

Postoperative Sense of Well-Being and Quality of Life in Breast Cancer Patients Do not Depend on Type of Primary Surgery

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Key Words

Breast cancer · Quality of life · SF-12 · MDBF ·
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Summary

Background: In primary breast cancer, breast conserving surgery and mastectomy are equal options with regard to patient survival. We therefore investigated whether and how the type of surgery has impact on the patients' quality of life (QoL) in order to support individualized surgical concepts in treatment of breast cancer. 3 types of surgery are compared: breast-conserving surgery; modified radical mastectomy with or without primary reconstruction. **Patients and Methods:** 91 out of 114 consecutive patients diagnosed with histologically confirmed primary breast cancer agreed to answer the QoL questionnaires within the first 2 years of their follow-up care. 2 recognized questionnaires on sense of well-being and QoL were used: Multidimensional Mood Questionnaire and QoL SF-12. **Results:** No significant correlation between sense of well-being and type of operation or tumor stage was found. With regard to health-related QoL, we saw no significant correlation with type of surgery. However, low tumor stage was significantly correlated with better physical ($p = 0.012$) but not psychological well-being. **Conclusion:** Within the first 2 years after primary surgery for breast cancer, we did not find significant differences in sense of well-being or QoL dependent on type of surgery.

Schlüsselwörter

Mammakarzinom · Lebensqualität · SF-12 · MDBF ·
Mastektomie · Brusterhaltende Operation

Zusammenfassung

Hintergrund: Bei der Therapie des primären Mammakarzinoms sind sowohl die brusterhaltende Operation als auch die Mastektomie gleichwertige Optionen in Bezug auf das Gesamtüberleben. Folglich entstand die Frage, ob und wie der Operationsmodus Einfluss auf die Lebensqualität (QoL) hat. Es wurden 3 Operationstypen miteinander verglichen: die brusterhaltende Therapie; modifiziert radikale Mastektomie mit und ohne primäre Aufbauplastik. **Patienten und Methoden:** 91 von 114 befragten Patientinnen mit primärem Mammakarzinom beantworteten die Fragebögen innerhalb der ersten 2 Jahre ihrer Nachsorge. 2 anerkannte Fragebögen zum Wohlbefinden und QoL wurden eingesetzt: der Mehrdimensionale Befindlichkeitsbogen und der QoL SF-12. **Ergebnisse:** Es fand sich keine signifikante Korrelation zwischen dem Wohlbefinden und dem Operationsmodus oder dem Tumorstadium. Hinsichtlich der health-related QoL sahen wir keine signifikanten Zusammenhänge zum Operationstyp. Jedoch korreliert ein niedriges Tumorstadium signifikant mit dem physischen ($p = 0,012$), nicht jedoch mit dem psychischen Wohlbefinden. **Schlussfolgerung:** Innerhalb der ersten 2 Jahre nach primärer Operation eines Mammakarzinoms fanden sich keine signifikanten Unterschiede im Wohlbefinden und der QoL in Abhängigkeit vom Operationsmodus.

Introduction

In primary breast cancer, breast conserving surgery (BCS) and mastectomy are equal options with regard to patient survival. The long-term survival rate among women who undergo BCS is the same as that among women who undergo radical mastectomy [1–3]. However, taking into account tumor stage, tumor multicentricity, and also sometimes social factors, mastectomies are indicated. With respect to quality of life (QoL) and psychosocial well-being, one would assume that they tend to be lower the more radical the operation is. In recent years, numerous studies have been carried out comparing BCS with modified radical mastectomy (MRM) regarding resulting QoL and sense of well-being [4–10]. However, several authors have shown that with respect to emotional well-being and general QoL there were no significant differences between the 2 surgical approaches [4–10]. Yet, other authors found that excision of the total mammary gland is associated with frequent changes in mood and with a negative sense and image of the body [11, 12]. Moreover, reports have shown that the body image in patients after BCS is more positive than that in a comparable collective after mastectomy [13, 14].

