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ORIGINAL ARTICLE / ОРИГИНАЛНИ РАД

Effects of early rehabilitation treatment on the functional recovery and quality of life in patients three months after breast cancer surgery

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SUMMARY

Introduction/Objective Breast cancer surgery is associated with the risk of developing functional constraints that may negatively affect the quality of patients' lives.
The objective of the study was to determine the impact of early postoperative exercises three months after surgery on functional recovery and the quality of life of patients who were operated on.

Methods A group of 149 patients was tested, divided by the type of surgery into two groups. The assessment of the quality of life by the SF-36 questionnaire and functional testing were done three months after surgery; the extent of movement in the shoulder joint and of the limbs was measured as well.

Results On basic measurements of the quality of life, the average results of SF-36 showed the highest values in the domain of physical functioning, while the lowest value was in the vitality and energy domain. After the realized rehabilitation activities, the results of the SF-36 questionnaire indicated the increase in all domains and components at the significance level of $p = 0.001$, except for the general health domain ($p = 0.04$). Preoperatively, a moderate negative association of mobility and the SF-36 questionnaire component with the overall health parameter was determined, whereby the lower value of the SF-36 questionnaire was followed by a larger deviation in the flexion movements and abduction of the shoulder joint.

Conclusion The results of our study support the concept of early-initiated rehabilitation interventions and confirm the positive impact on the quality of life of patients operated on for breast cancer in the three-month follow-up period.

Keywords: breast cancer, surgery; quality of life; SF-36 questionnaire; early rehabilitation

INTRODUCTION

Breast cancer is one of the most common malignancies that affects both women in the world and in the territory of the Republic of Serbia and of the Autonomous Province of Vojvodina [1].

Despite its great prevalence and the increase in new cases, advances in early detection, therapy and follow-up modalities have made this group of patients one of the largest within the oncological population with a five-year survival period [2, 3].

Breast cancer is classified by the tumor, node, and metastasis (TNM) classification and the medical treatment requires a multidisciplinary approach – surgery, chemotherapy, hormonal, biological (immunotherapy), and most commonly combined treatment. Within medical modalities of breast cancer treatment there is a wide variety of treatments with similar and positive effects, but with differences in regards to their effects on the patient's quality of life (QoL) [4–7]. One of the most important aspects of breast cancer treatment is surgery. Its extent depends on the size and spread of the tumor, its mobility with regards to the underlying chest muscles, skin infiltration and the tumor breast size ratio. Although all surgical methods are invasive and can lead to soft tissue injury leading to scaring and contributing to the development of contractures of breast muscles and those located around the shoulder joint [4].

Dysfunction of the shoulder joint manifests itself as a decreased/limited movement range of the shoulder joint with decreased muscle strength often followed by pain and fatigue [4–8]. Facts of the available literature show that in most of the patients that underwent surgery there are one or two functional disorders. The limitation of the shoulder joint movement is one of the most common complications [9, 10, 11].

The early rehabilitation program after breast cancer surgery at the Institute for Oncology of Vojvodina in Sremska Kamenica promotes a multidisciplinary approach and all the interventions that we apply to the in- or outpatients are individualized in order to accommodate a new, changed need of our patients who had been operated on. The importance of range of motion exercises (ROM) in the prevention and preservation of shoulder function, including the improvement of synovial drainage and lymph flow by activating physiological

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mechanisms (trans-synovial pump), prompted early rehabilitation to start two days after surgery [12].

Personalized approach to patients is based on the evidence of previous research, whose results prove that individually adjusted exercise programs in patients recovering from breast cancer surgery increase movement range and muscle strength and can significantly improve the function of the shoulder joint without risk of lymphedema [12, 13].

The objective of this study is to estimate the effect of early rehabilitation on the QoL of patients that have undergone breast cancer surgery.

METHODS

Breast cancer patients who started oncology treatment with a surgical procedure at the Clinic in the March–November period of 2015 participated in this prospective, repeated trans-sectional, descriptive study. Participation in this research was on the voluntary basis. The patients were given and have signed an informed consent form. The exclusion criteria were the return of tumor, repeated surgery, use of chemotherapy before surgery, existence of contractures and/or lymphedema on the affected arm.

An early postoperative rehabilitation treatment consisted of active and/or assisted ROM exercises (five to six exercises) with repetition twice a day for 30 minutes under the supervision of a physiotherapist. The average number of days of hospitalization was six. Education on the early signs of secondary lymphoma (self-monitoring), introduction to preventable risk factors for the emergence of functional complications, and recommendations for the hygienic and dietary regime were carried out during the hospitalization.

