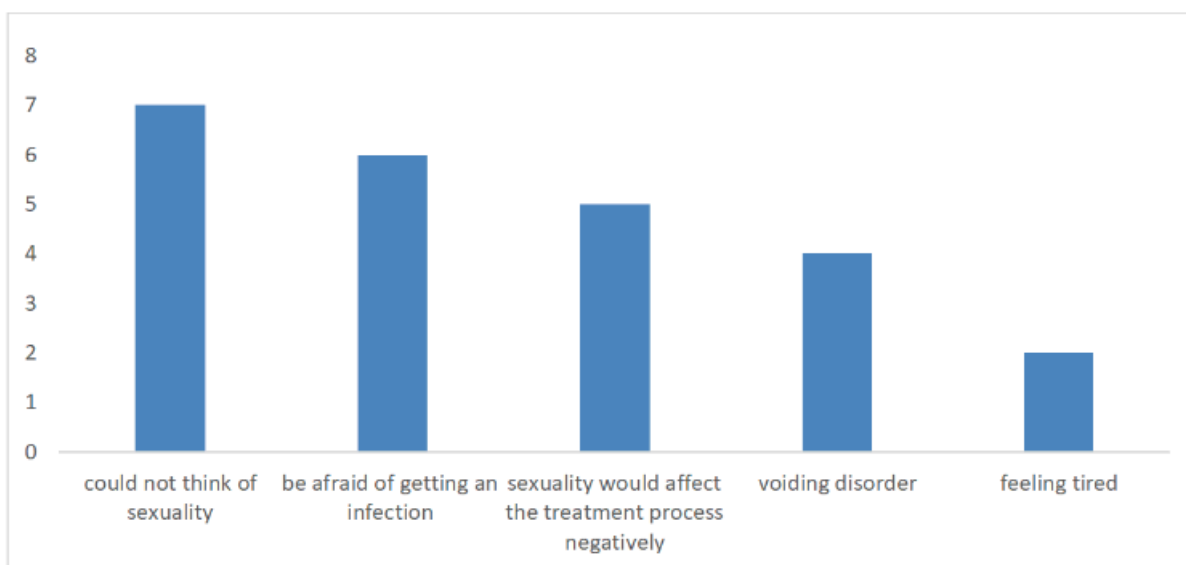
who accepted to interview, different responses were received. Seven of 10 patients could not think of sexuality because they were receiving cancer treatment. Six of them were afraid of getting an infection from their wife. Five of them thought that sexuality would affect the treatment process negatively. Four of them could not think of sexuality because of voiding disorders after the 4<sup>th</sup> week of RT. Two of them said they were feeling so tired. Among these responses, the most commons were ‘not thinking about sexuality, fear of infection during sexual intercourse, and thinking that cancer treatment would be adversely affected. The results of qualitative analysis are summarized in Figure 1.

The most striking answer was ‘I avoided sexuality because I was afraid of transmitting radiation to my wife.

**Table 2.** Results of IIEF questionnaire

	IIEF questionnaire	n	$\bar{x}$	Sd	t	p
Sexual desire	Pre Test	50	6.24	2.04	13.00	0.001
	Post Test	50	3.62	1.86		
Sexual satisfaction	Pre Test	50	8.94	3.91	11.46	0.001
	Post Test	50	4.6	3.89		
Erection functions	Pre Test	50	20.14	8.40	9.77	0.001
	Post Test	50	11.79	8.57		
Orgasmic function	Pre Test	50	9.6	3.47	10.35	0.001
	Post Test	50	3.9	3.25		
General satisfaction	Pre Test	50	7.48	2.01	14.00	0.001
	Post Test	50	4.36	2.05		

