

ORIGINAL ARTICLE

Medicine Science 2021;10(4):1474-80

A comparative analysis of long-term life qualities of head and neck cancer (nasopharyngeal, hypopharyngeal and laryngeal cancers) patients who were treated with the intensity-modulated radiation therapy (IMRT): Expectations and outcomes

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Received 10 August 2021; Accepted 29 September 2021

Available online 24.11.2021 with doi: 10.5455/medscience.2021.08.253

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Abstract

The long-term quality of life outcomes of head-neck cancer patients who were treated with Intensity-modulated radiation therapy (IMRT) are not well known. The aim of this study was to determine the long-term quality of life and problems in patients undergoing IMRT in head-neck cancers. The study was conducted at a high-volume tertiary care setting. Patients who have received IMRT for head and neck cancers in our clinic, who completed at least one year following the completion of their therapy, and who are being followed up for the present, were included in the study. To assess patients' quality of life and problems they experience, the updated(revised) version of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Head and Neck Module (EORTC QLQ-H&N43) and The Arizona Sexual Experience Scale (ASEX) were administered to patients by the same clinician, using the face-to-face interview method. The study included 18,28,30 patients who received IMRT for hypopharyngeal, nasopharyngeal, and laryngeal cancer, respectively. Given the EORTC QLQ-H&N43 results of patient groups; contrary to expectations, mucosal dryness, sense and voice problems were observed as common problems in all patient groups. Thanks to protection of body integrity, good social contact and communication, a high level of satisfaction was observed in all patient groups. In conclusion; a high level of satisfaction was observed in patient groups treated with IMRT, despite long-term mucosal dryness, voice disturbances and sense problems, thanks to the preservation of body integrity and good social communication.

Keywords: Head and neck cancer, Life quality (QoL), sexuality, EORTC QLQ-H&N43, Arizona Sexual Experiences Scale ASEX), Intensity-modulated radiation therapy (IMRT)

Introduction

Head and neck cancers and the treatments applied for them may affect various body functions such as breathing, digestion, smell and speech. As all these functions are related to our survival skill and/or our social life, head and neck cancers may trigger significant physical, emotional and social problems and significantly reduces the quality of life (QoL). The standard treatment of head and neck cancer has evolved dramatically over the past decades, and it includes surgery, induction or concurrent chemotherapy, radiotherapy and/or goal-directed therapies [1-5]. Radiotherapy is one of the mainstay of treatment for head and neck cancers. While the 5-year survival rate in early head and neck cancers is above 80%, this rate may decrease to up to 60% in advanced stages [6-8]. Intensity-modulated radiation therapy (IMRT) is a conformal

mode of radiotherapy that delivers precise radiation doses to a malignant tumor or specific areas within the tumor while protects tumor-free areas more. Studies have reported that in the early and late periods radiotherapy-induced effects occur, which affect the quality of life. Many effects that reduce the quality of life such as xerostomia, dental health, difficulties in swallowing and speech can be permanent in some patients [8].

In the early 1990s, the European Organization for Research and Treatment of Cancer (EORTC) Study Group on Quality of Life (QoL) has adopted a modular approach (starting with C30) to quality of life (QOL) assessment in head and neck cancer clinical trials. Thanks to the multi-participatory studies conducted at certain intervals, the EORTC QLQ-H&N35 [9-11] module was updated to the EORTC QLQ-H&N43 version [1,12]. Due to the need for revision arising with changing treatment modalities, the EORTC QLQ-H&N60 [1] version is currently being tested. These updates started with the determination of the relationship between patients' complaints/problems and healthcare providers [2] and the need to be updated periodically has arisen. In cancer patients receiving chemotherapy, a number of sexual side effects can occur as a result of cancer treatment, at the beginning or after

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the treatment. These problems, unfortunately, are sometimes underestimated and overlooked due to reasons arising from the patient and sometimes from the clinician. Sexual dysfunctions in these patients may be ignored due to several factors such as recognition in medical settings, problems in reporting and eliciting concerns relating to sexual function and satisfaction, being underestimated by clinicians, and social stress factors. Screening questionnaires may help to support this aspect of clinical practice. The Arizona sexual experiences scale (ASEX) includes items that quantify sex drive, arousal, vaginal lubrication or penile erection, ability to reach orgasm, and satisfaction from orgasm [13, 14].

