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Shoulder Pain, Kinesiophobia, Emotional State and Muscle Strength in Breast Cancer Surgery Patients: A Cross-Sectional Study

Meme Kanser Cerrahisi Geçirmiş Hastalarda Omuz Ağrısı, Kinezyofobi, Emosyonel Durum ve Kas Gücü: Kesitsel Bir Çalışma

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Abstract

Aim: This study aims to evaluate shoulder pain, kinesiophobia, emotional state, and muscle strength in female patients who underwent unilateral breast cancer surgery and were using aromatase inhibitors, as well as to examine the relationships between these factors.

Materials and Methods: A total number of 50 patients were included in the study. Hand grip strength was assessed using a hand dynamometer, emotional state was evaluated with the Beck Depression Inventory, and fear of movement was assessed using the Tampa Scale for Kinesiophobia. A Beck Depression Inventory score of 10 or higher and a Tampa Scale for Kinesiophobia score of 37 or higher were considered significant.

Results: Among the patients, 60% had surgery on the right breast and 40% on the left breast. Shoulder pain was present in 62% of the patients. Kinesiophobia was detected in 74% of the patients, and moderate to severe depression was observed in 64%. The mean Tampa Scale for Kinesiophobia score was 42.86±8.81, and the mean Beck Depression Inventory score was 15.19±10.98. A statistically significant positive correlation was found between kinesiophobia and depression ($p=0.005$, $r=0.410$). In patients who underwent surgery on the left side, the right-hand grip strength was 22.16±5.00 kg, while the left-hand grip strength was 18.22±5.10 kg. A significant difference was found between the left and right-hand grip strengths in patients who had left-sided breast cancer surgery ($p<0.001$).

Conclusion: This study determined that the prevalence of shoulder pain, kinesiophobia, and depression is high during the follow-up period after breast cancer surgery. The increase in kinesiophobia severity with higher levels of depression highlights the importance of psychosocial factors in this patient group. Multidisciplinary treatment approaches may contribute to managing shoulder pain, kinesiophobia, and depression during the follow-up process.

Keywords: Breast cancer; muscle strength; emotional state

Öz

Amaç: Bu çalışmada; tek taraflı meme kanseri cerrahisi geçirmiş ve aromataz inhibitörü kullanan kadın hastalarda omuz ağrısı, kinezyofobi, emosyonel durum ve kas gücünün değerlendirilmesi ve bu faktörlerin birbirleriyle olan ilişkisinin incelenmesi amaçlanmıştır.

Gereç ve Yöntemler: Çalışmaya dahil edilen toplam 50 hastanın el kavrama kas kuvveti el dinamometresi, emosyonel durumu Beck Depresyon Ölçeği, hareket korkusu Tampa Kinezyofobi Ölçeği ile değerlendirildi. Beck Depresyon Ölçeği skoru 10, Tampa Kinezyofobi Ölçeği skoru 37 ve üzerinde olması anlamlı olarak kabul edildi.

Bulgular: Hastaların %60'ı sağ, %40'ı sol memeden cerrahi geçirmişti. Omuz ağrısı %62'sinde vardı. Hastaların %74'ünde kinezyofobi ve %64'ünde orta ve şiddetli düzeyde depresyon vardı. Tampa Kinezyofobi ölçek ortalaması 42,86±8,81 ve Beck depresyon ölçeği ortalaması 15,19±10,98 idi. Kinezyofobi ile depresyon arasında istatistiksel olarak pozitif anlamlı ilişki saptandı ($p=0.005$, $r=0.410$). Meme kanser cerrahisini sol taraftan geçirenlerde el kavrama gücü sağda 22,16±5,00 kg, solda 18,22±5,10 kg'dı. Meme kanseri nedeniyle sol taraftan cerrahi geçirenlerin sol ve sağ el kavrama gücünde anlamlı farklılık saptandı ($p<0.001$).

Sonuç: Bu çalışmada, meme kanseri cerrahisi sonrası takip sürecinde omuz ağrısı, kinezyofobi ve depresyon görülme sıklığının yüksek olduğu saptanmıştır. Depresyon düzeyi arttıkça kinezyofobi şiddetinin de artması, psikososyal faktörlerin bu hasta grubunda önemini vurgulamaktadır. Multidisipliner tedavi yaklaşımları, takip sürecinde omuz ağrısı, kinezyofobi ve depresyonun yönetimine katkı sağlayabilir.

