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Quality of Life for Women with Breast Cancer-Related Lymphedema: The Importance of Collaboration between Physical Medicine and Rehabilitation and General Surgery Clinics

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ABSTRACT

Background: The aim of this study was to examine the clinical characteristics and quality of life (QOL) of patients with BCRL (breast cancer-related lymphedema).

Methods: In this cross-sectional descriptive study, patients' characteristics such as age, body mass index (BMI: kg/m²), history of chemotherapy (CT), radiotherapy (RT), hormone replacement therapy (HRT), neoadjuvant therapy (NT), cancer stages, and types of surgery were recorded. Patients were evaluated using the 'Disabilities of the Arm, Shoulder and Hand questionnaire' (DASH), the 'Lymphedema Quality of Life Questionnaire' (LYMQOL-ARM), and a visual analogue scale (VAS).

Results: A total of 68 women with the mean age of 52.50±9.33 and BMI 29.240 ± 5.05 kg/m² were recruited after breast cancer surgery in this study: thirty-three patients (48.5%) in Stage 0; 24 (35.3%) in Stage 1; 10 (14.7%) in Stage 2; and 1 (1.5%) in Stage 3. No statistically significant difference was found in the QOL according to treatments received after the diagnosis of breast cancer surgery, RT (except the appearance domain of QOL), CT, HRT, or NT. In patients who had received axillary dissection in combination with RT, a statistically significant association was observed between QOL related to body image and symptoms (p=0.009 and p=0.017, respectively). A statistically significant difference was found only in body image and clinical symptom domains according to the lymphedema stage (p=0.027 and p=0.002, respectively). It was observed that as shoulder pain (VAS) and disability (DASH) scores increased, scores of all domains of QOL increased except the overall domain in QOL (p<0.05).

Conclusion: It was observed that clinical symptoms and body image parameters in QOL were associated with the lymphedema stage and the number of lymph nodes dissected. It was concluded that axillary dissection with axillary RT and RT alone after breast cancer surgery is associated with body image. Our study revealed that body image perception is related to the quality of life in patients with BCRL. Optimal management of the negative effects of self-reported lymphedema evaluated in the latency phase on quality of life requires coordination between Physical Medicine and Rehabilitation and General Surgery Clinics.

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Introduction

Breast cancer is the most common malignancy in women worldwide. The GLOBOCAN project of the International Agency for Research on Cancer (IARC) shows the high incidence and mortality rates of breast cancer compared to other types of cancer worldwide.

In 2018, 2.1 million new cases of breast cancer were detected worldwide, and this number is expected to reach approximately 3.2 million by 2050.[1] Similar to developed countries, 5-year survival rate in Turkey was found to be 86%.[2] Lymphedema is a chronic progressive condition characterized by impaired lymph drainage due to various reasons, including the accumulation of protein-rich lymph fluid in interstitial cell spaces, and progressive swelling in one or more body regions.[3] Breast cancer-related lymphedema (BCRL) occurs due to obstruction of lymphatic ducts or lymph nodes or their infiltration with tumor cells (lymphangitis carcinomatosis). Lymphedema after breast cancer treatment is one of the most frightening and disturbing complications of patients. In BCRL, the greatest risk for the development of upper extremity lymphedema is in the first two years after diagnosis and treatment.[4] In a recent meta-analysis, the incidence of BCRL was found to be approximately 21%.[5] Risk factors for the disease include invasive cancer diagnosis, axillary lymph dissection, radiotherapy (RT), local infection, advanced age, and obesity, but other factors may also contribute.[6,7] It is known that patients with BCRL are affected more in different aspects (physical, functional, psychosocial, and emotional states) of their quality of life (QOL) compared to patients without lymphedema.[8] In the literature, different results have been obtained in studies examining the relationship between different lymphedema levels and functional status of the upper extremity and QOL, considering the risk factors for lymphedema, and this relationship has not been fully understood.[9] Collaboration among institutions that manage breast cancer survivors is necessary to establish standard treatment guidelines and to prevent lymphedema occurrence. The aim of this study is to evaluate the clinical characteristics and QOL of patients with BCRL in cooperation and follow-up of Physical Medicine and Rehabilitation and General Surgery Clinics.