The aim of this study was to determine the long-term quality of life (QoL) and problems in patients undergoing intensity-modulated radiation therapy in head and neck cancers (nasopharynx, hypopharynx and larynx).

Materials and Methods

Research pattern and sample: Patients, who have received IMRT for head and neck cancers in our head and neck cancer clinic, who completed at least one year following the completion of therapy, and who are being followed up curatively for the present, were included in the study. Patients were divided into three groups that received IMRT treatment for laryngeal cancers, nasopharyngeal cancers and hypopharynx cancers, who are followed up for present. Patients were asked to fill out the updated (revised) version of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Head and Neck Module (EORTC QLQ-H&N43) and The Arizona Sexual Experience Scale (ASEX). The study consisted of patients who received cisplatin + radiotherapy for nonsurgical early laryngeal cancers, nasopharynx cancers and hypopharynx cancers and whose follow-ups were over a minimum of 1 year. Patients with residual or recurrent tumors, psychiatric illness, diabetes or major heart disease or who refused to make a face-to-face interview were excluded. All face-to-face interviews were performed by the same clinician. All patients completed the updated (revised) version of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Head and Neck Module (EORTC QLQ-H&N43) and The Arizona Sexual Experience Scale (ASEX).

Radiation therapy

Laryngeal doses

Patients who were treated for laryngeal cancers received IMRT treatment (60-70 Gy) between 38-35 days for T-stage (T1-T2) and selected T3 and/or neck region. Induction (cisplatin) or concurrent (weekly cisplatin) chemotherapy was added to the radiotherapy of these patients.

Nasopharyngeal doses

Patients who were treated for nasopharyngeal cancers received IMRT treatment (60-70 Gy) between 30-33 days for T-stage (T2-T3) and neck region. Induction (cisplatin) or concurrent (weekly cisplatin) chemotherapy was added to the radiotherapy of these patients.

Hypopharyngeal doses

Patients who were treated for hypopharyngeal cancers received

IMRT treatment (60-70 Gy) between 30-35 days for T-stage (T2-T3) and neck region. Induction (cisplatin) or concurrent (weekly cisplatin) chemotherapy was added to the radiotherapy of these patients.

Chemotherapy

In our study, patients whose radiotherapies were added induction (cisplatin) or concurrent (weekly cisplatin) chemotherapy in accordance with local treatment standards were selected.

Assessment of Health-related quality of life (HRQoL)

Health-related quality of life (HRQoL) data were assessed with approved European Organization for Research and Treatment of Cancer (EORTC) tools and the Arizona Sexual Experience Scale (ASEX).

Instruments

The Arizona Sexual Experience Scale (ASEX) is one of the more commonly used scales to assess sexual functioning. It is designed to assess the core elements of sexual functioning: sex drive, arousal, vaginal lubrication or penile erection, ability to reach orgasm, and satisfaction from orgasm. It was found that this scale was reliable and valid, short and easy to apply in clinical settings. Possible total scores range from 5 to 30, with the higher scores indicating more sexual dysfunction [13, 14]. ASEX designates “sexual dysfunction” when the total score is 19 or higher; or when any single item has a score of 5 or 6; or when any three items each have a score of 4 or higher [14]. The EORTC QLQ-H&N43 contains 43 questions with four possible responses as “not at all”, “a little”, “quite a bit” and “very much”. Each item is rated on a four-point Likert scale and scores for each subscale range from 0 to 100 where higher scores indicate more serious symptoms, as in the QLQ-C30 questionnaire. A higher score and/or higher symptomatology scores indicates a lower quality of life, as in the QLQ-C30 symptom scales. The 19 symptom scales of the QLQ-H&N43 are made up of 12 scales consisting of multi item scales and 7 single item scales. Compared to the previous version, the updated H&N43 includes additional questions that specifically address side effects of newer cancer treatment strategies. These include skin problems, shoulder problems or neurological side effects [12, 15].