The evaluation of the functional status included the measurement of both upper extremity movements and lymphedema screening. Lymphedema was determined by measuring the circumference of the affected arm in seven points and also measuring the contra-lateral side. The size of the lymphedema expressed as the ratio between the circumference of the healthy and the affected arm is calculated by the following formula: [(total diameter of the affected arm – total diameter of the affected arm) / total circumference of the healthy arm] × 100.

The evaluation of the ROM of an upper extremity was performed by using a goniometer, and the mobility of the shoulder joint in terms of flexion, extension, abduction; internal and external rotation were also measured.

The measurements were repeated on the last day of hospitalization (basal measurement), and again three months after patient discharge (follow-up). The validity of the functional estimation test was verified by five specialist clinical nurses and physiotherapists.

In order to determine the QoL, we used the Medical Outcomes Study Short Form Health Survey SF-36. It is a theoretically grounded and empirically tested operationalization of two health concepts – physical and mental health and their two manifestations: functioning and wellbeing [14].

The score registered in each domain of the questionnaire is transformed into standard values on a unified scale that has a theoretical minimum of 0, and a maximum of 100 points. Higher scores pointed to a better QoL.

This way of scoring enabled quantitative comparison of different manifestations of health within the domains that were measured by the questionnaire, and the interpretation of the total value expressed through the total health (TH) parameter and the differentiation of eight domains and two components. Domains of the SF-36 test are as follows: PF – physical functioning; RP – limitations according to physical difficulties; RE – limitations because of emotional difficulties; VT – vitality and energy; MH – emotional well-being; SF – social functioning; BP – pain; GH – general health perception; components of the SF-36 are the following: PCS – physical health; MCS – mental health.

The reliability of the short form of the SF-36 scale was analyzed by determining the Cronbach's alpha coefficient ($\alpha = 0.71–0.92$).

For statistical analysis, the sample was stratified with regards to the type of the surgical intervention (group 1 – mastectomy; group 2 – breast-conserving surgery). Data analysis estimated the effectiveness of the intervention after three months by using the Student's t-test and Leven test, while the correlation between the functional status, socio-demographic variables and the QoL was presented by using the Spearman's coefficient.

For analyzing the differences in frequency distribution, for attributive variables we used the nonparametric χ^2 test, Cronbach's alpha coefficient – to determine the reliability of the questionnaire in its entirety and its various subscales and components. All statistical data were entered into StatSoft software (Statistica 10.0, StatSoft Inc., Dell, Round Rock, TX, USA); for all inferential statistical analyses, significance was defined as $p \leq 0.05$.

The study protocol was approved by the Ethics Council of the Institute for Oncology of Vojvodina in Sremska Kamenica and by the Ethics Committee of the Faculty of Medicine, University of Novi Sad.

RESULTS

A total of 187 participants were enrolled into the research, and a certain number of patients did not come to the follow-up examination three months after surgery; some of the patients incorrectly filled out the questionnaires and were excluded from the study.

The final sample consisted out of 149 appropriately filled out questionnaires (response of 79.67%). The average age of the surveyed participants was 58 ± 13 years (min = 20; max = 80; median = 60). Mastectomy was performed in 67 patients, who were assigned to group 1, while patients in group 2, totaling 82, had breast-conserving surgery.

The patients were divided into two groups according to the type of surgery and did not show differences with regards to demographic variables (Table 1).

At the base QoL measurement, the average SF-36 scores showed that both groups of patients scored highest in the domain of physical functioning (group:1 57.46 ± 30.88 *vs.* group 2: 66.28 ± 25.88).