Methods
Patients
A total of 68 patients diagnosed with BCRL, who applied to SANKO University, Faculty of Medicine, Physical Medicine and Rehabilitation and General Surgery Clinics, for the first time or for follow-up purposes, between December 2019 and February 2020, were included in this cross-sectional descriptive study. The study protocol was approved by the SANKO University Clinical Research Ethics Committee, dated 09.01.2020 and under approval number 2020/01-03. Written informed consent was obtained from all participants and the study was conducted in accordance with the Declaration of Helsinki Ethical Principles.

The inclusion criteria for participating in the study were: 1) an affected arm circumference of 2 cm greater than that of the unaffected arm in at least one of the two sites, 2) the presence of BCRL for at least 1 month or longer, 3) being a female aged 18 years or older, 4) volunteering for this study, and 5) not having received any lymphedema treatment. All patients who met these inclusion criteria were recruited in this study and no sample size calculation was made. Patients with advanced or metastatic cancer, those with bilateral breast cancer, and those with a previous history of orthopedic and/or neurological disease in the affected arm were excluded from the study. All survivors had finished their treatment including surgery, chemotherapy (CT) and RT at least 3 months before.

An Information Form was created to record the sociodemographic characteristics and the findings of examination of the patients who participated in this study. The age, body mass index (BMI; calculated as weight (kg)/height (m²)), (normal<25 kg/m²; overweight 25-29 kg/m²; obese≥30 kg/m²), disease and lymphedema durations, history of CT, RT, hormone replacement therapy (HRT), and neoadjuvant therapy (NT) were recorded. Cancer stages, types of breast and axillary surgery, sentinel lymph node biopsy (SLNB) and the number of dissected lymph nodes were also recorded from patient files.

Evaluation of Patients
The intensity of arm pain was measured using a 10-cm Visual Analogue Scale (VAS). The Disabilities of the Arm, Shoulder, and Hand questionnaire (DASH), which evaluates disability and symptoms, daily activity limitations, and leisure time activity limitations, was used in this study. The DASH, developed by the American Academy of Orthopedic Surgeons, and validated in Turkish, is a self-rated questionnaire that measures upper extremity disability and symptoms. The DASH score takes values between 0 (no disability) and 100 (most severe disability). Higher scores point to greater disability.[10]

The severity of lymphedema was determined according to the difference between the extremities that was adopted by the American Physiotherapy Association (less than 3 cm: mild, between 3 and 5 cm: moderate, and above 5 cm: severe lymphedema).[11]

In this study, no imaging device (bioimpedance spectroscopy, dual-energy x-ray absorptiometry, magnetic resonance imaging, computed tomography, color doppler imaging, lymphoscintigraphy, or indocyanine green lymphography) was used. Bioimpedance spectroscopy is often used to monitor individuals at risk for arm lymphedema after breast cancer surgery to determine stage 0, and if this method is not available, self-reported symptoms may also be a valid assessment of this stage.[12,13]

Clinical lymphedema staging of the patients was evaluated according to the International Society of

Lymphology with a degree between 0 and 3. In this respect, patients were classified as those who were Stage 0 (or 1a)- subclinical lymphedema (swelling is not yet evident despite impaired lymph transport, subtle changes in tissue fluid/composition, and changes in subjective symptoms); Stage 1 - spontaneous reversible (increase in upper extremity circumference, heaviness feeling and pitting edema); Stage 2 -spontaneous irreversible (non-pitting edema, tightness in soft tissue, fibrosis); and Stage 3- lymphostatic elephantiasis (severe lymphedema, trophic skin changes).[14]