The Turkish versions of the EORTC QLQ-H&N43, QLQ-C30, and ASEX scales, with Turkish reliability indexes approved, were obtained and applied with the permission of the relevant institutions. Permission to use the scales was obtained via e-mail.

Data collection

After obtaining written consent from the patients, the EORTC QLQ-H&N43 and ASEX assessment scales were administered to them. Patients’ personal data, their demographic characteristics such as gender and age, histopathological diagnosis, educational level, treatment method, length of follow-up, tumor, node and metastasis (TNM) stage were recorded.

Statistical analysis

Results of the prospective study are expressed with descriptive statistical values. The data of the study were analyzed by using the SPSS “Statistical Package for the Social Sciences (IBM

SPSS22.0) program. Mean, median, standard deviation, minimum and maximum values were calculated. As the variables did not satisfy normal distribution according to the results of the Kolmogorov-Smirnov test ($p < 0.05$), non-parametric statistical tests were used. The Kruskal-Wallis test was used to compare more than two groups. Mann-Whitney U test was used to compare two groups. In the statistical comparison, the alpha error rate was considered significant at $p < 0.05$. Statistical assessment of the EORTC questionnaires was calculated manually, using the EORTC Scoring Manual [12].

Ethical approval

This is a prospective cross-sectional study. Ethics committee approval (Decision number: 2021/1768) of the study was obtained from the Inonu University Scientific Research and Publication Ethics Committee. All patients were assured about confidentiality and the study was conducted with the patients' consent.

Results

The study included 18 patients (n1:18) who received IMRT for hypopharyngeal cancer, 28 patients (n2:28) who received IMRT for nasopharyngeal cancers and 30 patients (n3:30) who received IMRT for laryngeal cancers. Examining the groups in terms of age and gender, the data obtained were as follows: in the hypopharyngeal cancer group, 10F (55.6%)+8M (44.4%) in gender and 54.0000 ± 8.99673 years in age; in the nasopharyngeal cancer group, 12F (42.9%)+16M (57.1%) in gender and 49.2857 ± 9.00558 years in age; and in the laryngeal cancer group, 3F (10%)+27M (90%) in gender and 62.9333 ± 10.21808 years in age. Laryngeal cancer group was statistically significant compared to other groups in terms of age and gender (Table 1). Examining patients' length of follow-up, it was found that the hypopharyngeal cancer group has an average of 4.1667 ± 2.56676 years, while the nasopharyngeal cancer group has an average of 4.5714 ± 2.96808 years and the laryngeal cancer group has an average of 2.9167 ± 2.75770 years. The laryngeal cancer group was found to have lower length of follow-up, compared to the other groups (Table 1).

Patients who were treated for hypopharyngeal cancers received IMRT treatment (60-70 Gy) between 30-35 days for T-stage (T2-T3) and neck region. Induction (cisplatin) or concurrent (weekly cisplatin) chemotherapy was added to the radiotherapy of these patients. Patients who were treated for nasopharyngeal cancers received IMRT treatment (60-70 Gy) between 30-33 days for T-stage (T2-T3) and neck region. Induction (cisplatin) or concurrent (weekly cisplatin) chemotherapy was added to the radiotherapy of these patients. Patients who were treated for laryngeal cancers received IMRT treatment (60-70 Gy) between 38-35 days for T-stage (T1-T2) and selected T3 and/or neck region. Induction (cisplatin) or concurrent (weekly cisplatin) chemotherapy was added to the radiotherapy of these patients.

Analyzing the results of the EORTC QLQ-H&N43 questionnaire in the study, the following points were determined:

- Body image scores were found to be statistically significant in the laryngeal cancer group compared to the other two groups and this might be due to age and gender differences.

- Dry mouth scores were found to be moderate in all groups and statistically insignificant. Contrary to expectations, these scores were similar in the laryngeal cancer group, too.

