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Quality of Life after Breast Conservation versus Oncoplastic Surgery

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ABSTRACT

Background: Quality of life (QOL) is becoming an important indicator of treatment efficacy in patients with breast cancer. Most previous studies have compared patients' QOL following breast conserving surgery (BCS) and mastectomy with or without reconstruction. Our aim was to assess the impact of BCS versus oncoplastic breast surgery (OBS).

Methods: Selection of patients for BCS or OBS was performed according to standard criteria e.g the breast and tumor size. The QOL was assessed by employing EORTC QLQ-C3 and QLQ-BR23 questionnaires concurrently and one year after the surgery. The QOL scores one year after the surgery were compared between two groups using analysis of covariance, after adjusting for the baseline values.

Results: A total of 120 patients with a mean age of 46.16±1.4 years were enrolled in the study. BCS and OBS were the main surgical treatment techniques in 57(47.5%) and 63(52.5%) patients, respectively. At the time of the last follow-up visit, there were no differences between the two groups regarding functional scales such as physical (P = 0.761), role (P = 0.356), emotional (P = 0.107), cognitive (P = 0.051), and social functioning (P = 0.659). No differences were observed between the two groups regarding nine symptom scales. Based on the results of breast cancer specific module of the questionnaire, no differences were observed in functional scales and symptoms with the exception of arm symptoms which were less common in OBS group (P = 0.023)

Conclusions: Based on the results of the current study, it could be suggested that there are no significant differences in the in scores of QOL components between patients who received BCS or OBS.

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Introduction

Recent advances in early detection and treatment of breast cancer have significantly increased the survival of the patients; hence, improving the quality of life (QOL) is becoming one of the major indicators of treatment efficacy.[1,2] Loss of a breast is a serious traumatic event for many women, so in an

attempt to reduce the psychological side effects of breast cancer treatment, less aggressive approaches have been widely suggested.[3] Breast conserving surgery (BCS) followed by radiation therapy is becoming the standard approach to early stage breast carcinomas with the same disease-free and overall survival as conventional mastectomy or modified radical mastectomy (MRM); however, the cosmetic results of BCS are unfavorable in women with large tumors or small breast sizes.[4,5] It has been proven that the patient satisfaction and psychological outcome are strongly correlated with the cosmetic outcome.[6] In this regard, oncoplastic breast surgery (OBS) merged the tumor excision methods and plastic surgery techniques to achieve better cosmetic outcomes and minimize the psychological consequences of treatment.

Most previous studies have focused on the mood or psychosexual adjustment to breast cancer treatment and less information is available on the impact of the types of surgery on QOL.[7-10] Several researches have compared the QOL following BCS or MRM and a limited number of studies have compared BCS and OBS.[11-13] There is a general consensus that BCS leads to a better body image compared to MRM but other components of the QOL are not influenced by the type of surgery.[14]

The aim of this study was to assess the impact of primary treatment types (BCS and OBS) on the QOL one year after the surgery.

Methods

Study participants

A prospective cohort study was performed in Imam Khomeini Hospital, the largest referral cancer center in Iran affiliated with Tehran University of Medical Science, between February 2012 and July 2013. Informed consents were obtained from all patients prior to enrollment. The study population consisted of patients with primary breast cancer who were candidates for either BCS or OBS. The attending surgeon selected patients for OBS based on clinical criteria such as the breast size, tumor size, and location. Patients with a history of psychiatric disorders, systemic diseases, and previous breast surgery were excluded from the study. Demographic data such as age, marital status, educational level, and history of smoking or oral contraceptive pills (OCPs) were collected via face-to-face interviews. The details of the treatment protocol (radiotherapy, chemotherapy, and hormonal therapy) and the cancer stage were obtained from the patients' medical records. All operations were performed by two qualified breast surgeons. Lumpectomy or quandranectomy followed by frozen section pathology for confirmation of free margins were used for tumor excision in the BCS group and reduction or remolding mammoplasty was the technique of choice in the OBS group. Sentinel lymph node biopsy and axillary dissection were performed if indicated. Free flaps and prostheses were not used in any of the operations.

