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Comparison of the quality of life of women with breast cancer after mastectomy and after breast-conserving therapy: prospective observational study

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ABSTRACT

Introduction. Breast cancer is the most common malignancy in women in developed countries. Treatment of this disease affects the quality of life of patients. Quality of life is an ambiguous concept, which refers to the state of health, severity of symptoms, and implemented treatment. It is also linked to meeting individual needs of each person.
Aim. The aim of the study was to assess the quality of life of breast cancer patients according to the type of previous surgery.
Material and Methods. The study was conducted prospectively. The study population included 101 women with breast cancer after surgical treatment in the period from October 2012 to October 2014 (51 cases after mastectomy, the remaining ones after breast-conserving therapy). Standard questionnaires EORTC QLQ-C30 and QLQ-BR23 were used to assess the quality of life (assessment on the day of admission to the department, two months and one year after surgery).
Results. The analysis of QLQ-C30 revealed no statistically significant differences between the compared groups of patients. Regarding the analysis of QLQ-BR23, statistically significant differences related to the assessment of the patient's own body and life perspectives, evaluation of sexual feelings and social roles (they were not found in the evaluation of sexual functioning, undesirable effects of treatment or symptoms associated with the affected breast).
Conclusions. Regardless of the type of surgery performed, breast cancer patients require similar psychological actions supporting their possibility of adapting to the new situation and dealing with negative effects of surgical treatment.

Keywords: breast cancer, quality of life, mastectomy, breast-conserving therapy, QLQ-C30 questionnaire, QLQ-BR23 questionnaire.

Introduction

Quality of life is associated with physical, mental, and social well-being. It is also related to satisfaction with daily functioning [1].

A neoplastic disease may cause numerous unfavorable changes in the daily functioning of patients, thus decreasing their quality of life [2]. The diagnosis of cancer also interferes with patient's social function-

ing; withdrawal mechanisms are activated, followed by limited interpersonal contacts, reduced willingness to take social activity and impaired functioning in social groups [3, 4].

One of the oldest and the largest research groups involved in the standardization of questionnaires to assess the quality of life is the European Organization for Research and Treatment of Cancer (EORTC). The EORTC QLQ-C30 questionnaire is a basic tool for measuring the quality of life of cancer patients regardless of the type, form and location of the primary tumor [5]. The questionnaire includes modules for various diseases. The module for breast cancer consists of 23 questions (QLQ-BR23).

Aim

The aim of the study was to assess the quality of life of breast cancer patients according to the type of prior surgery.

Material and Methods

The study was conducted prospectively, on the basis of the consent of the Bioethics Committee of CM UMK KB 226/2011, in the period from October 2012 to October 2014.

The study population included 101 consecutive women with breast cancer scheduled for surgery at the Clinical Department of Breast Cancer and Reconstructive Surgery in Bydgoszcz; 51 patients underwent mastectomy (AMP group), whereas 50 women received breast-conserving therapy (BCT group).

Standard questionnaires EORTC QLQ-C30 and QLQ-BR23 were used to assess the quality of life in both study groups (the version translated by the Institute of Oncology in Warsaw). Assessment of the quality of life using QLQ-C30 and QLQ-BR23 was performed three times (on admission of patients to the Department, two months after surgery, and one year after surgery).

Procedures

Assessment of the quality of life using QLQ-C30 and QLQ-BR23 was performed three times.

- Exam I – on the day before the surgical procedure, the point of this exam was to show QLQ before surgery,
- Exam II – two months after the surgical procedure; adjuvant treatment had been initiated by that time, the point of this exam was to show QLQ during adjuvant treatment,
- Exam III – one year after the surgical procedure, all patient had finished adjuvant treatment, excluding those with hormone therapy, point of this exam was to show QLQ after adjuvant.

Patient inclusion criteria were as follows:

- provision of an informed consent to participate in a research study,
- patient age between 25 and 70 years.