- Fear of progression scores were similar in all groups, and future anxiety was observed in all patients.

- Pain in the mouth scores were found to be statistically low and significant in laryngeal cancers group. This may be due to mucosal dryness induced by radiotherapy in IMRT, stiffness of the muscles involved in swallowing function, problems in dental health. However, the present complaints did not lead to oral intake disorder and weight loss. It was observed that the patients overcome or alleviate their present complaints by regulating their diet.

- Senses scores were statistically less and significant in patients with laryngeal cancer. This score was high in the nasopharyngeal cancer group and in the hypopharyngeal cancer group. The current situation was evaluated as the posterior naso-oropharynx involvement due to irradiation of the nasopharynx and hypopharynx region, especially during IMRT. Because it was observed that patients complained of loss of taste sensation rather than reduced sense of taste.

- Sexuality scores were found to be slightly-moderately high in laryngeal and nasopharyngeal cancer groups and statistically significant. But compared to ASEX scores, values were found close to each other, while these values were not statistically significant. Given the current state, the mean age of the patients in the laryngeal cancer group was high and their ASEX scores were worse. However, compared to other questions in the questionnaire, it was observed that the patients did not give sound answers the questions investigating sexual function. Factors such as difficulty in expressing problems and/or satisfaction with sexual functions, beliefs, difficulties in expressing due to cultural factors, denial of sexual dysfunction especially by men were found to affect giving sound answers to the test. Two items questioning sexuality in the EORTC QLQ-H&N43 were found to be incomplete and insufficient to assess this content.

- Shoulder problems, skin problems and social eating scores were found to be mild in all patient groups and these scores were statistically insignificant.

- Speech scores were observed to be mild to moderate in all patient groups and these scores were statistically insignificant. While higher scores were expected in the laryngeal cancer group, it was observed that higher scores were obtained in the nasopharyngeal and hypopharyngeal cancer groups. Examining the reason of that, it was seen that hearing loss and related speech disorder and radiotherapy-induced articulation disorders were major in the nasopharyngeal and the hypopharyngeal cancer group. In addition, all patient groups reported articulation problems induced by mucosal dryness and dental health problems.

- Swallowing scores were found to be statistically significant and higher in the hypopharyngeal cancer group, as expected. The current situation was explained by the rigidity and mucosal dryness of the muscle groups involved in the swallowing function of the region where IMRT was administered.

• Teeth scores were found to be statistically low and significant in the laryngeal cancer group. These scores were similar and moderately high in other patient groups. It was observed that most of the dental health problems in the laryngeal patient group were not associated with IMRT but with age and poor oral hygiene.

• Coughing and neurological problems scores were present in all patient groups, while they were statistically significant and higher in the hypopharyngeal cancer group. The current situation was explained by the functional and anatomical effect of the hypopharynx region.

• Problems opening mouth were expressed in the nasopharyngeal cancer group and these scores were statistically significant and higher than other groups.

• Problems with wound healing, social contact, swelling in the neck and weight loss scores were close to each other in all patient groups and were quite low. Patients were observed to respond these items

by paying regard the acute phase of the treatment.

The patients were asked to indicate the three problems they experienced the most from the treatment they received and the three factors they were satisfied with the treatment. The nasopharyngeal cancer group stated that they suffered hearing loss, mucosal dryness and the problems it brings (speech and dental health) and reduced sense of smell and taste (loss of taste sensation in the forefront) at the most. The hypopharyngeal cancer group reported that they suffered mucosal dryness and the problems it brings (speech and dental health) and reduced sense of smell and taste and complaint of coughing the most. The laryngeal cancer group, on the other hand, stated that they suffered hoarseness-induced speech disorder, mucosal dryness and the problems it brings (speech and dental health) and reduced sense of smell and taste at the most. All three patient groups described the positive aspects of the treatment as maintaining body integrity, the disappearance of social phobia after the acute phase, good social communication, and feeling physically and mentally well after the acute phase (Table 2).

