



**CLINICAL PICTURE OF THE BREAST CANCER-RELATED LYMPHEDEMA AND PARKINSON DISEASE IN A MALE PATIENT: A CASE REPORT****ERKEK HASTADA MEME KANSERİNE BAĞLI LENFÖDEM VE PARKİNSON HASTALIĞININ KLİNİK TABLOSU: BİR OLGU SUNUMU**Alper TUĞRAL <sup>1</sup>, Yeşim BAKAR <sup>2</sup><sup>1</sup> İzmir Bakırçay University, Faculty of Health Sciences, İzmir, Türkiye.<sup>2</sup> İzmir Bakırçay University, Institute of Postgraduate Education, İzmir, Türkiye.**ABSTRACT**

**Objective:** Breast cancer (BC) is the most common type of cancer seen in women globally. However, BC can also be seen in males. On the other hand, the possible link between cancer and Parkinson's Disease (PD) has been debated regarding the significant association between specific types of cancer and PD yet reports still need to be updated. Breast cancer-related lymphedema (BCRL) is one of the most common and fearsome chronic complications after BC treatment. Not only in the perspective of BCRL but also in PD, exercise and ongoing conservative physiotherapy are prerequisites for improving clinical outcomes. Therefore, we aimed to present a compact clinical picture of a male patient with BCRL and PD.

**Case Description:** The 67-year-old male patient was referred due to having BCRL in his left upper extremity in August 2018. He was diagnosed with BC and a modified radical mastectomy was performed in March 2015. BCRL has been evident after 21 sessions of chemotherapy and 16 sessions of radiotherapy in June 2016.

**Conclusion:** Results showed that kinesiophobia and affected functionality of upper extremities along with affected balance ability were evident. Due to exercise acting as a milestone in lymphedema treatment, potential barriers should be carefully evaluated to manage symptoms not only for BCRL but also for PD.

**Keywords:** Breast Cancer, Lymphedema, Parkinson's Disease.

**ÖZET**

**Amaç:** Meme kanseri (MK) dünya genelinde kadınlarda en sık görülen kanser türüdür. Bununla birlikte, erkeklerde de görülebilmektedir. Öte yandan, kanser ve Parkinson Hastalığı (PH) arasındaki olası bağlantı, belirli kanser türleri ve PH arasında anlamlı bir ilişki olduğu konusunda tartışılmaktadır, ancak raporların hala güncellenmesi gerekmektedir. Meme kanseri ile ilişkili lenfödem (MKL), MK tedavisinden sonra en yaygın ve korkutucu kronik komplikasyonlardan biridir. Sadece MKL açısından değil, PH açısından da egzersiz ve devam eden konservatif fizyoterapi, klinik sonuçların iyileştirilmesi için ön koşullardır. Bu nedenle, MKL ve PH olan bir erkek hastanın kompakt klinik tablosunu sunmayı amaçladık.

**Olgu:** 67 yaşındaki erkek hasta Ağustos 2018'de sol üst ekstremitesinde MKL olması nedeniyle sevk edildi. Olguya Mart 2015'te MK tanısı konmuş ve modifiye radikal mastektomi yapılmıştır. Haziran 2016'da 21 seans kemoterapi ve 16 seans radyoterapi sonrasında MKL belirginleşmiştir.

**Sonuç:** Sonuçlar, artmış kinezyofobi ve üst ekstremitte işlevselliğinde azalma ile etkilenmiş denge yeteneğinin belirgin olduğunu göstermiştir. Egzersizin lenfödem tedavisinde bir kilometre taşı olması nedeniyle, yalnızca MKL için değil aynı zamanda PH için de semptomları yönetmek için potansiyel engeller dikkatle değerlendirilmelidir.

**Anahtar Kelimeler:** Meme kanseri, Lenfödem, Parkinson Hastalığı.

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## INTRODUCTION

Breast cancer (BC) which affects mostly women can also be seen in the male gender. Incidence studies indicate that 0.5-1% of all BC diagnoses are male BC in the United States and this rate corresponds to 2000 BC diagnoses per annum (Contractor et al., 2008; White et al., 2011). Other studies also indicate that the incidence of male BC is below 1% and its contribution to mortality is 0.1%. in the male gender (Cokkinides et al., 2005).

Treatment in male BC follows the protocol that is also followed in female BC. Although epidemiological risk factors have not been investigated deeply, risk factors for female BC are also determined as for male BC. Some common epidemiological risk factors are determined such as BRCA2 gene mutations, Klinefelter syndrome, and positive familial history. Obesity, testicular disorders, and radiation exposition constitute current risk factors for male BC (Weiss et al., 2005).