Table 1. Demographic and clinical characteristics of breast cancer patients

Variables	Total (n = 149) Mean ± SD	Group 1 (n = 67) Mean ± SD	Group 2 (n = 82) Mean ± SD	t/χ^2	p
Age		57.13 ± 13.720	58.34 ± 11.590	0.584*	0.56
Education levels				2.644**	0.61
Grade school	31 (20.3%)	15 (22.4%)	16 (18.5%)		
High school	82 (55.4%)	33 (49.3%)	49 (65%)		
Undergraduate	17 (11.5%)	10 (14.9%)	7 (8.6%)		
Graduate	19 (12.8%)	9 (13.4%)	10 (12.3%)		
Vocation				9.510**	0.14
Manual labourer	46 (16.9%)	23 (36%)	23 (28.4%)		
Office worker	41 (27.7%)	22 (32.8%)	19 (23.5%)		
Housewife	16 (10.8%)	7 (10.4%)	9 (11.1%)		
Retiree	45 (30.4%)	15 (22.4%)	30 (37%)		
Marital status				4.12**	0.39
Married	95 (63.8%)	39 (58.2%)	56 (68.3%)		
Divorced	31 (20.8%)	16 (23.9%)	15 (18.3%)		
Not married	9 (6%)	5 (7.5%)	4 (4.9%)		
Widow	14 (9.4%)	7 (0.4%)	7 (8.5%)		
Hobby				0.001**	0.93
No	105 (70.5%9	47 (70.1%9	58 (70.7%)		
Yes	44 (29.5%)	20 (29.9%)	24 (29.3%)		

*t-test;
**χ^2 test

Table 2. Baseline scores of the SF-36 questionnaire items among study groups

SF-36 domains	Baseline			t-test	
	Total (n = 149) Mean ± SD	Group 1 (n = 67) Mean ± SD	Group 2 (n = 82) Mean ± SD	t	p
PF	62.19 ± 28.54	57.46 ± 30.88	66.28 ± 25.88	-1.86	0.05
RP	46.19 ± 27.72	43.47 ± 28.02	48.39 ± 27.28	-1.08	0.28
RE	56.19 ± 27.39	51.24 ± 26.48	60.16 ± 27.46	-20	0.04
VT	39.52 ± 22.82	37.31 ± 21.89	41.23 ± 23.42	-1.04	0.29
MH	60.13 ± 21.62	57.53 ± 22.7	62.37 ± 20.47	-1.36	0.17
SF	52.95 ± 22.93	49.62 ± 23.53	55.64 ± 22.06	-1.6	0.11
BP	55.23 ± 27.58	50.37 ± 26.46	59.35 ± 27.83	-2	0.07
GH	50.23 ± 16.66	49.55 ± 17.6	50.97 ± 16.3	-0.51	0.60
TH	51.62 ± 17.51	48.6 ± 18.41	54.08 ± 16.44	-1.91	0.05
PCS	53.54 ± 18.68	50.21 ± 19.32	56.25 ± 17.79	-1.98	0.04
MCS	49.70 ± 18.16	46.98 ± 19.15	51.59 ± 17.1	-1.65	0.10

Group 1 – mastectomy; Group 2 – breast-conserving surgery; PF – physical functioning; RP – limitations due to physical difficulties; RE – limitations due to emotional difficulties; VT – vitality and energy; MH – emotional well-being; SF – social functioning; BP –pain; GH – general health perception; TH – total health; PCS – physical health; MCS – mental health

Table 3. Postoperative scores of the SF-36 questionnaire items among study groups

SF-36 domains	Follow-up			t-test	
	Total (n = 149)	Group 1 (n = 67)	Group 2 (n = 82)	t	p
PF	75.67 ± 21.45	73.25 ± 23.91	77.62 ± 19.16	-1.63	0.06
RP	64.27 ± 21.1	62.59 ± 21.44	65.62 ± 20.72	-1.08	0.28
RE	68.18 ± 22.16	64.80 ± 21.16	70.83 ± 22.61	-2	0.04
VT	57.81 ± 19.16	56.25 ± 18.59	59.22 ± 19.54	-0.94	0.06
MH	62.63 ± 20.18	58.80 ± 20.43	65.48 ± 19.62	-2.03	0.04
SF	70.27 ± 18.35	67.16 ± 18.82	72.71 ± 17.58	-1.85	0.05
BP	76.23 ± 20.46	73.28 ± 20.82	78.68 ± 19.84	-2	0.06
GH	51.79 ± 15.29	51.79 ± 15.06	51.58 ± 15.59	0.08	0.90
TH	65.37 ± 13.64	63.25 ± 14.33	67.07 ± 12.89	-1.7	0.09
PCS	66.99 ± 14.23	65.26 ± 15.1	68.38 ± 13.41	-1.32	0.18
MCS	63.71 ± 14.53	61.20 ± 14.75	65.76 ± 14.11	-1.92	0.05

Group 1 – mastectomy; Group 2 – breast-conserving surgery; PF – physical functioning; RP – limitations due to physical difficulties; RE – limitations due to emotional difficulties; VT – vitality and energy; MH – emotional well-being; SF – social functioning; BP –pain; GH – general health perception; TH – total health; PCS – physical health; MCS – mental health

The most common drop in scores was in the domains of vitality and energy (group 1: 37.31 ± 21.89 *vs*. group 2: 41.23 ± 23.42). Significant differences among the groups have been shown in physical functioning, limitation due to emotional difficulties, components of physical abnormalities, and overall health ($p \leq 0.05$) (Table 2).