Table 1. EORTC QLQ-HN43 and ASEX scores of the treatments of hypopharyngeal, nasopharyngeal and laryngeal cancers

EORTC QLQ-HN43	Hypopharyngeal cancer (n:18)		Nasopharyngeal cancer (n:28)		Laryngeal cancer (n:30)		P-value
	Mean±S.Deviation		Mean±S.Deviation		Mean±S.Deviation		
Gender	F:10 %55.6	M:8 %44.4	F:12 %42.9	M:16 %57.1	F:3 %10	M:27 %90	p=0.002**
Age	54.0000±8.99673		49.2857±9.00558		62.9333±10.21808		P=0.0001**
Post treatment year	4.1667±2.56676		4.5714±2.96808		2.9167±2.75770		P=0.026**
Multi-item scales							
	RS	S	RS	S	RS	S	
Body image	1.7022±0.69224	23.4022±23.07152	1.4271±0.60717	14.2450±20.24933	1.1880±0.33159	6.2660±11.05202	RS p=0.049** S p=0.052
Dry mouth	2.2778±0.59956	42.5822±19.98893	2.5357±0.75680	51.1879±25.22805	2.5667±0.99770	52.2190±33.25678	RS p=0.42 S p=0.296
Fear of progression	2.0556±0.16169	35.1822±5.39076	2.0714±0.71640	35.71707±23.87913	2.0277±0.53614	33.1850±18.85642	RS p=0.728 S p=0.624
Pain in the mouth	2.1111±0.48675	37.0267±16.23445	1.9286±0.70336	30.8007±23.59969	1.6417±0.66203	21.0393±21.81822	RS p=0.019** S p=0.021**
Senses	2.3333±0.59409	44.4422±19.80163	2.0357±0.87060	34.5200±28.34217	1.5333±0.85029	17.7743±28.34217	RS p=0.0001** S p= 0.001**
Sexuality	1.5556±0.70479	22.2167±22.8624	2.2143±0.97590	40.4729±32.52962	1.9000±0.87494	30.5537±29.05951	RS p=0.049** S p=0.116
Shoulder problems	2.1667±1.000	38.8878±33.3327	1.7500±0.65969	24.9957±21.98859	1.7000±0.66436	23.3310±22.14428	RS p=0.233 S p=0.233
Skin	1.6467±0.63799	21.5544±21.26538	1.6264±0.68840	19.8071±23.47995	1.4430±0.57607	14.7693±19.20631	RS p=0.336 S p=0.425
Social Eating	1.7500±0.63013	24.9900±20.99814	1.6429±0.73733	21.4257±24.57663	1.4333±0.49538	13.9420±16.66849	RS p=0.197 S p=0.164
Speech	2.1111±0.67466	37.0300±22.48878	2.1143±0.77254	37.1400±25.75193	1.9533±0.64687	31.7743±21.56219	RS p=0.715 S p=0.775
Swallowing	2.2500±0.61835	45.3644±18.57926	1.8929±0.60640	29.7543±20.21623	1.8360±0.79230	27.8620±26.40489	RS p=0.04** S p=0.011**
Teeth	2.3500±0.90162	45.0156±30.05463	2.3300±0.84455	44.4007±28.14298	1.6540±0.78486	21.8097±26.17371	RS p=0.002** S P=0.002**
Single item scales							
Coughing	59.2567±35.34303		23.8079±29.89191		25.5530±24.26197		P=0.001**
Neurological problems	55.5522±32.33808		19.0464±30.66847		24.4420±26.16123		P=0.0001**
Problems opening mouth	11.1100±16.16742		42.8543±32.52935		9.9990±21.70645		P=0.0001**
Problems with wound healing	25.9233±21.55657		19.0464±30.66847		13.3320±20.71311		P=0.104
Social contact	22.2200±22.86419		14.2843±21.13544		4.4440±11.52371		P=0.007**
Swelling in the neck	14.8133±23.49072		0±0		8.8880±14.99105		P=0.006**
Weight loss	22.2211±36.15399		21.4264±20.71409		9.9993±21.70788		P=0.054
ASEX	14.1111±5.58242		15.5714±6.54007		14.8000±5.90966		P=0.781

