Arch Gynecol Obstet (2010) 282:75–82
DOI 10.1007/s00404-009-1302-y

GYNECOLOGIC ONCOLOGY

Quality of life and satisfaction after breast cancer operation

Jing Han · Dirk Grothuesmann · Mechthild Neises · Ursula Hille · Peter Hillemanns

Received: 18 August 2009 / Accepted: 17 November 2009 / Published online: 4 December 2009

Abstract
Purpose To investigate the quality of life and satisfaction after different operations in patients with breast cancer, which are breast conserving therapy (BCT), mastectomy and reconstruction after breast BCT or mastectomy.
Materials and methods 180 patients with breast cancer who were operated from January 2005 to October 2006 were chosen. They presented without local or distant metastasis in this period of time and were asked to complete the EORTC quality of life questionnaire (QLQ-C30), the EORTC breast cancer module questionnaire (QLQ-BR23) and a specific questionnaire regarding satisfaction of postoperative results designed by ourselves.
Results Of 112 (62.2%) patients who responded there were 76, 20 and 16 patients in the group of BCT, mastectomy and reconstruction, respectively. Compared with the mastectomy group and reconstruction group, the patients in BCT group had better body image (BI) ($P = 0.004$, $P = 0.003$), the patients in the group of reconstruction had more financial difficulties (FD) and more future perspective (FP) than the BCT group ($P = 0.006$, $P = 0.039$). Compared with the group of mastectomy and reconstruction, the patients in the group of BCT had a better self-assessment of postoperative results ($P = 0.001$, $P < 0.001$) and less visible postoperative scars ($P = 0.003$, $P = 0.019$). Patients in the reconstruction group thought that the difference in shape of the bilateral breast was more visible than in the BCT group ($P = 0.005$). Regarding visible differences in size of the breasts and satisfaction with the position and form of nipple–areolar complex, there were no differences between the two groups ($P = 0.077$, $P = 0.272$).
Conclusion Patients with BCT have a better quality of life and higher satisfaction rate with their postoperative breasts compared to patients undergoing mastectomy or reconstructive surgery.

Keywords Breast carcinoma · Operation · Quality of life · Satisfaction

J. Han · U. Hille · P. Hillemanns (✉)
Department of Gynecology, Hannover Medical School, Hannover, Germany
e-mail: Hillemanns.Peter@MH-Hannover.de

J. Han
e-mail: hanjing779tj@yahoo.com.cn

J. Han
Department of Breast Surgery, Tongji Hospital, Tongji University, Shanghai, China

D. Grothuesmann
Department of Gynecology, Nord City Hospital, Hannover, Germany

M. Neises
Department of Psychology, Hannover Medical School, Hannover, Germany

Introduction

Breast cancer is a serious, stressful and life-threatening disease. It is the most frequently diagnosed cancer among women, accounting for approximately 23% of all cancers [1]. For many years, incidence and mortality of breast cancer have remained fairly stable in North America, Europe and partial Asia. The treatment of breast cancer consists of a multimodal approach. However, surgery plays a prominent role in the management. Today, breast-conserving therapy (BCT), mastectomy and reconstruction after BCT or mastectomy are the common operations for surgically

manageable breast cancer. Because the breast is the symbol of femininity for a woman and an operation can result in deformity, quality of life and satisfaction of postoperative patients are very important factors to evaluate the result of the operation. However, only a limited number of studies exist about the assessment of postoperative results. The purpose of the present study is to evaluate the impact of the three surgical approaches, BCT, mastectomy and reconstruction, on quality of life (QOL) and patients' satisfaction (Table 1).

Materials and methods

Patients

The retrospective study included breast cancer patients who were treated with BCT, mastectomy and breast reconstruction after BCT or mastectomy in the Department of Gynecology, Hannover Medical School between January 2005 and October 2006.