Anahtar sözcükler: Meme kanseri; kas gücü; emosyonel durum

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INTRODUCTION

Breast cancer is the most common type of cancer in women worldwide. The general treatment approach includes surgery, systemic chemotherapy, local radiotherapy and endocrine therapy. Thanks to advances in early diagnosis and treatment methods, breast cancer mortality is decreasing and life expectancy is increasing. Life expectancy is five years or more in 90% of patients, but multidisciplinary treatment approaches including rehabilitation and psychogenic evaluation in the postoperative follow-up period are becoming increasingly important (1).

Increased life expectancy leads to frequent treatment-related complications. Neuromuscular, musculoskeletal, lymphovascular, and psychogenic problems are encountered, especially after breast cancer surgery (BSC) as a result of anatomical and functional disorders (2). Neuromuscular problems include post-mastectomy pain syndrome and phantom breast syndrome. In contrast, myofascial pain syndrome and adhesive capsulitis, characterized by shoulder pain and restriction of movement, are common among musculoskeletal problems. Lymphovascular dysfunctions include lymphoedema and axillary web syndrome. Women may also experience decreased strength, aerobic capacity, mobility, fatigue and cognitive dysfunction. Emotional and psychosocial changes include depression, anxiety, fatigue, body image concerns and sexual problems (3). Although these emotional disorders are common and pose a serious threat to women's physical and mental health, they have rarely received clinical attention and have been ineffectively managed (4).

Shoulder pain is a common postoperative problem in patients undergoing breast cancer surgery and significantly affects quality of life. In particular, treatments such as lymph node dissection and radiotherapy may cause shoulder motion limitation, muscle weakness and pain. In these patients, pain is usually concentrated on the operated side and limitations in shoulder range of motion restrict activities of daily living (5).

Kinesiophobia is the behaviour of avoiding movement for fear of increased pain. Studies on the frequency of kinesiophobia, especially in patients in the follow-up period after breast cancer surgery, and its effects on participation in physical activity are limited. Kinesiophobia may lead to a decrease in physical activity, and its importance becomes more critical when rehabilitation programs are organized in the follow-up period of patients with breast cancer (5,6).

Research on the frequency and interrelationships of kinesiophobia and other complications in the follow-up period is limited. Therefore, we aim to evaluate shoulder pain, kinesiophobia, emotional state, and muscle strength in female patients who have undergone breast cancer surgery and are in the follow-up period and to examine the relationship between these factors.

MATERIALS and METHODS

This cross-sectional descriptive study was performed between 2023 and 2024 with the approval of the local ethics committee (decision no: 503, date: 09.03.2022). The study included 50 female patients who underwent BCS and axillary lymph node dissection, completed basic oncological treatment, had no metastases and were using aromatase inhibitors.

Patients with a history of previous surgery/treatment/trauma on the ipsilateral/contralateral side, metastasis, chronic inflammatory, orthopaedic, neurological disease, cognitive and cognitive impairment, psychiatric treatment with a diagnosis of anxiety/depression, patients who did not speak Turkish and patients with communication disorders were excluded from the study.

Demographic information such as age, gender, educational status, body mass index, medical and surgical treatments, side of breast cancer surgery, whether they received radiotherapy and chemotherapy, and lymphedema were recorded from their files. Shoulder pain, muscle strength, emotional state and fear of movement were evaluated.

Evaluation Parameters

The presence of shoulder pain, which is the most common symptom in terms of pain in the locomotor system, was questioned. A goniometer measured the active ROM of both shoulders (operated and unoperated side). Flexion and abduction ROM were measured in the supine position, extension ROM was measured in the prone position, and internal and external rotation ROM were measured in the supine position with the shoulder in 90° abduction and elbow in 90° flexion. A difference of ≥20° between the non-operated side and the operated side was considered as limitation in ROM on the operated side(7).

Hand grip strength indicates upper extremity, respiratory muscles and general body muscle strength (8). Hand grip strength was measured by a physical medicine and rehabilitation specialist using a Jamar hand dynamometer (Baseline hydraulic hand dynamometer Irvington, NY, USA).

The measurements were performed with the elbow flexed 90 degrees and the forearm and wrist in the neutral position. The average result of the measurements performed three times in both hands was recorded in kilograms (kg) (9). In studies, 95% of people are reported to use the right hand as the dominant hand. In their study, İncel et al found that 88% of women used the right hand as the dominant hand (10,11). Sinaki et al found hand muscle strength to be 24.7±5,2 kg for the right hand and 23.2±5,0 kg for the left hand in healthy women in their study (12). Therefore, the dominant hand was accepted as right.

Kinesiophobia was assessed using the Tampa Kinesiophobia Scale (TKS). This scale is a self-report questionnaire developed by Miller, Kori, and Todd in 1991. The TKS consists of 17 items rated on a 4-point Likert-type scale. The total score that can be obtained from the scale varies between 17 and 68, and generally, scores of 37 and above indicate the presence of kinesiophobia in the clinical sense (13).