The Lymphedema Quality of Life Questionnaire (LYMQOL-ARM) the validity and reliability of which has been assured was applied to the BCRL patients to assess their QOL.[15] This questionnaire, which consists of 21 questions has four domains, namely function (effect on daily activities and leisure activities, dependence on other people), appearance/body image (effect on appearance, difficulty finding clothes to fit and wear, effect on one's feeling about oneself and effect on relationships with other people), clinical symptoms (causing pain, numbness in swollen arm, feeling of pins and needles, feeling of weakness, feeling heavy and feeling tired) and mood/emotions (trouble sleeping and difficulty concentrating on things, feeling tense, feeling worried, feeling irritated and feeling depressed). Each domain score has a range between 1 and 4. Item scoring in each domain is as follows: not at all=1, a little=2, quite a bit=3, and a lot=4. The total score for each domain is calculated by adding up all the scores together and dividing the total by the total number of questions answered. High scores show poor QOL. The last domain evaluates overall QOL on a scale from 0 (poor overall QOL) to 10 (excellent QOL).

Statistical Analysis

Descriptive statistics were given as mean± standard deviation and median (min-max values) for continuous variables, frequency, and percentages for categorical variables. Normality of data was evaluated with Kolmogorov-Smirnov test. Mann-Whitney U test was used for comparison of two groups, Kruskal-Wallis test was used for comparison of more than two groups. For assessing the relationship between continuous variables Spearman's rho correlation coefficient was used. P-values<0.05 were considered as statistically significant.

Results

A total of 68 women were recruited for evaluation after breast cancer surgery in this study. The mean age of the patients was 52.50 ± 9.33. Their average BMI was 29.240 ± 5.05 kg/m². Most of the patients were obese (Table 1). In patients with lymphedema, disabilities of the arm, shoulder, and hand (DASH) score was 32.2 ± 18.24.

Table 1. Characteristics of patients

Characteristics	
Age[a]	52.50±9.34
BMI[a]	29.22±5.05
Cancer type[b]	
IDC	58 (85.3%)
ILC	7 (10.3%)
SAR	1 (1.5 %)
MIXT	2 (2.9%)
Disease Duration (months)[c]	12 (1-108)
Disease Stage[b] (pathology report)	
1	5 (7.4%)
2A	20 (29.4%)
2B	14 (20.6%)
3A	22 (32.4%)
3C	7 (10.3%)
The onset of BCRL (months)[c]	3.5 (1-84)
Severity of Lymphedema[ab]	
Mild	33 (48.5%)
Moderate	20 (29.4%)
Severe	15 (22.1%)
Lymphedema Stage[b]	
Stage 0	33 (48.5%)
Stage 1	24 (35.3%)
Stage 2	10 (14.7%)
Stage 3	1 (1.5%)
Type of Surgery[b]	
Modified Radical Mastectomy	35 (51.4%)
Simple Mastectomy	14 (20.6%)
Segmentectomy	18 (26.5%)
Standard Radical Mastectomy	1 (1.5%)
Number of Dissected Lymph Node[c]	13 (0-59)
RT[b]	
Yes	43 (63.2%)
No	25 (36.8%)
CT[b]	
Yes	50 (73.5%)
No	18 (26.5%)
HRT[b]	
Yes	26 (38.2%)
No	42 (61.8%)
NT	
Yes	16 (23.5%)
No	52 (76.5%)
VAS[c]	5 (0-9)
DASH[c]	32.29±18.24
Functions- LQOL[c]	1.2 (1.0-2.7)
Appearance/Body image-LQOL[c]	1.05 (1.0-3.0)
Clinical symptoms-LQOL[c]	1.8 (1.0-3.6)
Mood/Emotions-LQOL[c]	2.0 (1.0-3.8)
Overall-LQOL[c]	5 (2-10)

BMI: Body Mass Index, IDC: Invasive ductal carcinoma, ILC: Invasive lobular carcinoma sarcoma, SAR: Sarcoma, MIXT: Mixed type (Invasive ductal carcinoma and Invasive lobular carcinoma), VAS: Visual Analogue Scale, DASH: Disabilities of the Arm, Shoulder and Hand, BCRL: Breast cancer related lymphedema, LQOL: Lymphedema Quality of Life. ALND: Axillary lymph node dissection, CT: Chemotherapy, RT: Radiotherapy, NT: Neoadjuvant therapy, HRT: Hormone replacement therapy, [a](Mean±SD), [b]n (%), [c](Median (Min-Max)).