The majority of the patients underwent chemotherapy, radiotherapy and endocrine therapy after the initial surgery according to age, tumor staging and hormone receptor status. Some patients with a tumor size of >5 cm were treated with neoadjuvant chemotherapy. 180 breast cancer patients who were operated in this period of time and survived without local or distant failure were asked to complete the EORTC quality of life questionnaire (QLQ-C30), the EORTC breast cancer module questionnaire (QLQ-BR23) and a specific questionnaire regarding satisfaction designed by ourselves. Together with a letter of explanation all questionnaires were mailed to the eligible patients. A total of 112 (62.2%) patients completed the questionnaire and returned it to us. Subsequently, we contacted some patients by telephone who had not answered all questions.

The median age for the entire study population (112 patients) was 58 (57.5 ± 13.9) years (range 25–85 years). They were divided into three groups.

Group 1 included 76 (67.9%) patients who underwent BCT, the common operations in this group were lumpectomy and segment resection. Most frequently sentinel lymph node biopsies were performed (excluding patients with ductal carcinoma in situ, DCIS), and if positive, axillary lymph node dissection was undertaken. Among them, ten patients with hypermastia were treated with oncologic breast reduction. 11 (14.5%) patients were treated with immediate symmetric surgery of the contralateral breast. All 76 patients in this group had to be treated with radiotherapy following surgery. 7 (33.3%) patients had received neoadjuvant chemotherapy prior to surgery.

Group 2 included 20 (17.9%) patients who underwent mastectomy. Most patients were treated with modified radical mastectomy, which included resection of the breast, skin over the tumor, fascia of pectoralis major muscle and axillary lymph nodes. In 7 (35.0%) patients the pectoralis major muscle had been partially resected and in 1 (5.0%) patient the complete muscle had been resected. Only 1 (5.0%) patient had chosen reduction of the contralateral breast so that the two breasts looked more symmetric. 4 (36.4%) patients received neoadjuvant chemotherapy. 2 (10.0%) patients in whom BCT was indicated chose this operation themselves.

Group 3 included 16 (14.3%) patients who underwent breast reconstruction after BCT or mastectomy. In this group 1 (6.3%) patient had skin-sparing mastectomy followed by breast implant. All the others had breast reconstruction with latissimus dorsi muscle, whereby 4 (26.7%) patients had undergone modified radical mastectomy, 2 (13.3%) skin-sparing mastectomy, and 9 (60.0%) patients segment resection. All the patients who had chosen LADO had normal breast sizes; therefore the operations were performed without implants. 2 (12.5%) patients received neoadjuvant chemotherapy. Only 1 (6.3%) patient was given symmetric surgery of the contralateral breast.

Questionnaires

EORTC QLQ-C30 [2]

This questionnaire has been developed to cover aspects of life particularly relevant to cancer patients and was used with authorization from the EORTC Quality of Life Study Group. It is designed to assess the patients' physical functioning (PF), role functioning (RF), cognitive functioning (CF), emotional functioning (EF), social functioning (SF), global quality of life (GQL), pain (PA), fatigue (FA), nausea/vomiting (NV) by means of multi-item scales, disease- and treatment-related symptoms by means of single items: dyspnoea (DY), insomnia (IN), loss of appetite (AP), constipation (CO), diarrhea (DI) and financial difficulties (FI).

EORTC QLQ-BR23 [3]

The EORTC QLQ-BR23 is a 23-item breast cancer-specific questionnaire for evaluation of the site-specific information on QOL. This module was designed for breast cancer patients with varying stages of disease and treatment modalities. It incorporates two functional scales: body image (BI), sexual functioning (SF) and three symptom scales: arm symptoms (AS), breast symptoms (BS), and systematic therapy side effects (SS). The remaining items