Emotional state was assessed with the Beck Depression Scale (BDS). The BDS is a self-report questionnaire developed by Aaron T. Beck in 1961 to assess the severity of depression. The total score obtained from BDS is between 0 and 63. The BDS value is determined as 0-9 minimal, 10-18 mild, 19-29 moderate depression, and 30-63 severe depression (14).

Statistical Method

Statistical analysis was performed with SPSS version 25.0 statistical package programme. Data were presented as mean and standard deviation, median and 25%-75% percentile for numerical parameters and as frequency and percentage for non-numerical parameters. Whether the numerical data showed normal distribution or not was analysed by Shapiro-Wilk test, Student's t-test was used for the variables showing normal distribution and Mann-Whitney U test was used for those not showing normal distribution. Comparisons of non-numerical data were analysed by chi-square test. Pearson or Spearman correlation tests were performed according to the normal distribution of the data to evaluate the relationship between the parameters. P<0.05 was considered statistically significant.

RESULTS

The mean age of the 50 female patients included in the study was 59.3 ± 11.2 years. 88% of the patients were housewives and 54% had secondary education. Sixty per cent of the patients (n:30) had undergone surgery in the right breast. (n:33) 66% had received chemotherapy and (n:44) 84% had received radiotherapy. Demographic data of the patients who underwent breast cancer surgery are shown in table 1 and clinical characteristics are shown in table 2.

Table 1. Demographic characteristics of patients with operable breast cancer

	n(%)
Occupation	
Housewife	44(88)
Officer	1(2)
Pensioner	5(10)
Education Status	
Illiterate	4(8)
Primary School	11(22)
Middle School	27(54)
Higher Education	8(16)
Body Mass Index(kg/m2)	
Normal	6(32)
Overweight	28(56)
Obese	6(12)
Surgical Side	
Right	30(60)
Left	20(40)
Chemotherapy	
None	17(34)
Yes	33(66)
Radiotherapy	
None	8(42)
Yes	42(84)

n: number of patient %: percentage

Shoulder pain (n:31) was present in 62%. The relationship between shoulder pain and Tampa kinesiophobia scale and Beck depression scale was statistically significant (p:0.042, p:0.038). There was no statistically significant relationship between shoulder pain and right and left hand muscle strength (p:0.250, p:0.183).

In the Tampa kinesiophobia scale evaluation (n:37), 74% of the patients had fear of movement. The mean score of the Tampa Kinesiophobia Scale was 42.9 ± 8.8. The mean Beck Depression Scale score was 15.2 ± 11.0 and 64% of the patients (n:32) had depression findings according to BDS. When the relationship between kinesiophobia and depression was evaluated, a statistically significant relationship and positive correlation was found between the scores of TKS and BDS (p=0.005, r=0.410).

Table 2. Clinical characteristics of patients with operable breast cancer

	n (%)
Lymphedema	
None	39 (78)
Present	11 (22)
Stage of Lymphedema	
Stage 1	7 (14)
Stage 2	3 (6)
Stage 3	1 (2)
Shoulder Pain	
None	19 (38)
Present	31 (62)
Shoulder Range of Motion Limitation	
None	42 (84)
Present	8 (16)
Tampa Kinesiophobia Scale	
≥37 scores	37 (74)
<37 scores	13 (26)
Beck Depression Scale	
Minimal	18 (36)
Mild	16 (32)
Moderate	8 (16)
Severe	8 (16)
	mean ± sd
In patients who underwent surgery on the right side	
Left hand muscle strength (kg)	17,78±6,12
Right hand muscle strength (kg)	18,50±7,30
In patients who underwent surgery on the left side	
Left hand muscle strength (kg)	18,22±10,00
Right hand muscle strength (kg)	22,16±5,00

Data are presented as n (%) and mean ± standard deviation (mean±sd)

The mean right hand grip muscle strength was 18.50±7,30 kg and the mean left hand grip muscle strength was 17.78±6,12 kg in patients who underwent surgery for cancer in the right breast. There was no statistically significant difference between right and left hand grip strength (p=0.772). Right hand grip strength was 22.16±5,00 kg and left hand grip strength was 18.22±5,10 kg in patients who underwent left breast surgery for cancer. The difference between right and left-hand grip strength in patients who underwent surgery on the left breast was statistically significant (p<0.001).