Patient exclusion criteria were as follows:

- the necessity to radicalize the treatment while in the study (i.e. to perform mastectomy in a patient following previous breast conservation therapy),
- breast reconstruction surgery while in the study.

The statistic package PQStat ver. 1.4.2.324 was used for a detailed analysis of the results. Results of the analyzed parameters of the quality of life were compared between the two study groups (AMP and BCT) using the Mann-Whitney U test. The Friedman test and the post-hoc Dunn's test were used for the evaluation of the results obtained at the subsequent time points (I, II, III) in each study group. The choice of nonparametric methods of data analysis was preceded by checking the normality of distribution using the Shapiro-Wilk test and the Levene's test for homogeneity of variances.

Test probability was statistically significant at $P < 0.05$, and highly significant at $P < 0.01$.

Results

A total of 101 women were included in the analysis: 50 (49,9%) underwent BCT, 51 underwent MAS (50,1%).

The sociodemographic and clinical characteristics of the operated groups are summarized in **Table 1**. Patients who underwent BCT were older than those who underwent MAS, but there were no statistical differences ($p = 0,8913$). There were no statistical differences with regard to menopausal status and BMI (body mass index). More patients in MAS group had an axillary dissection, than those who underwent BCT. More patients in the MAS group had an advanced stage of cancer than those in BCT ($p < 0,001$). Neoadjuvant chemotherapy was preformed in 23,5% patient in MAS group. All study patients were subjected to post-operative treatment. The most common type of adjuvant treatment in both the MAS and the BCT group included combination of CHTH and RTH. More patient in MAS group had an advanced stage of cancer ($p < 0,001$).

Table 2 shows the scales of functioning in MAS and BCT groups and relationship between the groups at the subsequent time points on the basis of the EORTC

Table 1. Description of study population by age, menopause status, type of axillary operation, neoadjuvant and adjuvant therapy, stage of disease

Characteristics	MAS (n = 51)	BCT (n = 50)	P value
Age, mean year (SD)	54.0 (7.91)	55.2 (9.3)	0.405
BMI (SD)	27.26 (5.5)	26.92 (4.9)	0.8785
Menopause, n(%)			
– Yes	33 (64.7)	33 (66.0)	
– No	18 (35.3)	17 (34.0)	0.8913
Type of axillary operation, n(%)			
– No operation	0 (0)	0 (0)	
– Sentinel lymph node biopsy	32 (62.0)	18 (32.3)	
– Axillary dissection	32 (67.7)	19 (38.0)	< 0.001
Neoadjuvant therapy, n(%)			
– CHTH	12 (23,5)	0 (0)	
– RTH	(0)	0 (0)	
– HTH	(0)	0 (0)	< 0.001
Adjuvant therapy, n(%)			
– CHTH. RTH	27 (52.9)	28 (56.0)	
– CHTH	14 (27.4)	0 (0)	
– RTH	3 (5.9)	21 (42.0)	
– HTH	7 (13.7)	1 (2.0)	< 0.001
Stage of disease, n(%)			
– I A	14 (27)	38 (76)	
– II A	17 (33)	12 (24)	
– II B	11 (21.5)	0 (0)	
– III A	5 (9.8)	0 (0)	
– III B	4 (7.8)	0 (0)	< 0.001

BCT – group treated by breast conserving therapy, MAS – group treated by mastectomy, BMI – body mass index, CHTH – chemotherapy, RTH – radiotherapy, HTH – hormone therapy.