Postoperative evaluation of the QoL three months after discharge and after performing rehabilitation activities at home pointed to an increased average scores of all components and domains of the SF-36 questionnaire for both groups (Table 3).

Significant differences were expressed in the limitation of emotional difficulties, emotional well-being, social functioning, and mental health components ($p \leq 0.05$).

The evaluation of SF-36 questionnaires using the Student's t-test for repeated measurements examined the differences in domains, the total parameter, and the components for the whole sample. A statistically significant difference existed in all the domains and questionnaire components ($p \leq 0.05$) (Table 4).

The results of functional testing by measuring the circumference of the movement indicated the greatest deviation for the abduction and flexion movements of the shoulder joint in both measurement periods without statistically significant differences among the groups (Table 5). The measurement of the extremities in both groups of patients did not show any deviation either before or after surgery, and the results are not shown.

By calculating correlations, we determined a mild negative connection between the lower score of mental health on the base measurement and the higher deviation in abduction and flexion of the shoulder joint in patients after mastectomy (ρ = -0.353, p = 0.01 *vs.* ρ = -0.368, p = 0.02), as well as in the group of patients with breast-conserving surgery (ρ = -0.338, p = 0.04 *vs.* ρ = -0.409, p = 0.02).

After three months, we did not detect a connection between the QoL and the functional status in group 1, while there was a mild negative connection in group 2, namely the greater the deviation in shoulder joint flexion – the lower the scores in the physical and mental health components and the TH of the SF-36 questionnaire (ρ = -0.333, p = 0.04; ρ = -0.324, p = 0.05; ρ = -0.323, p = 0.04) (Table 6).

Table 4. Differences in mean values of SF-36 scores between the baseline and follow-up measurements for the complete sample

SF-36 domains	Scoring Mean ± SD; n = 149			t	p
	Baseline	Follow-up	Difference		
PF	62.19 ± 28.54	75.67 ± 21.45	-13.47 ± 1.11	-12.11	0.001
RP	46.19 ± 27.72	64.27 ± 21.1	-18.07 ± 1.67	-10.78	0.001
RE	56.19 ± 27.39	68.18 ± 22.16	-11.96 ± 1.17	-10.16	0.001
VT	39.52 ± 22.82	57.81 ± 19.16	-18.41 ± 1.22	-15.08	0.001
MH	60.13 ± 21.62	62.63 ± 20.18	-2.28 ± 0.84	-2.68	0.001
SF	52.95 ± 22.93	70.27 ± 18.35	-17.28 ± 1.22	-14.12	0.001
BP	55.23 ± 27.58	76.23 ± 20.46	-20.93 ± 1.2	-17.36	0.001
GH	50.23 ± 16.66	51.79 ± 15.29	-1.34 ± 0.66	-2.02	0.04
TH	51.58 ± 17.56	65.37 ± 14.34	-13.78 ± 0.69	-19.77	0.001
PCS	53.46 ± 18.72	66.99 ± 14.22	-13.52 ± 0.75	-17.82	0.001
MCS	49.7 ± 18.21	63.74 ± 14.57	-14.01 ± 0.74	-18.82	0.001

Group 1 – mastectomy; Group 2 – breast-conserving surgery; PF – physical functioning; RP – limitations due to physical difficulties; RE – limitations due to emotional difficulties; VT – vitality and energy; MH – emotional well-being; SF – social functioning; BP –pain; GH – general health perception; TH – total health; PCS – physical health; MCS – mental health

Table 5. Descriptive indicators of average movement range grouped by the type of surgery

Type of movement	Baseline		Follow-up	
	Group 1 (n = 67) Mean ± SD	Group 2 (n = 82) Mean ± SD	Group 1 (n = 67) Mean ± SD	Group 2 (n = 82) Mean ± SD
Abduction	118.28 ± 8.41	119.45 ± 8.18	158.28 ± 8.46	159.45 ± 6.18
Flexion	118.43 ± 8.78	119.51 ± 8.26	158.43 ± 8.88	159.51 ± 6.26
Extension	25.4 ± 2.45	25.7 ± 1.91	39.4 ± 2.54	39.7 ± 1.81
Internal rotation	49.25 ± 3.16	49.63 ± 1.88	69.25 ± 3.04	69.63 ± 1.88
External rotation	69.18 ± 3.76	69.33 ± 2.85	79.18 ± 3.67	79.33 ± 2.65