As an oncologically valid option which is also intended to support patients both physically and psychologically, the possibility of primary and/or secondary reconstruction using implants or autologous tissue exists. However, the proportion of women who choose this type of surgery is low and depends on the patients' cultural, psycho-social, and economical environment. Whereas in the U.S., the proportion of patients who choose breast reconstruction after mastectomy is around 30%, in European countries it is only 5–10% [15]. On the one hand, reasons given for not choosing breast reconstruction are, among others, that 'the result doesn't justify the effort', satisfaction with the comfort of a prosthetic brassiere, 'amputation of a breast has given the patient a feeling of security', patients would rather 'avoid post-operative radiation therapy' or they had 'no partner' [16–18]. On the other hand, investigations have shown that women regain a sense of body integrity and a feeling of external symmetry after reconstructive surgery [19, 20]. A new sense of sexual self-assurance emerges [21]. A factor that cannot be ignored here is the extent to which patients are informed about their planned operation. A significant correlation between pre-operative informing of the patient and post-operative satisfaction has been shown [6, 22].

The present study focuses on the 3 types of surgical procedure: BCS; MRM without primary reconstruction; and MRM with primary reconstruction (MPR). The goal was to answer the question: Is there a correlation between QoL or sense of well-being and type of surgery? Focus of this investigation were social and emotional dimensions of the patients' well-being in order to be able to recognize the individually most suitable type of surgery for a particular patient profile and to use that surgical option for maximum benefit.

Patients and Methods

Patients

Out of 114 consecutive patients diagnosed with histologically confirmed primary breast cancer (79.8%) between 2000 and 2002, 91 agreed to answer the QoL questionnaires within the first 2 years of their follow-up care. In 114 consecutive patients with histologically confirmed primary breast cancer, primary surgery was performed between 2000 and 2002 at the Department of Senology of the University of Cologne, Germany. These patients were eligible for this prospective study. Patient information and surgery was performed in a homogeneous manner under supervision of the head of the department (M.W.). Indications for surgical as well as adjuvant systemic or radiation therapy were made according to the guidelines at the time. Patients with prior contralateral breast cancer, male patients, and patients with secondary surgical interventions or symptomatic co-morbidities were excluded from the study. 91 patients, i.e. 79.8%, returned their questionnaire within 1 month – as requested. 30 of these 91 patients underwent BCS in the form of a lumpectomy, a segmentectomy, or a quadrantectomy; 30 had an MRM, and 31 patients had a MPR using a silicone implant (n = 9), latissimus dorsi flap (n = 8), or TRAM flap (n = 14). The average time between surgery and answering the questionnaire was 505 days. Upon receipt of the questionnaire, patients were allowed 4 weeks for judging and reporting their state of well-being. Additional variables such as tumor stage, tumor biology, administration of adjuvant systemic therapy, time spent in hospital after surgery, as well as past medical history were also documented. The vast majority, i.e. 75/91 patients (82.4%) had estrogen-receptor positive tumors. 54 of the 91 patients underwent adjuvant chemotherapy (59.3%), and 50 radiation therapy (54.9%). Median duration of hospitalization was 12.5 days in BCS patients, 14 days in MRM patients, and 11 days in MPR patients. These time periods did not differ significantly between the groups (p = 0.105).

Methods

In order to measure sense of well-being defined as the current state of relative stability and well-being resulting from unconscious emotions, and QoL as defined by mental, social, and functional patient status, 2 questionnaires were anonymously evaluated: First, the Multidimensional Mood Questionnaire (MDBF, 'Mehrdimensionaler Befindlichkeitsfragebogen') in the short form A. This psychometric test for determining the current mental state of well-being was developed and validated at the University of Trier [23, 24]. The MDBF comprises 3 conceptual polar pairs for evaluating a patient's current sense of well-being: good mood – bad mood; attentiveness – tiredness; calm – restlessness, each of which consists of 8 items, or 4 items in the short form A (see table 1). There are 5 levels of differentiation ranging from 'not at all' to 'a lot'. Responses add up to a total point score between 4 and 20, which is calculated by an integrated evaluation program. Second, the QoL questionnaire SF-12, which is the short form of the SF-36 questionnaire, was employed [25]. SF-12 is the standard instrument for psychometric determination of the health-based QoL and a patient's subjective sense of health [26]. The SF-12 comprises 8 scales with 12 items each. The scales are: physical functioning (2), physical role functioning (2), pain (1), health perception (1), which together form the 'physical summary scale'; vitality (1), social functioning (1), emotional role functioning (2), mental health (2), which together form the 'mental summary scale'. The responses go from clear yes or no answers to differentiated evaluations at 5 levels ranging from 'always/ never' to 'excellent/ bad'. The answers are scored using an integrated statistical program based on evaluation of indicator variables and subsequent formation of summary scales as described above.