Table 2. Scales of functioning in MAS and BCT groups and relationship between the groups at the subsequent time points on the basis of the EORTC QLQ-C30

QLQ-C30 scales of functioning	MAS (n = 51)				BCT (n = 50)				Mann--Whitney U test
	Arithmetic mean				Arithmetic mean				
	I	II	III	Test F	I	II	III	Test F	
Physical functioning	82.48	81.05	83.79	p > 0.05	82.53	84.80	80.13	p > 0.05	I 0.8812 II 0.1074 III 0.1038
Role functioning	89.00	84.67	80.33	p < 0.001	92.16	82.35	90.20	p < 0.05	I 0.8147 II 0.6176 III 0.0016
Cognitive functioning	84.31	80.72	80.72	p > 0.05	84.00	83.67	81.33	p > 0.05	I 0.7937 II 0.5144 III 0.7316
Emotional functioning	68.30	67.81	61.60	p > 0.05	65.17	63.78	77.67	p < 0.05	I 0.6200 II 0.3503 III 0.0001
Social functioning	89.87	79.74	81.05	p > 0.05	85.00	78.67	76.33	p > 0.05	I 0.0241 II 0.6224 III 0.8068
Overall quality of life	59.31	52.61	59.31	p > 0.05	60.17	58.00	59.33	p > 0.05	I 0.1638 II 0.6369 III 0.3331

EORTC QLQ C-30 – European Organization for Research and Treatment of Cancer Quality of Live Questionnaire Core 30, BCT – group treated by breast conserving therapy, MAS – group treated by mastectomy, Test F – the Friedman Test.

QLQ-C30. The assessment included results obtained for MAS and BCT groups at each measurement time point. In the scale of the overall quality of life as well as physical and social functioning, comparison of the results showed no statistically significant differences ($p > 0.05$). The assessment of roles functioning showed statistically significant differences. Patients in the MAS group had highly significant worse scores than patients in the BCT group in III examination ($p = 0.0016$). There was also statistically significant

difference in MAS group in functioning roles between each examination (p = 0,0016). In BCT group QLQ in functioning roles decreased between I and II examination p < 0,05) but one year after surgery increased (BCT, III = 90.20). With regard to emotional functioning patient in MAS group had worse scores than patient in the BCT in III examinations (p = 0.0001). There was also statistically significant difference in BCT group in emotional functioning between II and III examination (p < 0,05) it means that QLQ in emotional functioning increased in that time.

Table 3 shows evaluation of the symptoms related to the treatment of breast cancer in MAS and BCT groups. and the relationship between the groups at the subsequent time points on the basis of the EORTC QLQ-C30. Evaluation of nausea and vomiting at I study time points revealed statistically significant differences between the results in both study groups. The MAS group has more symptoms nausea and vomiting than BCT (p = 0.038). The results of subjective assessment of insomnia in the period before surgery were significantly different, in the BCT group, sleep disorders were more severe (p = 0.0241). Evaluation of pain showed significantly difference in III examination, in the BCT group pain was more common (p = 0,0120). In the scale of fatique, dyspnoea, loss of appetite, constipation, diarrhea and financial difficulty, comparison of the results showed no statistically significant differences (p > 0.05).

Results obtained using EORTC BR-23 scale in both groups are shown in **Table 4**. When evaluating the quality of life in terms of sexual functioning, undesirable effects of treatment, and symptoms related to the affected breast, there were no statistically significant differences between the compared groups of patients in each examinations. Statistically significant differences were demonstrated for the body image patient in MAS group had significantly worse results than those who underwent BCT (p = 0.0352). Sexual enjoyment was higher in III examination in MAS group was higher than in BCT group p = 0.0104). Complaining of arm symptoms was in I examination higher in the MAS group than in BCT group (p = 0.0045).

Table 3. Evaluation of the symptoms related to the treatment of breast cancer in MAS and BCT groups and the relationship between the groups at the subsequent time points on the basis of the EORTC QLQ-C30