Raw Score = RS = {(I1+ I2+ ... +In)/ n} Linear Transformation scale: S = { (RS - 1) /range } × 100 p<0.05** was considered statistically significant

Table 2. Problems expressed by patients receiving IMRT treatment and satisfaction results

	The Three Most Frequently Expressed Problems	Three Factors That They Are Satisfied with the Treatment
Hypopharyngeal cancer	Mucosal Dryness and The Problems It Brings (Speech and Dental Health)	Maintaining Body Integrity (Body Image)
	Reduced Sense of Smell and Taste	The Disappearance of Social Phobia (Social Eating)
	Coughing	Good Social Communication(Social Contact)
Nasopharyngeal cancer	Hearing Loss	Maintaining Body Integrity (Body Image)
	Mucosal Dryness and The Problems It Brings (Speech and Dental Health)	The Disappearance of Social Phobia (Social Eating)
	Reduced Sense Of Smell And Taste	Good Social Communication(Social Contact)
Laryngeal cancer	Speech Disorder	Maintaining Body Integrity (Body Image)
	Mucosal Dryness and The Problems It Brings (Speech and Dental Health)	The Disappearance of Social Phobia (Social Eating)
	Reduced Sense Of Smell And Taste	Good Social Communication(Social Contact)

Discussion

Head and neck cancers are important problems that have severe consequences depending on the treatment modalities chosen and affect the daily life of patients. In head and neck cancers; malformation, altered body image, social phobia and impaired communication, reduce or loss of the quality of important relationships and social functionality may occur due to treatment modalities (especially surgical modalities). In head and neck cancers, radiation therapy is used as a primary, complementary and palliative therapy. Intensity-modulated radiation therapy (IMRT) refers to a conformal radiotherapy method that treats with delivery of non-uniform beam intensities on patient, using various computer-based optimizations [16, 17]. Almost lack of organ movement in the head and neck region and its relatively immobile structure makes the head and neck region an excellent application area for IMRT. IMRT begun to be implemented for the head and neck region in the 1990s and thanks to its advantages over traditional radiotherapy, it has become the first choice. In IMRT, critical tissue structures such as optic chiasm, cerebellum, medulla spinalis and brain parenchyma, which limit the treatment in conventional radiotherapy, are protected and dose-volume-based constraints were eliminated. By selecting zone during neck irradiation, existing lymph flow and tissues can be preserved [16]. Intensity modulated proton therapy (IMPT), one of the bleeding-edge technologies, is introduced as a novel radiotherapy method with less side effect potential compared to IMRT [18]. However, its high cost and being limited restricts its usage for the moment. Using IMRT in the treatment of head and neck cancers provided highly conformal dose distributions to the target volumes and enabled physicians avoiding from predefined organs at risk (OAR), such as the salivary glands and pharyngeal musculature. This potentially led to improved health-related quality of life (HRQoL) and brought up short- and long-term outcomes [19].

The World Health Organization (WHO) defines health as “a state of complete physical, mental and social well-being”. Therefore, simply being disease free does not mean that you are healthy. Quality of life (QoL) is a concept which consists of values related to physical, psychological, and social aspects [20]. The concept of health-related quality of life aims to evaluate the components described above by parameters after a medical treatment. The goal of patients should be not only extending lifespan but also satisfied with their life. Because of the complex anatomy of the head and neck region, this area in particular is considered to be a sensitive area where surgical interventions can cause severe limitations [15,

21]. The primary goal should therefore be to enable patients to enjoy an unlimited sense of well-being in all areas of life after a therapeutic intervention. The concept of health-related quality of life (HRQoL) can be defined as “how well a person functions in life based on perceived well-being in physical, mental and social areas of health” [22]. The modules developed by the EORTC to evaluate the patient’s condition in the treatment and follow-up of head and neck cancers are currently considered as the gold standard [21]. Interpreting HRQoL results can be challenging for various reasons and measurement of HRQoL can provide background knowledge in the population being assessed. However, collection and standardization of such data is not easy. Especially in sections where some functions are questioned, it appears that there is manipulation or difficulty in expression in the answers. In our study, it was observed that particularly the items questioning sexuality were insufficient and incomplete and that the patients avoided or exaggerate this situation.