QOL questionnaire

The QOL was assessed by employing European Organization of Research and Treatment of Cancer (EORTC) QOL questionnaire (EORTC QLQ-C30 version 3.0) and its breast cancer specific complementary measure (EORTC QLQ-BR23).[15] The translation of the above-mentioned questionnaire to Persian and its validation were previously performed by Montazeri *et al*.[16]

The QLQ-C30 is a validated questionnaire that is specifically designed to assess the QOL in patients with cancer. It comprises five functional scales (physical, role, emotional, cognitive, and social functioning), a global health status/QOL scale, three symptom scales (fatigue, nausea/vomiting, and pain) and six single items regarding either common symptoms in patients with cancer (dyspnea, insomnia, anorexia, diarrhea, and constipation) or financial problems. The QLQ-BR23 is the breast cancer specific module of the questionnaire that is composed of multi-item scales assessing the body image, sexual functioning, sexual enjoyment, systemic therapy side effects, hair loss, arm and breast symptoms.

Higher scores in the functional scale and global health status represent healthier levels of functioning and a higher QOL, while a higher score in symptom items indicates the severity of the problems. All items of the questionnaire assess the interested variable during the preceding week except for the sexual-related items which evaluate the patients' status during the past four weeks. Patients were asked to complete the questionnaires preoperatively and one year after surgery.

Statistical analysis

Scorings were performed according to the QLQ-C30 and QLQ-BR23 scoring manuals provided by EORCT.[17] After applying the standard transformation, each scale score ranges from 0 to 100. Statistical analyses were done using the SPSS software version 20.0 for windows (IBM Inc., NY, USA). Independent T-test and Chi-square test were employed to compare the demographic and baseline characteristics between the two groups. Comparison of the QOL scores one year after surgery was performed by analysis of covariates (ANCOVA), after adjusting for the preoperative corresponding scores. Considering the nature of study, for data which violated the assumption of normality, log transformations were applied before ANCOVA.[18]

Results

A total of 132 patients met the inclusion criteria but 12 subjects were lost to follow-up after

Table 1. Demographic and clinical characteristic of breast cancer patients

	Total (n = 120)	BCS (n = 57)	Oncoplasty (n = 63)	P-value
Age	46.16±10.4	46.98±1.37	44.63±1.23	0.206
Marital status				0.357
Married	100 (75.8%)	51 (89.4%)	49 (77.7%)	
Single	20 (24.2%)	6 (10.6%)	14 (22.3%)	
Smoking				0.496
Yes	9 (7.5%)	3 (5.3%)	6 (9.5%)	
No	111 (92.5%)	54 (94.7%)	57 (90.5%)	
Menstrual status				0.406
Regular	98 (74.2%)	45 (78.9%)	53 (84.1%)	
Irregular	34 (25.8%)	12 (21.1%)	10 (15.9%)	
Educational level				0.530
College graduate	19 (15.8%)	9 (15.8%)	10 (15.9%)	
High school graduate	44 (36.7%)	19 (33.3%)	25 (39.7%)	
Less than high school	36 (30.0%)	16 (28.1%)	20 (31.7%)	
Illiterate	21 (17.5%)	13 (22.8%)	8 (12.7%)	
Adjunct Treatment				
Chemotherapy	115 (95.8%)	54 (94.7%)	61 (96.8%)	0.612
Radiotherapy	116 (96.6%)	53 (92.9%)	63 (100%)	0.093
Hormonal therapy	53 (44.1%)	22 (38.5%)	31 (49.2%)	0.247
Disease stage				0.692
I	13 (9.8%)	7 (12.2%)	6 (9.5%)	
II	74 (56.1%)	34 (59.6%)	40 (63.4%)	
III	44 (33.3%)	22 (38.5%)	22 (34.9%)	
IV	1 (0.8%)	1 (1.7%)	0	

treatment; therefore, 120 patients were included in the final analyses. The mean age of the participants was 46.16±1.4 years. BCS was the main surgical treatment method in 57(47.5%) patients and the rest of subjects, i.e. 63(52.5%), underwent the OBS techniques. Patients received treatment regimens including chemotherapy (95.8%), radiotherapy (96.6%) and hormonal therapy (44.1%) based on the tumor stage, receptor status, and the decision of the attending physician. The two groups did not differ significantly regarding age, marital status, smoking history, menstrual status, educational level, treatment regimens, and disease stage (Table 1).