QLQ-C30 scales of symptoms	MAS (n = 51)				BCT (n = 50)				Mann--Whitney U test
	Arithmetic mean				Arithmetic mean				
	I	II	III	Test F	I	II	III	Test F	
Fatigue	27.02	27.67	27.02	p > 0.05	26.44	24.67	26.89	p > 0.05	I 0.8893 II 0.2306 III 0.9162
Nausea and vomiting	6.86	10.78	2.61	p < 0.05	0.67	2.67	1.56	p > 0.05	I 0.0380 II 0.0692 III 0.8126
Pain	17.97	18.63	14.71	p > 0.05	18.00	17.00	22.67	p > 0.05	I 0.9404 II 0.3263 III 0.0120
Dyspnoea	9.80	12.42	10.46	p > 0.05	12.00	9.33	15.33	p > 0.05	I 0.5799 II 0.7062 III 0.3791
Insomnia	25.49	32.68	35.95	p > 0.05	40.00	32.00	32.67	p > 0.05	I 0.0241 II 0.6224 III 0.8068
Loss of appetite	8.50	11.11	9.15	p > 0.05	10.67	10.00	12.00	p > 0.05	I 0.8016 II 0.7806 III 0.5799
Constipation	17.65	16.99	20.26	p > 0.05	12.67	14.00	18.00	p > 0.05	I 0.2771 II 0.2817 III 0.4715
Diarrhea	5.88	6.54	4.58	p > 0.05	4.00	6.67	6.67	p > 0.05	I 0.4407 II 0.9081 III 0.5892
Financial difficulty	21.57	23.53	22.88	p > 0.05	26.67	26.67	31.33	p > 0.05	I 0.8919 II 0.5254 III 0.0961

EORTC QLQ C-30 – European Organization for Research and Treatment of Cancer Quality of Live Questionnaire Core 30, BCT – group treated by breast conserving therapy, MAS – group treated by mastectomy, Test F – the Friedman Test.

Table 4. Evaluation of the quality of life based on the EORTC QLQ-BR23 in MAS and BCT groups at the subsequent study time points

Assessment with QLQ-BR23 scale	MAS (n = 51)				BCT (n = 50)				Mann--Whitney U test
	Arithmetic mean			Test F	Arithmetic mean			Test F	
	I	II	III		I	II	III		
Body image	1.53	1.57	1.61	p > 0.05	1.44	1.59	1.40	p > 0.05	I 0.2468 II 0.9756 III 0.0352
Sexual functioning	1.52	1.51	1.62	p > 0.05	1.61	1.50	1.58	p > 0.05	I 0.3556 II 0.8678 III 0.9108
Sexual enjoyment	2.75	2.35	2.63	p > 0.05	2.28	2.45	2.04	p > 0.05	I 0.1407 II 0.7313 III 0.0104
Future perspectives	2.84	2.67	3.00	p > 0.05	2.86	3.04	2.42	p < 0.05	I 0.9810 II 0.1024 III 0.0072
Therapy side effects	1.47	1.50	1.56	p > 0.05	1.44	1.42	1.55	p > 0.05	I 0.7885 II 0.1414 III 0.6564
Breast symptoms	1.47	1.60	1.46	p > 0.05	1.34	1.45	1.53	p > 0.05	I 0.2151 II 0.2189 III 0.2567
Arm symptoms	1.46	1.49	1.61	p > 0.05	1.15	1.35	1.39	p > 0.05	I 0.0045 II 0.2127 III 0.0625

EORTC QLQ-BR23 – European Organization for Research and Treatment of Cancer Quality of Live Questionnaire breast cancer-specific modules, BCT – group treated by breast conserving therapy, MAS – group treated by mastectomy, Test F – the Friedman Test.

Discussion

In this study standardize questionnaire (QLQ-C30 and QLQ-BR23) were used to compare the quality of life of breast cancer patients according to the type of previous surgery (total mastectomy vs breast conserving-therapy). The same patient was examined three times (before surgery, 2 month after surgery an one year after surgery). In our study, the overall assessment of the quality of life of patients did not change during the whole study period. Results obtained in our study in this scale ranged from 52.61 to 60.17 points (out of 100 points maximum), and were consistent with the values reported by Ganz et al. [6]. Studies carried out by other authors have demonstrated that the stress related to the treatment process can last up to two years after surgery [7, 8].