Statistical Evaluation

Responses to the 2 questionnaires were evaluated for statistically significant relationships using a Student t-test, a Kruskal-Wallis test, or an exact

Table 1. Multidimensional Mood Questionnaire (MDBF, 'Mehrdimensionaler Befindlichkeitsfragebogen') in the short form A. This psychometric test for determining the sense of well-being which was developed and validated at the University of Trier [21, 22]; items are scored and transformed by an integrated evaluation program

	Low scale value	High scale value
GB (good mood-bad mood)	negative sense of well-being bad – poor – good – content	good sense of well-being
AT (attentiveness-tiredness)	nervous tired – listless – cheerful – calm	lively
CR (calm-restlessness)	tense restless – uneasy – relaxed – self-possessed	relaxed

Table 2. SF-12 assessment of quality of life: results of physical summary scale in relation to type of surgery; BCS patients scored 4.3 points more than MRM patients (2-sided $p = 0.07$)

Surgery	Patients, n	Mean	Standard deviation	95% CI of mean		Minimum	Maximum
				Lower	Upper		
MRM	30	43.1	8.7	39.8	46.3	22.7	58.3
MPR	31	46.3	8.8	43.1	49.5	24.0	59.6
BCS	30	47.4	9.6	43.8	51.0	24.0	61.4
Total	91	45.6	9.1	43.7	47.5	22.7	61.4

CI = Confidence interval; MRM = modified radical mastectomy; MPR = mastectomy with primary reconstruction; BCS = breast-conserving surgery.

Table 3. SF-12 assessment of quality of life: results of mental summary scale in relation to type of surgery; BCS patients scored only 0.7 points more than MRM patients (2-sided $p = 0.8$).

Surgery	Patients, n	Mean	Standard deviation	95% CI of mean		Minimum	Maximum
				Lower	Upper		
MRM	30	47.5	11.0	43.4	51.6	29.4	62.6
MPR	31	48.0	10.8	44.0	52.0	25.5	62.9
BCS	30	48.2	10.9	44.1	52.3	22.4	62.1
Total	91	47.9	10.8	45.6	50.1	22.4	62.9

CI = Confidence interval; MRM = modified radical mastectomy; MPR = mastectomy with primary reconstruction; BCS = breast-conserving surgery.

test as appropriate. The SPSS statistics package (Version 10.0 and up, Chicago, IL, USA) was used for statistical evaluation as well as the special statistics programs supplied with the questionnaires.

Results

Median patient age was 58 years (range: 35–82 years). There was a significant age difference between the 3 surgical groups with MRM patients being the oldest, and MPR patients being the youngest cohort ($p < 0.001$). Moreover, tumor stages differed significantly between the 3 surgical groups with higher stages present in MRM patients compared to BCS and MPR patients ($p < 0.001$).

The response rate for returning the questionnaires within 1 month was 79.8% (91/114). Response rates were similar among the 3 surgical groups: 30 of the 37 BCS patients (81.1%), 30 of the 38 MRM patients (78.9%), and 31 of the

39 MPR patients (79.5%) responded. Mean interval between primary surgery and response was 505 days, with 516 days in the BCS group, 454 days in the MRM group, and 544 days in the MPR group. These intervals did not differ significantly between the groups ($p = 0.105$).

Evaluation of the sense of well-being measurement using the MDBF questionnaire gave the following results. Mean values of the points achieved in each group are shown in figure 1. Observed tendencies towards higher point scores in BCS patients were not significant ($p_{GB} = 0.57$; $p_{AT} = 0.557$; $p_{CR} = 0.373$). Sense of well-being did not differ significantly in relation to adjuvant chemotherapy or radiation therapy. Attentiveness was somewhat higher in patients who received radiation therapy, but the difference was not significant (t-test, $p = 0.122$). Endocrine therapy was not evaluated separately since the majority of patients had estrogen-receptor positive disease. No significant correlation between tumor stage and sense of well-being was observed.