Radiotherapy in the treatment of nasopharyngeal cancer is one of the most successfully administered field. Since critical organs were affected after specific dose limits in traditional radiotherapy, dose constraints could be applied. However, thanks to IMRT, almost no dose constraints are required and treatment can be successfully performed [16]. As IMRT treatment in nasopharyngeal cancers generally covers both lateral pharyngeal spaces and neck, it is almost impossible for the salivary glands to be unaffected. At the same time, interaction is tried to be minimized by dosing with IMRT. In our study, mucosal dryness and the problems it brings, smell and taste problems (especially sense of taste) and hearing impairment-induced voice disorders occurred in the long-term. In hypopharyngeal cancers, IMRT usually covers the oropharynx and larynx region as well. In our study, as a result of the radiotherapy of the region, mucosal dryness and the problems it brings, difficulty in swallowing, reduced sense of smell and taste (especially sense of taste) and coughing were seen as long-term outcomes. In IMRT treatment of laryngeal cancers, the affected area of the larynx is screened at different doses as the main target point. In our study, as a result of the radiotherapy of the region, voice disorders associated with reduced sound quality, mucosal dryness and the problems it brings, reduced sense of smell and taste (especially sense of taste) were identified as the long-term outcomes.

Compared with the literature, long-term quality of life evaluations is very few in head and neck cancers. The survival of the patient population and the prognosis of the treatment are influential in this regard. Given the long-term outcomes; dysphagia, mucosal

dryness, dental problems, and smell and taste alteration are seen as long-lasting effects [19, 23, 24]. While dysphagia is considered as the most complained long-term side effect, voice disturbances, smell and taste alterations, coughing and dental problems are also experienced [19, 25, 26]. In our study, voice disorders, dysphagia, smell and taste alterations, dental problems and coughing were found to be long-term side effects and this finding was consistent with the literature.

Conclusion

As a result of the EORTC QLQ-H&N43 and ASEX questionnaires that involve three patient groups receiving IMRT treatment, the following conclusions were reached:

- When patients' length of follow-up after treatment is monitored, it was seen that hypopharyngeal cancer group has an average of 4.1667 ± 2.56676 years, while the nasopharyngeal cancer group has an average of 4.5714 ± 2.96808 years and the laryngeal cancer group has an average of 2.9167 ± 2.75770 years. In this respect, these are long-term outcomes.

- Patients who received IMRT treatment expressed a high satisfaction despite the long-term side effects of the treatment, as their body integrity was protected. They stated that physically protected integrity has a positive effect on mental health in patients and that their social life, thus, was little affected.

- Contrary to expectations, mucosal dryness, reduced sense of taste and smell (especially reduced sense of taste), and voice disturbances were observed as common problems in all patient groups. It is thought that in the EORTC QLQ-H&N43 questionnaire, there will be more items questioning hearing.

- The EORTC QLQ-H&N43 and ASEX questionnaires were found to give similar results in general, however, the sexuality section in the EORTC QLQ-H&N43 questionnaire was seen to be incomplete and inadequate. Besides, patients were found to manipulate, experience difficulties or avoid from the items related this subject. It was determined that cultural factors and beliefs played a role in expressing sexuality problems. It is hereby recommended to determine the normative values of societies and age groups.

- The EORTC QLQ-H&N43 modules are quite successful, reliable and easy-to-understand questionnaires to assess the quality of life of patients who have received treatment for head and neck cancers. The fact that these modules are open to revision with the development of further treatment modalities makes the EORTC QLQ-H&N43 questionnaire valuable.

Conflict of interests

The authors declare that they have no competing interests.

Financial Disclosure

All authors declare no financial support.

Ethical approval

Ethics approval was obtained before the study. (2020.38.02.12)

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