DISCUSSION

In our study, 62% of the patients who underwent BCS had shoulder pain and it was positively associated with kinesiophobia and depression. Kinesiophobia was detected in 74% of the patients. When their emotional status was evaluated, 64% had moderate to severe depression. Depression was positively correlated with kinesiophobia. When breast cancer surgery was evaluated according to the direction of surgery, the hand grip muscle strengths of patients operated on the right side were the same, while the right hand grip strength of patients operated on the left side was significantly higher than the left side.

Shoulder pain is a common symptom after breast cancer surgery. Feyzioğlu et al. found high rates of shoulder pain, dysfunction, and kinesiophobia in breast cancer patients in their study. They reported that kinect-based exercise programme provided improvement in all parameters(15)

In our study, the incidence and severity of kinesiophobia was high. Mosso et al. also found kinesiophobia in one of every three women who underwent breast cancer surgery. They reported that kinesiophobia decreased physical activity and quality of life (16). It has been emphasised that the thought of pain and fatigue increases kinesiophobia even more in oncology patients. In our study, depression rate and mean scores were found to be high. The rate of depression in patients with breast cancer is reported to be between 9% and 84.2% (17). In a study conducted in Africa, the prevalence of depression was found to be 45.6% in 2236 female breast cancer patients. Difficulties in the diagnosis and treatment process, loss of symbols of femininity due to breast surgery and deterioration in cosmetic structure may negatively affect the emotional state of women. This may lead to loss of self-confidence and social isolation. Depression may further increase the burden of disease in patients who have undergone breast cancer surgery (18). The positive correlation between depression and kinesiophobia once again emphasises the importance of psychosocial factors in patients undergoing BCS. Fear of movement increases in patients with negative mood and may lead to a vicious cycle. Sunar et al. also reported that the rate of depression was high in female patients during and after breast cancer surgery and depression increased

kinesiophobia (19). This situation leads to decreased muscle strength and impairment in functions and decreased quality of life. Especially when women's critical roles in family and social life are considered, it is reported that it may affect the current situation even more negatively. Depression in patients with breast cancer may often be accompanied by anxiety (18,19).

Hand grip strength is one of the most important components affecting upper extremity functionality, and grip is important for the continuity of daily life activities (4). When we evaluated surgically, there was no difference in right and left-hand grip muscle strength in patients who underwent surgery from the right breast, whereas left-hand muscle strength was lower in patients who underwent surgery from the left breast than the right.

There may be several reasons for this situation. The first may be that women in the community have to continue their activities at home and in their social lives after cancer surgery and use their dominant right upper extremity more actively. The results suggest that in patients who underwent left breast surgery, activities of the right dominant extremity continued while the left extremity was used less.

Grustat et al. reported that hand and finger motor skills were impaired after surgical and medical treatment in women who underwent BCS (20).In agreement with our study, Valenti et al. emphasised that arm movements on the operated side decreased during and after treatment in patients with breast cancer and the patient avoided physical activity for fear of re-injury (21).

Regular physical activity and exercise positively affect quality of life and survival rates in breast cancer patients during and after treatment. In particular, exercise interventions improve immune function, musculoskeletal performance, cardiorespiratory fitness, body awareness, cognitive and psychological status during and after breast cancer treatment (22). Therefore, improving mood and eliminating fear of movement becomes more important. Recent studies emphasise a multidisciplinary approach and personalised rehabilitation programmes to improve patients' quality of life after BCS (23). In a multidisciplinary approach, oncologists, surgeons, rehabilitation specialists, psychiatrists, endocrinologists and primary care physicians take part in joint evaluations and decisions. Rehabilitation approaches are important with cancer diagnosis and in the following period.

When planning rehabilitation programs, it is important to evaluate depression and kinesiophobia in patients who have undergone breast cancer surgery. The appropriate approach to depression and kinesiophobia identified according to the results of the evaluation will contribute positively to the success of the treatment.

The limitation of our study is that shoulder pain severity and lymphedema were not evaluated in detail.

CONCLUSION

In this study, it was found that the incidence of shoulder pain, kinesiophobia and depression was high in the follow-up period after breast cancer surgery. As the level of depression increases, the severity of kinesiophobia also increases, emphasising the importance of psychosocial factors in this patient group. Multidisciplinary treatment approaches may contribute to the management of shoulder pain, kinesiophobia and depression in the follow-up process. Our study shows that addressing depression and kinesiophobia may improve quality of life in patients who have undergone breast cancer surgery.

Author's Contribution

The authors declare no conflict of interest.

The authors disclose that no grants or support resources were used.

All authors declared their contribution to the study at all stages and approved the final version of the manuscript.

All authors declared that this manuscript has not been published before and is not currently being considered for publication elsewhere.

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