For statistical evaluation of the questionnaire SF-12, the physical summary scale and the mental summary scale of the 3 collectives were compared. The physical summary scale comprises physical role functioning, pain, and general perception of health; the mental summary scale comprises vitality, social functioning, emotional role function, and emotional well-being. The means of the points achieved in each collective are shown in table 2. According to the physical summary scale (table 3), BCS patients scored 4.3 points more than MRM patients (exact 2-sided test, $p = 0.07$), whereas the corresponding difference was only 0.7 points according to the mental summary scale (table 3; exact 2-sided test, $p = 0.8$).

Looking at impact of tumor stage at primary surgery on QoL, a significantly better health-based QoL score (physical summary scale) was found in stage I patients compared to higher-stage patients ($p = 0.012$). However, tumor stage did not have a significant impact on mental factors ($p = 0.224$) (fig. 2). Administration of adjuvant chemotherapy or radiotherapy did not impact on QoL as assessed by physical summary scale ($p = 0.483$) or the mental summary scale ($p = 0.74$).

Discussion

In primary breast cancer, several surgical standard procedures associated with similar survival benefits are currently available for patients. The present study was therefore initiated to evaluate whether QoL differences associated with these different types of surgery can be observed within the first 2 years after primary breast cancer surgery. The study was based on evaluation of patient QoL using the MDBF questionnaire and the QoL questionnaire SF-12 for physical as well as mental QoL. Almost 80% of the patients in our study (91/114) completed the questionnaires which they received during the first 2 years of their follow-up care.

It is interesting to note that with respect to sense of well-being, all results are in the upper range near the maximum of 20, between 13.7 and 15.5. This strongly suggests that patients in general perceive a good sense of well-being after primary breast cancer surgery. Although a trend to higher physical well-being was observed in BCS patients compared to MRM patients, the mental summary scores of these 2 groups were remarkably close. With regard to physical well-being, our study is consistent with the majority of studies showing superiority of breast-conserving therapy [18, 27, 28]. However, most previous studies consider combined psycho-social and/or functional outcome. In the present study, mental well-being was very similar in all surgery subgroups. This suggests that mental and purely physical well-being should be considered as independent attributes.

In contrast with the study of Pusic et al. [29], our study focused on the social and emotional realms, whereas previous investigations have focused primarily on physical-visual aspects or on pain [29–32]. Kiene et al. [33] emphasized the importance

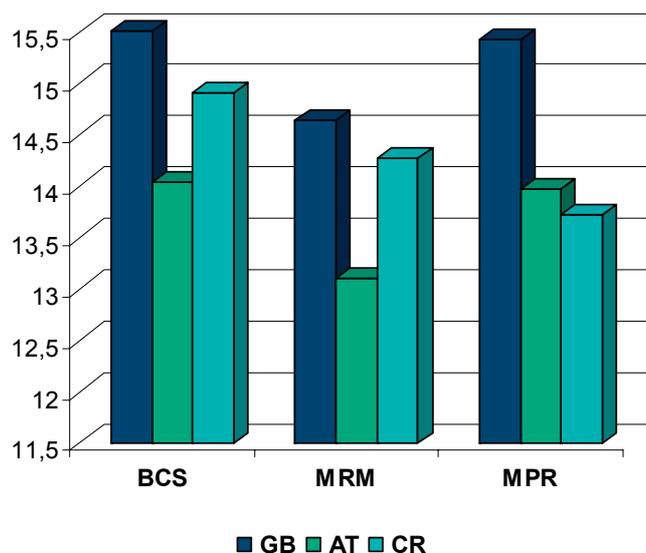


Fig. 1. Evaluation of the sense of well-being measurement using the Multidimensional Mood Questionnaire. Mean values of the points with respect to the three different surgical procedures are shown. Differences between groups are not significant. BCS = Breast conserving surgery, MRM = modified radical mastectomy, MPR = MRM with primary reconstruction, GB = good mood – bad mood, AT = attentiveness-tiredness, CR = calm-restlessness.