n: number of patients,  $\bar{x}$ : mean, Sd: standard deviation, t: t-test



**Figure 1.** The results of qualitative analysis.

## Discussion

Erectile dysfunction is a side effect that can be observed after prostate cancer treatments. In the study of Donovan et al, patients with a diagnosis of low-risk prostate cancer who were included to the active observation arm, underwent radical prostatectomy or received RT were examined. The erection rate of 67% at baseline was reported as 12% in the radical prostatectomy group and 22% in the external RT group when the patients were examined 6 months later [15]. Erectile dysfunction observed after RT is due to penile neurovascular and cavernosal damage. In contrast to erectile dysfunction observed shortly after radical prostatectomy, it is generally observed 3-5 years after RT [16]. The side effect that occurs at least 6 months or even 3-5 years after RT can be considered as a chronic side effect of treatment. In this study, the questionnaire was conducted before and just after RT. Considering that erectile dysfunction is a chronic side effect of RT, it may not be correct to evaluate the statistical decrease in sexual desire, sexual satisfaction, erectile function, orgasmic function, and general satisfaction observed shortly after RT as a side effect of RT.

In the study of Kikuchi et al, IIEF was used to evaluate the erectile function in 55 patients with prostate cancer who received RT. It was reported that there was a decrease in the erectile function and intercourse satisfaction after RT. There was no statistically meaningful difference in orgasmic function, sexual desire, and overall satisfaction after RT [17]. In this study, the average sexual desire score of the patients before RT was 6.24 and the average after RT was 3.62 ( $p=0.001$ ). The average pre-RT sexual satisfaction score was 8.94; after RT, it was 4.6 ( $p=0.001$ ). Before RT, the average erection function score was 20.14; after RT it was 11.76 ( $p=0.001$ ). The average orgasmic function score before RT was 9.6; after RT it was 3.9 ( $p=0.001$ ). Before RT, the average general satisfaction score was 7.48, which decreased to 4.36 ( $p=0.001$ ) after RT. The reason of the difference between these studies may be considered the fact that the patients were followed for at least 12 months in the study of Kikuchi et al, and were evaluated immediately after RT in this study. It can be said that RT period may affect all sexual functions psychologically. Still, to be able to say this precisely, patients should be followed up for longer periods of time.

In the recent study of Pinkawa et al, the erectile function of 123 patients who received RT for pros-

tate cancer was evaluated using the Expanded Prostate Cancer Index Composite (EPIC) questionnaire. Patients were asked to answer the questionnaire on the first day and the last day of RT, 2 months and 16 months after RT. The most significant decline in erectile function was observed on the last day of RT and 2 months after RT. It was reported that this decrease in erectile function continued till the 16<sup>th</sup> month. It was stated in the study that the erectile dysfunction observed in the early period might be predictive of erectile dysfunction in the late period [18]. In this study, a statistically significant decline was observed in sexual desire, sexual satisfaction, erectile function, orgasmic function, and general satisfaction. Longer follow-up is required to evaluate the effects of this decline on sexual functions in the late period.

Albaugh et al conducted face-to-face interviews with 27 patients and 9 patients' sexual partners to evaluate the sexual function of patients treated for prostate cancer. They interviewed the patients and their sexual partners after the 1<sup>st</sup> and the 5<sup>th</sup> year of treatment. As a result of this study, they concluded that patients needed education on sexual life before, during, and after treatment. This study also reported that men with sexual dysfunction after prostate cancer treatment had also anxiety and depression [19]. In this study, the responses were given by the patients in face-to-face interviews, especially the response of a patient who said "I avoided sexuality because I was afraid of transmitting radiation to my wife." show that patients should be seriously informed, educated, and guided about this issue.

Considering the responses received in face-to-face interviews and the literature reporting that the effects of RT on sexual dysfunction can be observed approximately 3-5 years after RT, the decrease in sexual function that emerged in this study may be mostly related to the anxiety, fear of infection, and cancer treatment, but not directly to RT. However, more detailed evaluations and long-term follow-up should be done for more accurate results.

Sexual dysfunction is an essential parameter affecting the patient quality of life. Informing and educating patients on this subject in detail is an issue that should be taken seriously to keep the patient quality of life high.

## Conflict of interests

The authors declare no conflict of interests.

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