Table 1 Demographic and clinical patient characteristics

	Group1 ($n = 76$)	Group2 ($n = 20$)	Group3 ($n = 16$)
Age (years)			
Mean (SD)	58.8 ± 13.8	57.7 ± 15.3	51.6 ± 11.4
Range	33–85	33–85	25–67
Postmenopausal	60 (79.0%)	16 (80.0%)	12 (75.0%)
Previous pregnancy	55 (72.4%)	14 (70.0%)	12 (75.0%)
Previous breast-feeding	44 (57.9%)	14 (70.0%)	8 (50.0%)
Marital status			
Single	9 (11.8%)	2 (10.0%)	3 (18.8%)
Married	50 (65.8%)	10 (50.0%)	10 (62.5%)
Separated/divorced	9 (11.8%)	4 (20.0%)	2 (12.5%)
Widowed	8 (10.5%)	4 (20.0%)	1 (6.3%)
Stable partner			
Yes	50 (65.8%)	10 (50%)	12 (75.0%)
No	18	8	3
Unknown	8	2	1
Education			
Secondary school	40 (52.6%)	9 (45.0%)	4 (25.0%)
High school graduated	36 (47.4%)	11 (55.0%)	12 (75.0%)
Employment status			
Employed	30 (39.5%)	5 (25.0%)	9 (56.3%)
Unemployed	3 (4.0%)	1 (5.0%)	1 (6.3%)
Home duties	20 (26.3%)	10 (50.0%)	4 (25.0%)
Retired	22 (29.0%)	4 (20.0%)	2 (12.5%)
Histology type			
DCIS	9 (11.8%)	0 (0%)	2 (12.5%)
Invasive ductal Ca	60 (79.0%)	15 (75.0%)	13 (81.3%)
Lobular Ca	5 (6.6%)	4 (20.0%)	0 (0%)
Rare forms[§]	2 (2.6%)	1 (5.0%)	1 (6.3%)
Tumor size*			
≤2 cm (pT1a-c)	52 (77.6%)	7 (35.0%)	5 (35.7%)
>2 cm (pT2–pT4)	15 (22.4%)	13 (65.0%)	9 (64.3%)
Lymph node metastases*			
No (pN0)	49 (73.1%)	10 (50.0%)	9 (64.3%)
Yes(pN1–pN2)	18 (26.9%)	10 (50.0%)	5 (35.7%)
Grading*			
G1	15 (22.4%)	1 (5.0%)	1 (6.7%)
G2	30 (44.8%)	7 (35.0%)	3 (20.0%)
G3	18 (26.9%)	7 (35.0%)	9(60.0%)
Unknown	4 (6.0%)	5 (25.0%)	2 (13.3%)
Hormone receptor (ER)			
Positive	55 (72.4%)	10 (50.0%)	8 (53.3%)
Negative	21 (27.6%)	10 (50.0%)	7 (46.7%)
Adjuvant treatment			
Chemotherapy	21 (27.6%)	11 (55.0%)	11 (68.8%)
Endocrine therapy	25 (32.9%)	7 (35.0%)	7 (43.8%)
Radiotherapy	76 (100%)	13 (65.0%)	15 (93.8%)
Re-excision	12 (15.7%)	0	2 (12.5%)
Symmetric surgery of the contralateral breast	11 (14.5%)	1 (5.0%)	1 (6.3%)

* DCIS patients are not included

§ Including: tubular cancer and sarcocarcinoma

assess future perspective (FP), sexual enjoyment (SE) and shock due to hair loss (HL).

These two questionnaires were rated on a four-level response system (except for the global health status/QOL Q29, Q30, where a 7-point scale is used): "Not at all", "A little", "Quite a bit" and "Very much". When scoring, each raw item is scored 1–4 corresponding to the response categories, and each domain (whether a scale or a single item) score is obtained by averaging the item scores within the domain. A linear transformation was performed to standardize the raw scores (RS), so that the standardized scores (SS) range from 0 to 100 with a higher score representing a higher ("better") level of functioning and health for the functional domain and global health, and a higher ("worse") level of symptoms for the symptoms domain.