Evaluation of the EORCT QLQ-C30 questionnaire items demonstrated that the mean scores of all five functional scales increased one year after the surgery. The highest increase was observed in emotional functioning which rose from 49.10±2.68 to 83.82±1.53. After adjusting for the baseline values, the increasing trend did not differ between patients who underwent BCS or OBS. A similar trend was observed in the global quality of life item with no differences between the two groups (P = 0.119) (Table 2).

Patients reported that they experienced the eight investigated symptoms less commonly one year

Table 2. Baseline and postoperative scores of the QLQ-C30 questionnaire items among study groups

	Before surgery			One year After surgery			P-value
	Total	BCS	Oncoplasty	Total	BCS	Oncoplasty	
Functional scales							
Physical functioning	91.22±1.43	90.64±2.29	91.74±1.78	97.44±0.50	97.19±0.78	97.67±0.66	0.761
Role functioning	92.50±1.43	92.10±2.09	92.85±1.98	99.16±0.33	98.83±0.56	99.47±0.37	0.356
Emotional functioning	49.10±2.68	49.10±3.89	62.16±3.56	83.82±1.53	79.76±2.30	87.50±1.96	0.107
Cognitive functioning	86.38±2.07	83.04±3.55	89.41±2.27	94.81±1.06	92.10±1.77	97.31±1.16	0.051
Social functioning	82.77±2.35	78.94±3.83	86.24±2.81	91.31±1.28	90.35±2.04	92.20±1.61	0.659
Global quality of life	66.18±1.79	67.25±2.58	65.21±2.49	87.60±1.11	86.54±1.71	88.57±1.44	0.119
Symptom scales							
Fatigue	1.48±1.57	11.50±2.32	11.46±2.16	3.64±0.77	4.09±1.26	3.22±1.12	0.555
Nausea & vomiting	3.05±1.16	3.80±2.12	2.38±1.12	1.12±0.43	0.87±0.49	1.34±0.69	0.441
Pain	10.27±1.76	11.11±2.61	9.52±2.40	1.12±0.38	1.46±0.63	0.80±0.45	0.451
Other scales							
Dyspnea	8.33±1.98	11.11±3.26	5.82±2.32	2.77±0.93	4.67±1.75	1.05±0.74	0.145
Insomnia	23.88±2.98	30.99±4.63	17.46±3.68	10.27±1.71	14.03±2.63	6.87±2.15	0.584
Appetite loss	5.55±1.32	4.67±1.94	6.34±1.82	1.94±0.71	1.75±0.99	2.11±1.03	0.913
Constipation	6.11±1.52	5.26±2.32	6.87±2.01	3.36±1.00	2.92±1.26	3.76±1.55	0.947
Diarrhea	1.11±0.67	0.58±0.12	1.58±1.17	0.28±0.27	0.0	0.53±0.08	0.353
Financial difficulties	52.50±3.65	55.55±5.23	49.73±5.10	66.38±2.82	68.42±3.86	64.51±4.11	0.728

after treatment (fatigue, nausea and vomiting, pain, dyspnea, insomnia, appetite loss, constipation and diarrhea). No statistical differences were observed comparing the decreasing trends between the two groups.

Furthermore, financial problems were more commonly reported one year after the treatment, again with no significant differences between the groups (Table 2).

For the breast cancer specific module (EORCT QLQ-BR23), similar increasing trends were observed in all components of functional scale. Comparing the functional scales including sexual function (P = 0.541), sexual enjoyment (P = 0.238), and future prospective (P = 1) did not show statistical differences between patients receiving BCS or OBS (Table 3). Patients who underwent BCS had a baseline score for body image of 77.19±4.20 which increased to 87.42±3.37 one year after treatment.

On the other hand, patients who received OBS had a baseline score of 89.89±2.23 which similarly increased to 97.95±0.88. Although patients in OBS group reported better feelings about their aesthetics or sexual attractiveness of their own body at the post-operative follow up visits, no statistically significant differences were noted after adjusting for the baseline scores (P = 0.384).

Patients in both groups had lower scores of systemic side effects of therapy one year after surgery with no difference between the two study groups (P = 0.065). Also, the frequency of breast symptoms and hair loss were not significantly different before and after surgery. P = 0.739 and P = 0.495, respectively) (Table 3). The only significant difference between treatment groups was the arm symptoms. Patients in the OBS group reported a profound decline in the severity of arm symptoms one year after surgery (P = 0.023) (Table 3).