Breast cancer-related lymphedema (BCRL) is one of the most common complications after BC. Lymphedema is described as a clinical edema situation characterized by a chronic accumulation of protein-rich fluid in interstitial spaces. While excision of lymph nodes after BC surgery is the main risk factor, chemotherapy and radiotherapy which are applied as adjuvant therapy could also aggravate the manifestation of this condition. (DiSipio et al., 2013).

Though studies indicated a decreased risk of cancer in patients with Parkinson Disease (PD), some types of cancers are reported to be significantly associated with PD such as breast and melanoma (Ejma et al., 2020; Leong et al., 2021). Tacik et al. (Tacik et al., 2016) stated that according to their retrospective study in which 971 patients with PD were evaluated regarding cancer diagnosis, 17.3% of patients had skin cancer, 12.8% prostate cancer in males, 10.6% BC in females in the general population were found and they also indicated that these cancers were already present before PD.

Since BCRL has been reported to be associated with decreased quality of life and functionality along with increased kinesiphobia, and depression (DiSipio et al., 2013), (Lopez Penha et al., 2014), our outcome measures were framed within these features. Besides, PD is well well-known factor for deteriorated balance (Robinson et al., 2005), therefore we also chose to evaluate balance. The purpose of this case report is to present clinical assessment outcomes in a male patient with BCRL and PD.

## MATERIALS AND METHODS

### Case

The 67-year-old male patient was referred due to having BCRL in his left upper extremity in August 2018. (Fig.1) He was diagnosed with BC and a modified radical mastectomy was performed in March 2015. Tissue samples that were sampled intraoperatively verified the diagnosis of BC as grade III invasive breast carcinoma. Axillary lymph node dissection (ALND) was performed in intramammary and axillary areas and 7 out of 30 nodes were found as positive. BCRL has been evident after 21 sessions of chemotherapy and 16 sessions of radiotherapy in June 2016. Prior to breast cancer surgery, he was consulted by Neurology due to having a PD. According to the pre-operative CT, Neurology consultancy resulted in no sign of metastasis while lesions compatible with small vessel ischemic disease in hemispheric white substance were detected. The medical history of the case was taken in addition to lymphedema and lymphedema-specific evaluations were performed. Verbal and written informed consent was taken from him to publish his photograph.



**Figure 1.** A 67-year-old male patient with unilateral left side BCRL

**Assessments:*****Lymphedema Assessment:***

Lymphedema-specific medical history and demographic characteristics (i.e. age, body mass index, job, etc.) of the patient were taken. PD diagnosis was also present while there was no history of any other surgery. Lymphedema severity was graded according to the International Society of Lymphology (ISL) classification as stage II. When he was inspected in physical examination, his upper extremities showed an asymmetry while there was no asymmetry in his upper body.

***Tissue Dielectric Constant Assessment:***

Sub-tissue fluid quantity was assessed with Moisture Meter D (Delfin Technologies, Finland) in both arms in predefined reference points (6 cm distal point and 8 cm proximal point of cubital fossa, 10 cm inferior point of axilla) accounting for dielectric values of the tissues namely Tissue Dielectric Constant (TDC) method. The device can assess the dielectric values in different penetration depths as follows: 0.5 mm, 1.5 mm, 2.5 mm, and 5.0 mm. It is a non-invasive, easy, and safely applicable portable device that provides measurement wherever needed. Dielectric values ranged from 1 to 80 where pure water and air have values of 80 and 1, respectively. Operational procedures have been well established in previous studies (Aimoto & Matsumoto, 1996; Alanen et al., 1998, 1999). The patient was positioned in the supine position and reference points were marked by a soft pen on the medial side of both arms. Special attention was paid to whether there was a cream or lotion that might interfere with the measurement results in each reference point. The patient was rested for five minutes and then measurements were taken at each reference point with three repetitions. The TDC values were automatically transacted to the computer interface via Bluetooth receiver and the mean of the triplicate measurements were recorded for each reference point.

***Balance Assessment:***

Balance assessment was assessed with the Biodex Stability System (Biodex Medical System, Shirley, New York). Postural stability, mediolateral and anteroposterior stability index, fall risk, and m-CTSIB (Modified Clinical Test of Sensory Integration in Balance) parameters were assessed. Lower scores are accepted as better results compared to higher ones due to deviation from the center calculated (Drouin et al., 2004).

***Quality of Life***

The patient's disease-specific quality of life assessment was performed with the Lymph Quality of Life Questionnaire (LymQoL). LymQoL consists of four subdimensions symptoms, body image, function, and mood. A total of 26 questions are required to be answered in LymQoL and each item is scored 1 to 4 within a Likert-type scale. Higher scores indicate a better quality of life (Keeley et al., 2010).