Specific questionnaires about postoperative satisfaction of the cosmetic results

Patients in BCT and reconstruction groups were asked:

- Is there a visible difference between the size or shape of the two breasts [4]?
- Are you satisfied with the position and shape of the nipple–areolar complex [4–6]?

The reconstruction patients were asked specially:

- Do you regard your reconstructed breast as a natural part of your body [7]?
- Do you think your breasts feel similar [7]?
- Did you experience any delay in further treatment because of having breast reconstruction surgery [7, 8]?

The postoperative mastectomy patients were asked:

- Do you wish to have a reconstructive operation?

All the postoperative patients were asked if they think the scars were visible and to assess the cosmetic result of their breast operation

Statistics

Statistical analysis was performed using SPSS version 15.0 (SPSS, Chicago, IL, USA) statistical package. The non-parametric data analysis just as QOL, satisfaction and self-assessment of patients were compared with a Mann–Whitney *U* test. Statistical comparisons between age, menopausal and tumor size in different groups were made using one-way ANOVA analysis and Chi-square analysis. A P value of <0.05 was considered significant. The items with missing value were not taken into account.

Results

Among the 112 patients, the mean age of the BCT patients, mastectomy patients and reconstruction patients

Table 2 Comparison result of "QLQ-C30" questionnaire

QLQ-C30	G1	G2	G3	*P* value		
				G1 versus G2	G1 versus G3	G2 versus G3
GOL	68.4	64.6	64.6	0.359	0.413	0.888
Functioning[a]						
PF	81.5	77.7	84.2	0.430	0.501	0.290
RF	68.2	60.8	63.5	0.560	0.633	0.987
EF	67.0	67.9	51.6	0.931	0.069	0.109
CF	79.6	90.0	67.7	0.102	0.353	0.102
SF	75.9	71.7	61.5	0.660	0.094	0.352
Symptom[b]						
FA	39.6	32.8	34.7	0.434	0.509	0.937
NV	9.0	1.7	2.1	0.115	0.741	0.411
PA	25.9	30.0	35.4	0.545	0.225	0.648
DY	24.1	25.0	20.8	0.821	0.812	0.741
IN	36.4	35.2	41.7	0.546	0.346	0.271
AP	10.1	6.7	14.6	0.453	0.115	0.189
CO	16.2	18.3	8.3	0.956	0.289	0.498
DI	7.5	3.5	6.3	0.458	0.688	0.909
FI	15.6	28.3	43.8	0.105	0.006	0.305

All figures shown here are mean values of standardized scores of each item

G1 group 1, the BCT group; *G2* group 2, the mastectomy group; *G3* group 3, the reconstruction group

[a] In functioning domain, higher score = better QOL

[b] In symptom domain, higher score = more obvious symptom

Table 3 Comparison result of "QLQ-BR23" questionnaire

QLQ-BR23	G1	G2	G3	*P* value		
				G1 versus G2	G1 versus G3	G2 versus G3
Functioning[a]						
BI	82.7	60.4	56.8	0.004	0.003	0.718
SF	71.5	87.5	68.8	0.106	0.492	0.083
SE	70.4	76.5	70.8	0.337	0.916	0.444
FP	53.5	51.7	31.3	0.966	0.039	0.067
Symptom[b]	26.1	23.3	30.6	0.513	0.617	0.422
AS	28.2	41.7	41.7	0.069	0.100	0.987
BS	26.9	20.4	32.8	0.304	0.346	0.102
SS	50.1	42.3	50.0	0.330	0.955	0.498
HL	20.7	3.9	22.2	0.088	0.776	0.313

All the figures represented are mean values of standardized scores of each item

G1 group 1, the BCT group; *G2* group 2, the mastectomy group; *G3* group 3, the reconstruction group

[a] In functioning domain, higher score = better QOL

[b] In symptom domain, higher score = more obvious symptom

was 58.8 ± 13.8 (33–85), 57.7 ± 15.3 (33–85) and 51.6 ± 11.4 (25–67), respectively.