Group 1 – mastectomy; Group 2 – breast-conserving surgery

Table 6. Correlation of the quality of life (total score of SF-36 components) and movement range in the shoulder joint

Type of surgery	Type of movement		Components of SF-36					
			Baseline			Follow-up		
			PCS	MCS	TH	PCS	MCS	TH
Mastectomy	Abduction	ρ	-0.17	-0.35	-0.26	-0.22	-0.26	-0.25
		p	0.30	0.03	0.12	0.18	0.12	0.14
	Flexion	ρ	-0.22	-0.36	-0.30	-0.27	-0.26	-0.28
		p	0.18	0.02	0.07	0.10	0.11	0.10
Breast-conserving surgery	Abduction	ρ	-0.25	-0.33	-0.27	-0.28	-0.26	-0.26
		p	0.12	0.04	0.10	0.09	0.10	0.12
	Flexion	ρ	-0.26	-0.40	-0.30	-0.33	-0.32	-0.33
		p	0.10	0.01	0.06	0.04	0.05	0.04

ρ – Spearman coefficient; PCS – physical health; MCS – mental health; TH – total health; p ≤ 0.05

DISCUSSION

A heterogeneous rehabilitation approach with specific rehabilitation interventions and different methodological approaches are described in numerous studies [5–10, 12, 13]. Most authors reported their positive influence on the QoL of those suffering from and being treated for breast cancer [15–24].

The advantages and disadvantages of rehabilitation in different times from the moment of diagnosing the disease, applying medical treatment, and during recovery period still cause confusion. Most authors have determined that active and/or assisted ROM started from one to three days after surgery compared to ROM started four days after surgery have more positive effects on shoulder flexion and abduction. The benefits of early-started exercises (24–72 hours after surgery) without increased risk from seroma and difficulties in treatment complications like postoperative pain and lymphedema are well documented [3, 6, 8, 10, 12]. The reason why we chose the early-start intervention program was the fact that ROM is a safe, efficient, and feasible intervention for breast cancer surgery patients which includes a reduction of pain, fatigue, and depression [3, 12, 15–18, 21, 22].

In our study by assessing the QoL at base point we detected distinctly low levels of vitality and energy. A total of 105 (70.5%) patients reported that they were unsettled throughout the last four weeks and more than 50% of them were discouraged and depressed. Such data did not differ significantly depending on the type of planned surgical intervention. Strong emotional reactions such as fear, uneasiness, sadness, and uncertainty with regards to possible outcomes have been described in other studies [5–8].

By analyzing the responses within the limitation domain according to physical difficulties, we noticed that more than 50% of the patients had avoided or had not realized their usual activities mostly related to housework (ironing, vacuuming, meal preparation, etc.) out of fear of potential postoperative complications. Consequently, patients who displayed such behavior reported more limitations regarding the type of job and activity and spent less time working.

In our study, effects of the early rehabilitation program three months after surgery point to an increase in average summation scores in all domains and components in both patient groups. These results are also supported by studies done in Denmark, Poland, and Spain [2, 17, 19, 20, 25].

The greatest difference (-20.93 ± 1.2) in favor of the repeated measurement was

detected in the domain of pain, without any difference according to the type of surgical procedure. In comparison with the results of our study, many other papers point out that after fatigue, pain is the most commonly reported symptom, presented in about 27–79% of women in the first months after surgery [3–11]. It would be expected that prevalence rate has to decrease with the process of healing, but a systemic review of about 30 studies undertaken by Wang et al. [26] shows that 12–82% of women report pain even one year after surgery.

High scores in the BP domain three months after surgery in our study pointed to the fact that both patient groups three months after surgery have had fewer limitations induced by body pain. Such results of our research can be explained by regular post-surgical recovery and the effects of rehabilitation. Among the patients from our study there were no early or late post-operative complications. Standard personalized physiotherapeutic approach in guiding and controlling pain after a surgical intervention of breast cancer encompasses a spectrum of exercises, myofascial stretching, non-pharmacological methods and educating patients so that they can identify positions and activities that could relieve pain. The personalized approach makes sure that planned therapeutic exercises are carried out up to the individually determined pain and discomfort limits. On the repeated measurement, the patients reported that daily exercises supervised by physiotherapists and nurses helped them eliminate fear and increase knowledge regarding the healing process and allow them the use of the affected arm at home. Such accounts of our patients support the findings of other authors who claim that appropriate pain guidance in the early stages of breast cancer treatment is necessary in the prevention of the long-term-related pain invalidity [3, 4, 17, 21, 22].