Thirty-five (51.4%) patients had undergone modified radical mastectomy, 14 (20.6%) simple mastectomy, 18 (26.5%) segmentectomy, and 1 (1.5%) standard radical mastectomy (traditional radical mastectomy). Also, 34 patients with negative SLNB had not received ALND. The median number of dissected nodes was 13 (min-max=0-59).

The median disease duration was 12 (1-108) months, and median time from surgery to lymphedema onset was 3.5 (1-84) months for patients.

The majority (68.5%) of the lymphedema-positive patients had early-onset lymphedema of less than 12 months. It was determined that disease duration, lymphedema onset time, and the number of lymph nodes dissected influenced QOL related to the appearance and symptoms domains.

According to clinical lymphedema staging, thirty-three patients (48.5%) who had symptoms such as postoperative arm pain, feeling of heaviness in the arm, numbness, tingling (pins and needles),

loss of strength, skin tightness and loss of flexibility were accepted as Stage 0. The stage distribution of other patients was as follows; 24 (35.3%) patients in Stage 1, 10 (14.7%) patients in Stage 2, and 1 (1.5%) patient in Stage 3.

Cancer types among patients were invasive ductal carcinoma (85,3%); invasive lobular carcinoma (10.3%); mixed type (invasive ductal carcinoma and invasive lobular carcinoma) (2.9%); and sarcoma (1.5%) (Table 1).

The pathological stages of the patients in the study were mostly stage 3A (32.4%) and stage 2A (29.4%). The socio-demographic and clinical features of the patients are shown in Table 1.

The QOL of the patients did not differ statistically according to cancer stage (p>0.05, Table 2).

Most of the patients who developed lymphedema after surgery had received CT, (73.5%) and RT (63.2%). In our study, no statistically significant difference was found in the QOL according to treatments received after the diagnosis of breast