***Depression***

The depression level of the patient was assessed with the Beck Depression Inventory (BDI). BDI consists of a total of 21 questions (Beck et al., 1988). Each question is scored between 0 to 3. Therefore, the total score is ranged from 0 to 63. Scores ranged from 0-9 minimal, 10-16 mild, 17-29 moderate, and 30-63 are interpreted as severe depressive signs. Turkish reliability and validity study of BDI was conducted by Hisli et al. (Hisli, 1989). BDI is answered by considering in the last seven days.

***Kinesiophobia***

The kinesiophobia level of the patient was assessed with the Tampa Scale of Kinesiophobia (TSK). TSK consists of 17 items and each item is scored based on a Likert-type scale as 1= strongly disagree, 2= disagree, 3=agree, and 4=strongly agree. The total score ranges from 17 to 68. Higher scores indicate a higher level of kinesiophobia (Woby et al., 2005).

***Functional Assessment of Upper Extremity***

Upper extremity functionality was assessed with a Quick-DASH (Disabilities of Arm, Shoulder, and Hand) questionnaire. Quick-DASH is a short form of the DASH questionnaire and consists of 11 questions. 11 questions were required to be answered between 0 to 5 on Disability/symptom, work, and performance scale. Higher scores indicate better functionality (Dogan et al., 2011).

## RESULTS

The mean scores of the Tampa scale of kinesiophobia, Beck Depression Inventory, Disabilities of Arm, Shoulder, and Hand, and Lymph Quality of Life Questionnaire are shown in Table I. The mean dielectric values of predefined reference points and circumferential measurements are shown in Table II and Table III, respectively. Table IV shows the mean and standard deviations of sway indexes retrieved from the balance assessment. The highest difference in circumferential measurements was 4.5 cm on the proximal side between both upper extremities. When the TDC values of the affected side were divided by the unaffected side's values, these ratios were 1.25 and 1.42 for the arm and forearm at 2.5 mm depth, respectively.

**Table 1.** Kinesiophobia, Depression Level, Upper Extremity Function, and Quality of Life Scores of The Case.

	Score/Max score
<b>TSK</b>	53/68
<b>BDI</b>	9/63
<b>Quick-DASH</b>	50/100
<b>LYMQoL</b>	2.58/5.00

**TSK:** Tampa scale of kinesiophobia, **BDI:** Beck Depression Inventory, **DASH:** Disabilities of Arm, Shoulder, and Hand, **LYMQoL:** Lymph Quality of Life Questionnaire.

**Table 2.** Tissue Dielectric Constant Values of Patient in Predefined Reference Points

Depth (mm)		Affected (A)	Unaffected (UA)
<b>0.5</b>	<b>Arm</b>	44.3	51.4
	<b>Forearm</b>	45.6	41
	<b>Thorax</b>	48.8	47.8
<b>1.5</b>	<b>Arm</b>	48.9	39.8
	<b>Forearm</b>	48.9	34.1
	<b>Thorax</b>	55.2	42.7
<b>2.5</b>	<b>Arm</b>	41.4	33.2
	<b>Forearm</b>	47.8	33.8
	<b>Thorax</b>	47.4	37.3
<b>5.0</b>	<b>Arm</b>	33.1	28.2
	<b>Forearm</b>	43.3	23.8
	<b>Thorax</b>	41.1	32.8

mm: Millimeter

**Table 3.** Circumferential Measurements of Bilateral Upper Extremities

	Right (cm)	Left (cm)
<b>cC</b>	17.9	17.5
<b>cD</b>	21.8	23.8
<b>cE</b>	25.9	26.8
<b>cF</b>	29.8	29.5
<b>cG</b>	32.5	36

**cC:** Wrist, **cD:** Forearm, **cE:** Elbow, **cF:** Arm, **cG:** Axillary

**Table 4.** Mean Sway Indexes of the Case

m-CTSIB	Sway Index
Eyes open firm surface	0.56
Eyes closed foam surface	1.95
Eyes open foam surface	1.15
Eyes closed foam surface	5.02
<b>Postural Stability Test</b>	
Overall Stability Index	0.6±0.42
Ant/Post Index	0.4±0.39
Med/Lat Index	0.3±0.32
<b>Fall Risk</b>	0.9±0.38

**m-CTSIB:** Modified Clinical test of Sensory Interaction in Balance

## DISCUSSION

This report aimed to share clinical assessments of a male patient with BCRL in addition to pre-existing PD. Results showed that kinesiophobia and affected functionality of upper extremities along with affected balance ability which showed itself as increased oscillations when visual input was inhibited on the unstable floor were evident.