The result regarding the items of QLQ-C30 and the comparisons between these three groups are shown in Table 2. There was no difference between the groups with respect to global health status, functioning (PF, RF, EF, CF, SF) and most items in the symptom domain (FA, NV, PA, DY, IN, AP, DI).The only significant differences regarding FI between the three groups were to be found in the symptom domain. The reconstruction group had more financial difficulties when compared with the BCT group ($P = 0.006$).

Table 3 provides the results and comparison of items of QLQ-BR23. There was no difference between all symptoms (AS, BS, SS, HL) and some functioning items (SF, SE), but significant differences existed in BI and FP. In BI, the BCT group had a much better body image compared with the mastectomy ($P = 0.004$) and reconstruction ($P = 0.003$) group; In FP, the reconstruction group had more future perspective than the BCT group ($P = 0.039$).

Regarding the self-assessment of cosmetic results in the three groups, there were significant differences between the BCT group and the mastectomy group ($P = 0.001$), the BCT group and the reconstruction group ($P < 0.001$). There was no difference between the mastectomy group and the reconstruction group ($P = 0.211$). The BCT group patients thought that the postoperative cosmetic results were better than the patients in the other two groups.

When patients' satisfaction were compared with the cosmetic result, regarding visible difference in size of the bilateral breast, there was no difference between the two groups ($P = 0.077$), but patients in the reconstruction group thought that the difference in shape of the bilateral breast was more visible than the BCT group ($P = 0.005$). There was no difference between the two groups regarding the satisfaction with the position and form of the nipple–areolar complex ($P = 0.272$). With regard to scars, patients in BCT group stated that they have less visible scars than the reconstruction group ($P = 0.019$) (Figs. 1, 2).

Discussion

Breast conservation therapy, mastectomy and oncologic reconstructive surgery are methods of treatment which are all safe and equally effective [6]. Thus, clinicians and patients have become more interested in QOL [9], patients' satisfaction and the cosmetic results. Clinicians recommend the way of operation according to the status of the patients. BCT followed by radiotherapy has now become the standard way of treatment for invasive breast carcinomas up to 5 cm and is increasingly being used for DCIS and some larger tumors [10]. Especially for women with small breast cancers, it is an

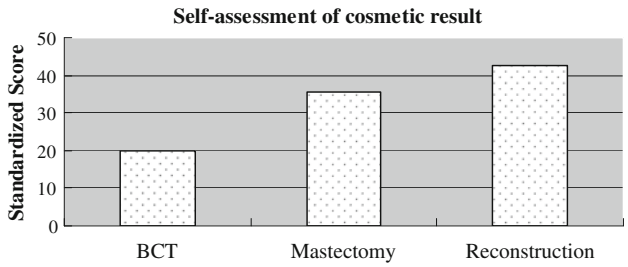

Fig. 1 Descriptive analysis of "self-assessment of result" scores for BCT, mastectomy and reconstruction groups of patients (lower score = more satisfactory)

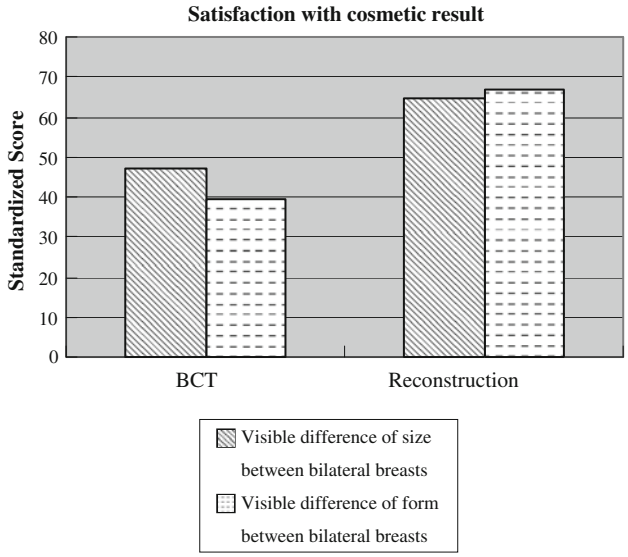

Fig. 2 Descriptive comparison of "visible difference between postoperative and contralateral breast about breast size and shape" scores for BCT and reconstruction groups of patients (higher score = more visible different)