Our results showed that some very specific benefits of BCT, such a better body image, better roles functioning, and emotional functioning are visible during one year after surgery. There is a lot of studies focused on the quality of life of women with breast cancer [9]

In our study, there were no statistically significant changes in the overall quality of life as well as physical, cognitive and social functioning of the analyzed subjects, which could indicate an improvement or deterioration of the quality of life of patients throughout the study period, and this has been shown in a number of previous studies [11, 12]. In our study showed that women who underwent MAS had worse scores in social roles and emotional functioning one year after surgery. Similar results for this assessment were obtained in previous study [11]. Symptoms scale in our study showed that patient who underwent MAS had more symptoms nausea and vomiting in first examination that BCT patient. It is strictly connected with neoadjuvant hemotherapy. In other symptoms (fatigue, dyspnea, loss of appetite, constipation, diarrhea or financial problems) no statistically difference were found. However, a common upward trend for the worsening of symptoms was observed in both groups, especially between II and III examination. Similar results, suggesting an increase in the severity of symptoms assessed using the QLQ-C30 were obtained by Arora et al. [12] Evaluation of nausea and vomiting at I study time points revealed statistically significant differences between the results in both study groups. The MAS group had more symptoms nausea and vomiting than BCT. It had connection with adjuvant chemotherapy. Nausea and vomiting are basics side effect of chemotherapy [13].

Analysis of EORTC QLQ-BR23 questionnaire showed that women who underwent MAS had worse

body image than women with underwent BCT. Similar conclusions can be drawn from the other studies [14, 15]. The studies by Ganz et al. showed no differences in the mental functioning of women treated with mastectomy or BCT during the first year after surgery [10].

Statistically significant differences in the assessment of sexual pleasure (a year after surgery) were observed in the analyzed group of patients. More favorable study results concerning sexual satisfaction were obtained in patients after mastectomy. It is worth noting that only sexually active women answered the questions about sexual pleasure. It was observed that questions about this particular sphere of life, especially in women over 60 years old, were frequently omitted in the study. Similar observations were presented in other studies [16].

The treatment of neoplastic disease may also result in financial problems, as well as the feeling of being an incompetent family member. Severity of these changes is related to the age and social function performed by the patient [17].

As it has been shown in studies by Wrońska et al., support provided by the members of the immediate family results in the fact that a significant number of patients requiring mastectomy do not experience the feeling of rejection or isolation [18]. Similar results were presented by Trojanowski et al. [18] and Zanapalıoğlu Y et al. [19], who demonstrated that mastectomy did not result in the deterioration of family relations.

This study is prospective study and has a limitation in QLQ evaluation, there was statistically significant difference between adjuvant therapy in study group. In our study we didn't compare difference between adjuvant therapy and degree of lymph node dissection and the results of QLQ. Other authors noted that both chemotherapy and other methods of antitumor therapy reduced the assessed quality of life of patients [20]. The observation term was one year after surgery. It was stressful time for examined patient. Studies carried out by other authors have demonstrated that the stress related to the treatment process can last up to two years after surgery [21]. Other study demonstrated that higher scores of the overall quality of life in women after BCT were statistically significant five years after surgery [22]. The use of quality of life assessments in breast cancer patients has an significant role as a risk for treatment outcome and prognosis [23–25].

Our study suggest that breast cancer patients who underwent BCT experienced more positive outcomes in roles functioning, emotional functioning, body image. Patient who underwent mastectomy had better results with sexual functioning. Our study findings also that intense physical therapy and psychological intervention is required both in patients who underwent breast conserving therapy and mastectomy. Diagnosed breast cancer, regardless of the type of surgery, resulted in similar changes regarding the evaluation of the quality of life by patients. Perhaps, the phenomenon of "a half-woman complex", attributed to mastectomy as a kind of mental disability, also applies to women receiving breast-conserving therapy.

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Conflict of interest statement
The authors declare no conflict of interest.

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