Table 2. Comparison of quality of life according to patient characteristics

	Functions-LQOL	Appearance/Body image-LQOL	Clinical symptoms-LQOL	Overall-LQOL	Mood/Emotions-LQOL
Disease Stage					
2A-2B (n=34)	1.2 (1.0-2.6)	1.0 (1.0-2.4)	1.55 (1.0-2.8)	2.0 (1.0-3.3)	5 (3-10)
3A-3C (n=29)	1.3 (1.0-2.7)	1.2 (1.0-2.6)	2.0 (1.0-3.6)	2.0 (1.0-3.8)	5 (2-10)
p	0.183	0.744	0.091	0.533	0.839
Severity of Lymphedema					
Mild (n=33)	1.2 (1.0-2.6)	1.0 (1.0-2.4)	1.6 (1.0-2.8)	2.0 (1.0-3.6)	5 (2-10)
Moderate (n=20)	1.2 (1.0-2.0)	1.1 (1.0-3.0)	1.6 (1.0-3.6)	1.9 (1.3-3.3)	5 (2-10)
Severe (n=15)	1.4 (1.0-2.7)	1.5 (1.0-2.6)	2.0 (1.0-3.0)	2.6 (1.0-3.8)	5 (2-10)
p	0.721	0.249	0.327	0.554	0.437
Lymphedema Stage					
Stage 0 (n=32)	1.15 (1.0-2.4)	1.0 (1.0-2.0)	1.5 (1.0-2.6)	1.8 (1.0-3.3)	5 (2-10)
Stage 1 (n=24)	1.35 (1.0-2.6)	1.3 (1.0-2.6)	1.9 (1.0-3.0)	2.3 (1.1-3.8)	5 (3-6)
Stage 2 + Stage 3 (n=10)	1.25 (1.0-2.7)	1.7 (1.0-3.0)	2.1 (1.6-3.5)	2.2 (1.0-3.3)	4.5 (2-6)
p	0.299	0.027	0.002	0.244	0.425
Type of Surgery					
ALND (+) (n=46)	1.25 (1.0-2.7)	1.2 (1.0-3.0)	2.0 (1.0-3.6)	2.0 (1.0-3.6)	5 (2-10)
ALND (-) (n=22)	1.15 (1.0-2.1)	1.0 (1.0-2.6)	1.5 (1.0-3.0)	1.95 (1.0-3.8)	5 (3-10)
p	0.435	0.897	0.482	1.000	0.272
RT					
yes (n=43)	1.2 (1.0-2.7)	1.2 (1.0-3.0)	2.0 (1.0-3.6)	2.0 (1.0-3.8)	5 (2-10)
no (n=25)	1.3 (1.0-2.6)	1.0 (1.0-2.0)	1.5 (1.0-2.6)	2.0 (1.3-3.6)	5 (2-10)
p	0.247	0.026	0.156	0.601	0.907
CT					
yes (n=50)	1.2 (1.0-2.6)	1.15 (1.0-3.0)	1.9 (1.0-3.6)	2.0 (1.0-3.8)	5 (2-10)
no (n=18)	1.3 (1.0-2.7)	1.0 (1.0-2.0)	1.55 (1.0-2.3)	2.5 (1.5-3.6)	5 (2-10)
p	0.469	0.188	0.095	0.183	0.575
HRT					
yes (n=26)	1.2 (1.0-2.7)	1.15 (1.0-2.4)	1.7 (1.0-2.8)	2.1 (1.0-3.3)	4.5 (2-10)
no (n=42)	1.25 (1.0-2.4)	1.0 (1.0-3.0)	1.8 (1.0-3.6)	1.8 (1.3-3.8)	5 (2-10)
p	0.409	0.334	0.756	0.771	0.588
NT					
yes (n=16)	1.25 (1.0-2.7)	1.05 (1.0-2.0)	1.6 (1.0-3.6)	1.8 (1.0-3.0)	5 (2-9)
no (n=52)	1.2 (1.0-2.6)	1.05 (1.0-3.0)	1.8 (1.0-3.5)	2.05 (1.0-3.8)	5 (2-10)
p	0.853	0.434	0.913	0.173	0.240
RT with ALND (n=34)	1.25 (1.0-2.7)	1.4 (1.0-3.0)	2.0 (1.0-3.6)	1.9 (1.0-3.3)	5 (2-10)
RT without ALND (n=34)	1.2 (1.0-2.6)	1.0 (1.0-2.6)	1.5 (1.0-3.0)	2.2 (1.0-3.8)	5 (2-10)
p	0.656	0.009	0.017	0.155	0.448

LQOL: Lymphedema Quality of Life. ALND: Axillary lymph node dissection, CT: Chemotherapy, RT: Radiotherapy, NT: Neoadjuvant therapy, HRT: Hormone replacement therapy. (Median (Min-Max)).

Table 3. Relationship between patient characteristics and quality of life

	Functions-LQOL	Appearance/Body image-LQOL	Clinical symptoms -LQOL	Mood/Emotions -LQOL	Overall-LQOL
BMI					
r	-0.035	0.053	0.009	0.005	-0.202
p	0.777	0.670	0.944	0.970	0.098
Disease Duration (months)					
r	-0.117	0.258	0.289	0119	-0.094
p	0.342	0.033	0.017	0.332	0.445
The onset of BCRL (months)					
r	0.019	0.223	0.379	-0.021	-0.066
p	0.879	0.068	0.001	0.863	0.591
Number of Dissected Lymph Node					
r	0.224	0.347	0.402	0.103	-0.259
p	0.068	0.004	0.001	0.408	0.035
VAS					
r	0.441	0.252	0.484	0.400	-0.242
p	<0.001	0.038	<0.001	0.001	0.047
DASH					
r	0.633	0.327	0.420	0.367	-0.286
p	<0.001	0.007	<0.001	0.002	0.018

r: Correlation Coefficient, BMI: Body Mass Index, VAS: Visual Analogue Scale, DASH: Disabilities of the Arm, Shoulder and Hand, BCRL: Breast cancer related lymphedema, LQOL: Lymphedema Quality of Life.