attractive alternative to mastectomy [11]. Nevertheless, many women still need mastectomy to acquire oncologically optimal local control. These cases include women with large primary tumors (>5 cm or >20–30% of the breast volume), those who have refused or failed to be treated with neoadjuvant treatment, cases with multicentric or diffuse disease, either invasive ductal carcinoma (IDC) or DCIS. Breast reconstruction should be discussed with the patient at the time of primary surgery (Figs. 3, 4, 5).

The breast can be reconstructed with autologous tissue and/or a prothesis immediately or at a later stage. During recent decades various methods of autologous tissue reconstruction have been developed, the latissimus dorsi (LADO) flap has been commonly used in breast reconstruction, because it enables the placement of healthy skin on the anterior chest wall with a very low (1%) risk of flap necrosis [12]. Due to the fact that there is relatively plenty of tissue and the flexibility of drawing the material, it is suitable in the case of most patients and can provide a relatively symmetric size to the patient. In our study, 15 (93.8%) of the 16 patients in the reconstruction group had been treated with the LADO flap (Fig. 3). There are other reconstructive methods which were not evaluated in our study. Based on our evaluation we cannot address the question of surgery satisfaction when other methods of reconstruction are employed such as techniques using autologous tissues from the abdominal wall (TRAM or DIEP flap) which may be viewed by some plastic surgeons as golden standard for breast reconstruction. Therefore, we cannot state whether they show comparable or even improved data.

We have used the EORTC QLQ-C30 and EORTC QLQ-BR23 to assess the QOL of the patients, who were treated in our department during the last 2 years. The result that the body image of patients in the BCT group is better than in the mastectomy group could be expected, however, that it is even better than in the reconstruction group is rather surprising [13]. Body image is defined as the mental picture of one's body, an attitude about the physical self appearance, and state of health, wholeness, normal functioning, and sexuality [14]. It is a component of a larger concept of self that for women includes feeling, feminine and attractive, enjoying one's body as a symbol of social expression, and as a way of being in the world. The better their body image, the better the women coped with cancer. Women with better body image perceptions had higher levels of self-confidence in coping with breast

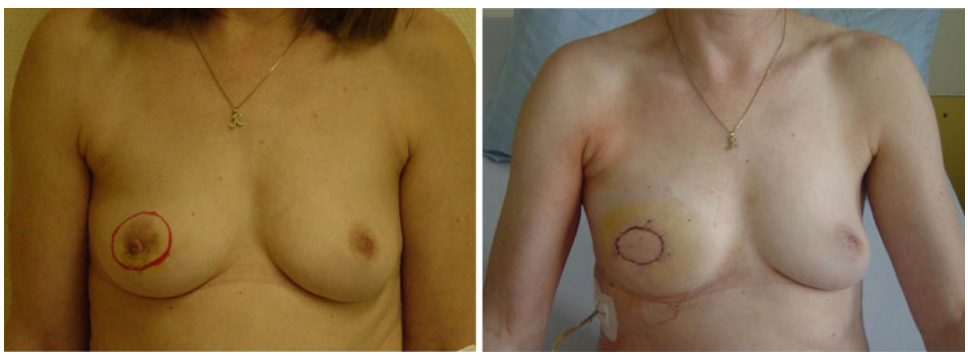

Fig. 3 53-year-old patient who had right breast ductal-invasive cancer was treated with skin-sparing mastectomy, nipple–areola complex resection, SLN dissection and immediate reconstruction with LADO flap. *Left* preoperative view. *Right* 7 days after operation