After surgery, a significant increase has been reported in the domains of emotional difficulties, emotional well-being, social functioning, and mental health components in both groups.

Significant differences regarding the type of surgery indicate that the patients from group 1 were less depressed and/or discouraged than those in group 2 ($\chi^2 = 10.56$; df = 2; p = 0.03). They indicated that due to the physical or mental problems they neglected their usual social activities with family and friends ($\chi^2 = 8.50$; df = 2; p = 0.03).

Unlike ours, the results of the study by M. Kamińska et al. [27] indicate that the level of depression and anxiety is more pronounced in the patient group after mastectomy.

Before the admission, all the patients from our study received recommendations for continuing the exercise program in home conditions, with education aimed at preventing possible complications. We cannot say with certainty that all the patients adhered to the given recommendations when exercising at home, but the results of the functional assessment of the mobility of the shoulder joint indicated that they did. However, shoulder joint flexion and abduction of the affected arm showed the greatest deviation from the normal motion range during the first three months, which matches the results of other researches [4, 6, 8, 13, 22, 25]. Additionally, the patients achieved high scores in the domain of physical functioning. Reported discrepancies in the motility of the shoulder joint of the affected arm, compared to the other one, do not have a negative effect on physical functioning and independence in daily life activities.

Furthermore, our research shows that there is a mild negative connection between the MCS component and shoulder motility in the affected arm in both groups of patients during base measurement. We did not find any connection between the QoL and functional status in group 1 after three months. In group 2 there was a moderate negative connection. As the patients had higher deviations in the flexion movement of the shoulder joint, lower scores on PCS and MCS components and TH ensued ($\rho = -0.333$, $p = 0.04$; $\rho = -0.324$, $p = 0.05$; $\rho = -0.323$, $p = 0.04$, respectively).

The influence of social and demographic variables of the respondents on the QoL in our study manifested only in the case of age and existence of a hobby. Namely, as the age of the patients increases and if they had a hobby, the limitations caused by emotional difficulties decreased ($\rho = -0.311$, $p = 0.001$; $t = 4.47$; $p = 0.001$) regardless to the type of surgery.

Regarding TH and physical functioning, the QoL was similar between the women in the early post-operative period after mastectomy and those who underwent breast-conserving surgery.

CONCLUSION

Early rehabilitation contributes to the functional recovery of the affected arm while promoting independence in daily life activities and increases the QoL. The findings of our study have shown that the early rehabilitation program did not influence the risk and incidence of early and/or late complications caused by breast cancer surgery.

Conflict of interest: None declared.

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Ефекти раног рехабилитационог третмана на функционални опоравак и квалитет живота болесника три месеца после операције карцинома дојке

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САЖЕТАК

Увод/Циљ Хируршке интервенције карцинома дојке повезане су са ризиком развоја функционалних ограничења која могу негативно утицати на квалитет живота оперисаних. Циљ студије био је да се утврди утицај раног рехабилитационог третмана на функционални опоравак и квалитет живота оперисаних болесница три месеца после операције карцинома дојке.

Методе Испитивану групу чинило је 149 болесница, подељених према врсти хируршке интервенције у две групе. Процена квалитета живота извршена је упитником *SF*-36, а функционалним тестирањем мерен је обим покрета у раменом зглобу и обим екстремитета пре и три месеца после операције.

Резултати На базном мерењу квалитета живота, просечни резултати упитника *SF*-36 показали су највеће вредности у домену физичког функционисања, а најнижу вредност имао је домен виталности и енергије. После реализованих рехабилитационих активности резултати упитника *SF*-36 указују на пораст свих домена и компонената на нивоу значајности од $p = 0,001$, осим домена општег здравља ($p = 0,04$). Преоперативно је утврђена умерена негативна повезаност покретљивости и компонената упитника *SF*-36 са параметром укупног здравља, при чему ниже вредности упитника *SF*-36 прати веће одступање у покретима флексије и абдукције раменог зглоба.

Закључак Резултати наше студије подржавају концепт рано започетих рехабилитационих интервенција и потврђују њихов позитиван утицај на квалитет живота оперисаних због карцинома дојке у тромесечном периоду праћења.

Кључне речи: карцином дојке, хирургија; квалитет живота; упитник *SF*-36; рана рехабилитација