Although there are a number of studies in which the relationship between cancer and Parkinson's was investigated, the results are contradictory. Tacik et al. (Tacik et al., 2016) pointed out that patients with Parkinson's have a lower risk of cancer compared to the general population. Fois et al. (Fois et al., 2009) reported a lower risk of cancer in patients with Parkinson's while Driver et al. (Driver et al., 2007) reported a lower risk of cancer in patients with Parkinson's who have a smoking history even in cancers related to smoking. (RR: 0.33, 95% CI: 0.12-0.92). Rugbjerg et al. (Rugbjerg et al., 2012) reported a risk ratio of 1.17 in patients with Parkinson's in which BC was studied. However, this rate was reported in patients with BC in the female gender, yet there is no report in which Parkinson's and BC were linked to male BC.

Obesity has been frequently an accentuated risk factor for male BC. Researchers reported a 2.63 to 5.45-fold increased risk for male BC in case of obesity (Humphries et al., 2015). Brinton et al. (Brinton et al., 2014) also highlighted obesity in which a 30% risk effect on increased male BC within 2400 males and 10 different cohorts were studied in their study. In our case, BMI was found to be 31.64 kg/m<sup>2</sup> and this rate is classified as level 1 obesity according to the classification of World Health Organization. In compliance with this result, the association between increased male BC and obesity might have played a role in our case, too.

When individuals with or without lymphedema were investigated, it was reported that patients with BCRL had a lower quality of life. It was stated that even existing lymphedema itself only is a major factor in the decreased quality of life (Lopez Penha et al., 2014). Yet, disease-specific quality of life was found to be good and moderate level, respectively. We think that this might be attributed to the grade of BCRL. In addition, the accumulation of swelling was mostly on the proximal area instead of the distal parts of the upper extremity in our case according to the circumferential measurement.

Questionnaire-based upper extremity functionality evaluation might be accepted as a limitation in our case. Quick-DASH is required to be scored for different upper extremity activities according to the difficulty level of patients in the last week. According to the circumferential measurement results of both upper extremities, there was no serious edema condition in the forearm, therefore, activity limitations might have originated from PD rather than BCRL. Not only lymphedema severity but also an existing diagnosis of PD may affect functionality and upper extremity functions should also be noted. Depression can be seen frequently in Parkinson's disease and affects patients in the range of 13 to 89% (Reijnders et al., 2008). Aesthetic concerns, social isolation, the effect of disease-related symptoms on daily life, and decreased functionality are associated with increased depression levels in the case of lymphedema (Ridner et al., 2012). Nonetheless, the depression level of our case was found as normal. Kinesiophobia is described as vulnerability and a feeling of fear of movement or painful injury or re-injury. A strong correlation is reported between kinesiophobia and daily life and activity performance (Vlaeyen & Linton, 2000). Karadibak et al. (Karadibak et al., 2008) reported a strong correlation between lymphedema severity and kinesiophobia in BCRL. It is well known that patients with PD have an avoidance behavior in movement, particularly with fear of falling. This manifested kinesiophobia might be an aggravation of the process of the disease along with restricting daily life activities and therefore social isolation (Robinson et al., 2005). In our case, a high level of kinesiophobia was found. This increased kinesiophobia level might be attributed to both BCRL and PD-related symptoms. Walking and balance problems are the major issues that affect the quality of life and disability in patients with PD. Contrary to movement restriction, Angin et al. (Angin et al., 2014) reported impaired postural balance patterns in patients with upper extremity lymphedema in comparison with healthy controls due to impaired body image and symmetry. In our case, the overall stability index, anterior-posterior index, and mediolateral index were found 0.6±0.42, 0.4±0.39, and 0.3±0.32, respectively. When sway indexes are taken into account in patients with PD according to Kurt et al.'s (Kurt et al., 2017) study (2.00±1.35), it can be said that balance is not affected majorly. Increased sway indexes in eyes closed foam surface can be explained by deteriorated proprioception feeling and kinesiophobia score. However, it can be concluded that the clinical characteristics of this case can influence the planned clinical applications

associated with lymphedema rehabilitation via choosing stable surface exercises in order to prevent potential falls.

As far as we know this is the first study that presents a male patient with a BCRL and Parkinson's. In our point of view, there are also limitations to our study. First, our case was referred to us due to having BCRL, therefore assessments were focused on BCRL. Specific evaluations on PD could not be done. On the other hand, some assessment parameters were based on questionnaires and patient-reported outcomes which are vulnerable to recall bias.

## CONCLUSION

This case report showed a deteriorated disease-specific quality of life, upper extremity functions, and evident kinesiophobia level in a male BC patient with BCRL and PD. Due to exercise acting as a milestone in lymphedema treatment, potential barriers should be carefully evaluated to manage symptoms not only for BCRL but also for PD.

## Conflict of interest

None.

## Author Contributions

Plan and desing: A.T,Y.B. Data collection: A.T,Y.B. Analysis and comments: A.T. Review and check: A.T,Y.B, Writing: AT.

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