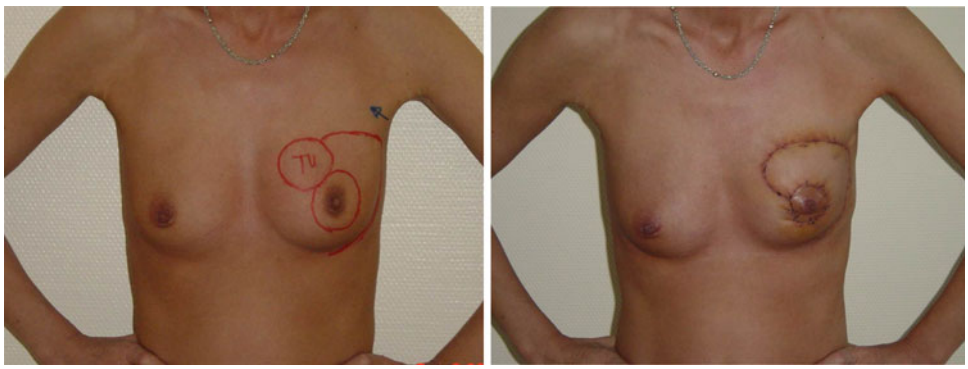

Fig. 4 42-year-old patient who had left breast ductal-invasive cancer was treated with left breast BCT, rotation flap lifting and SLN dissection. *Left* preoperative view. *Right* 6 days after operation

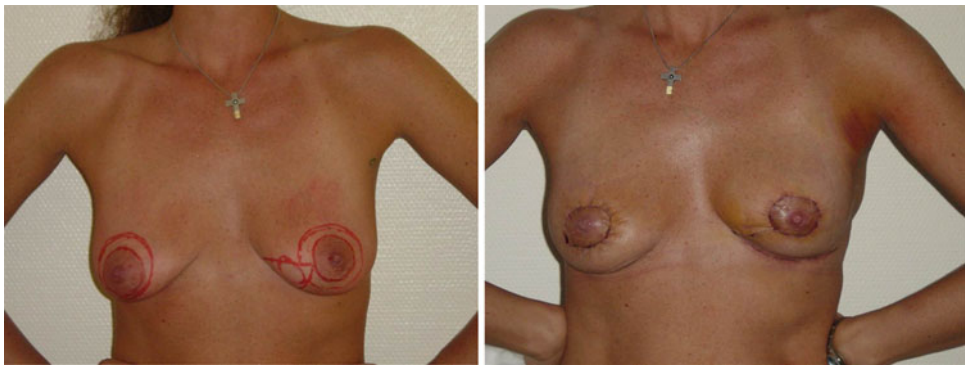

Fig. 5 37-year-old patient who had left breast ductal-invasive cancer was treated with left breast BCT, oncoplastic mastopexy, SLN dissection and controlateral symmetrical mastopexy. *Left* preoperative view. *Right* 5 days after operation

cancer. There is no consensus if the type of surgery received is related to postoperative body image. Some studies found that women with a mastectomy were more likely to report body image dissatisfaction than those with BCT [13, 15, 16], whereas Poulsen et al. [17] did not find the type of surgery to be a significant problem. Usually reconstruction is considered to result in better body image [7]. Negative perceptions of body image among breast cancer survivors include dissatisfaction with appearance, perceived loss of femininity and body integrity, reluctance to look at ones-self naked, feeling less sexually attractive, self consciousness about appearance, and dissatisfaction with surgical scars.