cancer surgery, RT (except the appearance domain of QOL), CT, HRT, or NT (p>0.05, Table 2). There was no significant difference between patients who underwent surgery with or without axillary lymph node dissection (ALND) (p>0.05, Table 2). In addition, patients who had received axillary dissection in combination with RT were associated with poorer QOL related to body image scores included (p<0.05, Table 2).

It was also observed that the increase in the stage of lymphedema worsened symptoms such as arm weakness, pricking, and feeling of heaviness and body image (p<0.05, Table 2). It was observed that as shoulder pain and disability scores increased, scores of all domains of QOL increased except the overall domain in QOL (Table 3). On these questionnaires, low scores indicate less pain (VAS) and disability (DASH).

Discussion

Lymphedema is one of the most feared complications after breast cancer treatment. It affects approximately one-third of all breast cancer survivors and may compromise patients' overall QOL due to symptoms such as limitation of upper limb movements, pain, feeling of limb heaviness, skin changes and increased risk of infection (e.g., cellulite). In addition, psychologically, women may experience negative emotions such as loss of self-esteem, anxiety, disappointment, sadness, and anger due to a disturbance in body image. In this study, we evaluated the clinical characteristics and QOL of patients who underwent breast cancer surgery.

In our study, the mean BMI was 29.240 ± 5.05 kg/m² (range, 19.8 to 43.4 kg/m²). There are studies in the literature that show significant differences in BMI and QOL score variables[16,17], but in our study, no significant correlation was found between BMI and QOL.

Although age is assumed to be a factor associated with the risk of BCRL, few studies to date have documented the age-related incidence and prevalence of BCRL. The mean age of the patients was 52.50±9.33 (range, 36 to 74 years) in this study. However, we found no differences between age and QOL in BCRL patients. In cancer survivors, the normal aging process can affect cancer treatment and QOL over time. Studies show that breast cancer has a greater effect on QOL in younger patients than in the elderly.[18,19]

BCRL can occur even years after breast cancer treatment is completed.[20] In our study, the average time from surgery to the onset of lymphedema was 3.5 (1-84) months. One prospective study reported that 75% of the BCRL cases were evident in the first year after surgery.[21] Likewise, the study with the longest follow-up (11 years) reported the highest incidence.[22]

While more imaging modalities are needed to investigate the etiology of lymphedema symptoms, the accumulation of lymph fluid in the physiologically affected arm can create a feeling of heaviness, tension, and stiffness, and may also cause neuropathic complaints. In this study, thirty-three (48.5%) of 68 patients were evaluated as stage 0 according to clinical lymphedema staging according to these symptoms. The diagnosis of lymphedema in most patients can be easily determined with anamnesis and detailed physical examination. Objective assessment of lymphedema, such as lymphoscintigraphy and circumferential band measurement, may not detect the early stage, and self-

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reported symptoms can potentially be a useful and low-cost tool for early screening of lymphedema.[23] In addition to the fear of cancer, these symptoms related to lymphedema are among the most important factors that cause stress in breast cancer patients and negatively affect their QOL.[24] Therefore, it is emphasized that referring patients to physical therapy and rehabilitation clinics immediately after surgery helps to detect early lymphedema in this study. We believe that the negative effects of self-reported lymphedema evaluated in the latency phase with stage 0 on quality of life should not be ignored.