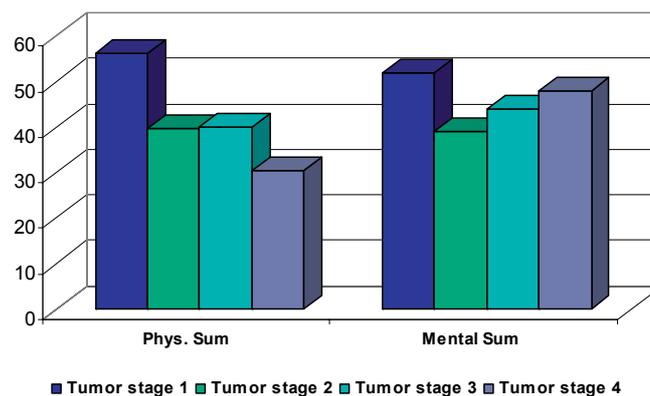


Fig. 2. Relationship between tumor stage and quality of life as assessed by the SF-12 questionnaire. Lower stage patients have a significantly better physical summary score (Phys. Sum; $p = 0.012$). Mental summary score (Mental Sum) values do not differ significantly according to tumor stage ($p = 0.224$).

of symmetric reconstruction for patient QoL. In view of our results, one could hypothesize that from the perspective of everyday life including success at the workplace, esthetic considerations recede into the background, since our MPR patients did not show improved QoL scores compared to MPR patients. Of course, esthetic considerations could be a more important consideration for younger than for older women – this issue could not be addressed in our collective since there was a significant age difference between our surgical subgroups.

Tykkä et al. [34] and Harcourt et al. [35] recognized that breast reconstruction is a sensitive topic and may not always be the optimal solution. A further explanation for our present results could be a gradual change in the public and social image: The changed appearance of a patient after mastectomy has recently tended to become more acceptable due to a certain openness with which society – including the media – deal with breast cancer as a disease today. Another recent study looking at QoL after 2 different types of breast reconstruction also did not find a significant QoL difference between implant or autologous tissue reconstruction [36]. In addition, Roth et al. [37] found that women who undergo mastectomy show early stabilization of their psycho-social health within the first post-operative year. Again, another recent study by Elder et al. [38] also showed that psycho-social QoL in MPR patients is comparable to that of the normal population after one year.

We did not observe a significant correlation between adjuvant chemotherapy or radiotherapy and sense of well-being or QoL. Several studies have shown that adjuvant treatment produces a mental burden [18, 29, 39]. It may well be that problems associated with chemotherapy or radiation therapy are very individual and may be perceived differently depending on patient motivation or the ratio of estimated benefit versus actual side effects. Moreover, the impact of these therapies may not be so great after a 1–2 year period. However, a possible weakness of the MDBF questionnaire may be found here: The means of the point values of only 4 criteria were calculated. A different evaluation with more differentiated scales for sense of well-being could be more sensitive but also more complex to interpret.

Tumor stage correlated significantly (inversely) with physical QoL functions such as physical functioning, role functioning, pain, and perception of health. It is quite logical that a larger tumor burden affects patients' physical well-being, but one might have expected that mental well-being might also be affected – a finding that was not observed in our study. Here, one might speculate that the mere fact of having breast cancer induces such a large mental burden that the extent of tumor burden as described by tumor stage recedes into the background. A limitation of the study is the small patient number which can lead to false negative results. Therefore, the null hypothesis is kept as true, although the alternative hypothesis is correct. In conclusion, the present investigation suggests that all 3 evaluated surgical therapeutic options for breast cancer, i.e. BCS, MRM, and MRP, are justifiable and accepted. When patients are thoroughly informed about the oncological necessity, and their personal considerations are taken into account, the type of primary surgery does not significantly impact on their sense of well-being [40]. Long-term assessment after at least 1 year as well as consideration of social and emotional realms in addition to physical-visual aspects shows that patients perceive a good sense of well-being after primary breast cancer surgery independent of type of surgery. Given the convincing data in the literature on the equivalent long-term outcome after BCS and MRM, randomized prospective studies comparing these surgical options in order to assess QoL issues are not ethical anymore. Thus, in order to create a valid foundation for optimizing the individual surgical approach, longitudinal long-term observational data including QoL assessment in large cohorts are urgently needed.

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