In our study, the BCT group had a higher score with respect to self-assessment of the cosmetic result than the reconstruction group and mastectomy group, and the patients in BCT group considered they have less visible scars and less visible difference in shape between the postoperative and the contralateral breast. Thus, it has to be noted that the postoperative appearance is an important item which influences the patients' body image. Since there is no standardized questionnaire for the evaluation of reconstructive surgery, we decided to design a specific one ourselves. The use of a non-validated questionnaire concerning cosmetic results, however, may lead to non-reliable findings and conclusions. Therefore, further studies should be taken into account before definite conclusions from our results can be drawn.

Patients in the reconstruction group have more future perspective in our study. This should be another aspect that influences the body image of patients. The future perspective of breast cancer patients is actually the worry about the future, particularly the fear of recurrence. Nissen et al. [18] found that women who had postmastectomy reconstruction have more difficulties in some ways, for example greater mood disturbance and poorer well-being. Reconstruction does not counteract the biggest emotional challenge of breast cancer: fear of recurrence [19]. Patients who had mastectomy have less fear of future [20] and less mood disturbances [18], which may explain why some patients with early stage breast cancer request mastectomy voluntarily [21]. In our study, two younger patients, who could be treated with less extensive surgery, chose mastectomy.

Patients' satisfaction is another important factor evaluating the treatment equal to QOL. The patients after BCT have higher self-assessment score, more symmetrical bilateral breasts after operation and less obvious postoperative scars. Tumor size [10, 22] is one of the most important factors when attempting to obtain a cosmetically favorable result. BCT is interpreted as the optimal ways of operation to be used in order to thoroughly remove the malignant tissues and, on the other hand, still retain enough normal tissues to achieve a nice shape of the breast [23]. A conflict exists between performing a resection wide enough to obtain optimal oncologic control and not removing too

much breast tissue as to leave a deformed breast or a large discrepancy compared with the other side. One way of resolving this conflict is to use plastic surgery techniques such as breast reconstruction to reshape the breast immediately following lumpectomy. BCT combined with oncoplastic surgery has rapidly gained acceptance in Europe and is now widely practiced in some dedicated breast units. Takeda et al. [24] found BCT with immediate volume replacement with a lateral tissue flap made with adipose tissue located caudal to the axillary arch is a reasonable surgical procedure and has the advantage of avoiding unnecessary surgical procedures for reconstruction and surgical invasion without delaying the diagnosis of local relapse. Compared with reconstruction, oncoplastic surgery not only can remain the better shape of the postoperative breasts, but also are easier and can avoid scars in donor site and the common complication like seroma.

Based on the results from our questionnaires we know that patients in the reconstruction and mastectomy groups are more aware of their visible scars than in BCT group, which is also an important factor that influences the cosmetic result. Besides retaining the shape of the affected breast, it is important to keep the symmetry between the bilateral breasts. The symmetric surgery of the contralateral breast is very important, especially to the patients with large or ptotic breasts, including the reduction and mastopexy which can lift the breast, in order to decrease the difference of shape and size between the double breasts. However, in our study, many patients refused the suggestion made by the clinicians. Some patients were afraid of additional surgery on the healthy side, some considered it was unimportant. It is one of the reasons that had an impact on the patients' postoperative QOL and cosmetic result.

Usually, patients who wish to receive reconstructive surgery will have greater expectations regarding the final cosmetic result before the operation, and, consequently they are more fastidious when contemplating breast reconstruction. Therefore, before performing breast reconstruction, it is important to ensure that the patient's expectations regarding the outcome are realistic. They should be aware that the reconstructed breasts will neither feel nor function like a normal breast but may help in restoring body image and confidence. Photographs need to be available so that the patient can see good, average and poor cosmetic outcomes.

We should recognize that breast cancer has a unique and complex emotional dimension different from that of all other malignancies. The psychological trauma of breast cancer appears to arise more from the actuality of a potentially fatal disease than from the surgical treatment. To improve the patients' QOL and satisfaction after operation is an emphasis to all clinicians.

Conflict of interest statement None.

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