In the earliest stages of BCRL, mild changes occur, along with a feeling of heaviness in the arms or hands, discomfort, or both. In the mid-advanced stage, limb edema does not subside with elevation or external pressure, and the affected area may become enlarged and show severely dry, scaly thickened skin. In this study, women with advanced lymphedema stage had statistically significantly lower median QOL scores for body image and clinical symptoms. Clinical symptoms may vary depending on the severity and course of BCRL.[25,26]

There are studies showing that BCRL is related to specific treatment modalities, particularly ALND, a greater number of lymph nodes dissected, RT and CT, alone or in combination. Surgical technique, CT, and RT after surgery extend the life of patients but negatively affect their QOL.[5,27-29] In our study, 34 patients with negative SLNB had not received ALND and there was no significant difference between the patients who underwent ALND and those who did not undergo ALND in terms of QOL. This finding was concordant with a study by Velanovich et al., showing that ALND alone does not impair QOL.[30] There are some conflicting results in the literature. In 3 studies with 1755 participants, it was reported that the quality of life was better after SLNB than ALND in two studies and no difference was observed in the other study.[31]

In our study, the median number of dissected nodes was 13 (min-max=0-59). These results suggest that QOL in BCRL associated with axillary surgery may depend on the number of nodes removed in the lymphatic system. In addition, in this study, a significant relationship was found between the number of lymph nodes dissected and scores for QOL in the domains of clinical symptoms and body image.

In addition to possible risk factors for BCRL, there are conflicting results on adjuvant and NT. In this study, no statistically significant difference was determined between CT, HRT, NT implemented following the diagnosis of breast cancer, and all domains in QOL. Some studies show that adjuvant CT is a potential risk factor for BCRL and reduces the QOL.[32,33] HRT has been associated with various side effects (arthralgia, osteoporosis) that reduce the QOL and treatment compliance of breast cancer patients.[34-36]

Radiation therapy is an important and approved treatment method in all clinical stages of breast cancer patients. Skin injury is a common side effect of breast cancer radiation therapy. Changes such as sunburn-like rash, skin peeling, and darkening of the skin can be seen in the treated area, which highly affect the body image of the patients. In this paper, we observed that women who received RT had negative QOL body image scores, negative feelings towards themselves and relationships with other people. Negative body image inevitably affects a woman's mood and interpersonal relationships, leading to social stigma and hence social isolation. Conditions including scarring, pigmentary changes, chronic radiation dermatitis, and radiation fibrosis have been associated with decreased QOL and impaired function.[37]

In our study, QOL of patients who received the combination of ALND and RT, was statistically lower regarding the body image domain. Some studies conducted on breast cancer survivors report that RT is associated with a 2-4.5 times higher risk of lymphedema, while RT received in combination with ALND poses an 8-10 times higher risk of lymphedema.[38]

Lymphedema can cause limitations in range of movements, pain, weakness, paresthesia, dysesthesia, stiffness, and upper limb function limitation in the affected arm. In this study, a statistically significant correlation was found with shoulder pain and disability scores in all domains of the QOL of patients with lymphedema. A recent study showed that shoulder abnormalities on ultrasonography (e.g., supraspinatus tear, biceps tenosynovitis, acromioclavicular arthritis, subdeltoid bursitis, and adhesive capsulitis) and pain factors are associated with upper extremity dysfunction and poor quality of life in patients with BCRL.[39]

The current study has some limitations. First, the sample size was small. Second, this study is not a longitudinal study; it is cross-sectional. Therefore, we could not observe a longitudinal change in quality of life in patients, as we included patients in different postoperative periods. Therefore, future longitudinal and large-scale prospective studies are needed.

In conclusion, although QOL did not differ significantly in terms of clinical and demographic characteristics, it was observed that clinical symptoms and body image in QOL worsened as the lymphedema stage and the number of lymph nodes dissected increased. Based on the results of this study, ALND plus RT and RT alone after breast cancer surgery were associated with a lower score in body image domain in QOL. In addition, this study revealed how much body image perception can be related to the QOL in patients with mostly subclinical lymphedema. These negative effects of

lymphedema on quality of life can be minimized with collaboration between Physical Medicine and Rehabilitation and General Surgery Clinics.

Conflicts of Interest
The authors declare that they have no conflict of interest.

Acknowledgements

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