Table 3. Baseline and postoperative (one year) scores of the QLQ-BR23 questionnaire items among study groups

	Before surgery			One year After surgery			P-value
	Total	BCS	Oncoplasty	Total	BCS	Oncoplasty	
Functional scales							
Body image	83.75±2.40	77.19±4.20	89.89±2.23	90.60±2.62	87.42±3.37	97.95±0.88	0.384
Sexual functioning	33.33±2.34	30.11±3.32	36.29±3.28	37.42±2.30	35.38±3.06	39.34±3.41	0.541
Sexual enjoyment	44.21±2.76	37.50±3.92	50.66±3.71	57.97±3.04	50.34±4.02	66.66±4.29	0.238
Future perspective	55.12±3.93	55.55±3.04	66.12±2.06	55.12±3.93	55.55±3.04	66.12±2.06	1
Symptoms							
Systematic therapy side effects	13.20±1.34	15.05±2.14	11.56±1.67	4.88±0.53	6.01±0.81	3.79±0.68	0.065
Breast symptoms	14.58±1.70	18.56±2.76	10.97±1.99	2.18±0.40	2.63±0.63	1.71±0.51	0.739
Arm symptoms	10.92±1.54	10.72±2.48	11.11±1.91	3.01±0.51	4.09±0.81	2.00±0.60	0.023
Upset by hair loss	41.90±5.52	42.85±6.95	40.47±9.36	13.97±3.00	15.00±3.80	12.12±5.07	0.495

Discussion

In the current study, the QOLs of the patients with breast cancer who underwent either BCS or OBS were compared. Patients were asked to complete the QOL questionnaires preoperatively and one year after surgery. All patients reported that their physical, role, emotional, cognitive, and social functioning improved after the follow-up visits. The severity of the patients' symptoms decreased one year after treatment with the exception of financial problems which showed an increasing trend in our study population. No differences were observed regarding body image scores between two study groups. Only in one item of QLQ-BR23, arm symptoms, patients in the oncoplastic group experienced a more profound declining pattern compared to those who underwent BCS.

Over the past few years increasing attention has been given to the QOL in patients with breast cancer. It has been suggested that the QOL can be considered as an important non-biomedical predictor of the survival. However, the predictive role of QOL at baseline or one year later is limited to patients with metastatic disease; while the conventional factors are of much greater importance than the QOL in women with early disease.[19-21]

The impact of different surgical modalities on the QOL of breast cancer patients has been the field of interest in a review of several published articles.[1] Most of them have suggested that MRM and BCS have similar impacts on the long-term QOL with exceptions for body image and sexual function which are significantly better in patients who undergo BCS.[1] It has been shown that the patient's age and systemic adjuvant treatment can play important roles as confounding variables in a way that younger patients are more susceptible to report poorer short-term and long-term QOLs.[7,22,23]

Another study assessed and compared the QOL of breast cancer patients treated by OBS or BCS. A total of 45 and 42 patients were allocated to each group, respectively. The QOL was assessed by two questionnaires (Rosenberg Self-Esteem Scale and Short Form-36). In contrast to our results, authors concluded that patients who underwent OBS had better physical and social functioning, role playing, mental health, and self-confidence.[24]

A possible explanation for the different results that were observed in our study is that our patients were not matched for demographic characteristics

although the differences in the mean age and the frequency of married women were not statistically significant between the two groups. In our study, patients in the OBS group were relatively younger than those in the BCS group (with the mean age of 44.63 vs. 46.98, respectively) and as mentioned previously, younger patients usually report poorer QOL.[22] Marital status is another factor that has a proven effect on the QOL and married patients tend to have better post-operative and post-treatment QOL.[25] Patients in the BCS group were more commonly married compared to the OBS group (89.4% vs. 77.7%). Due to insignificant differences in these factors, they might not be the only reason for the discrepancy of our findings. Another explanation could be the implications of choosing patients for BCS or OBS appropriately. In this regard, if the patients are appropriately chosen for BCS or OBS by a qualified surgeon, the cosmetic outcomes might be similar. In that situation, the different components of the QOL are not expected to be different according to the type of surgery. Further studies are warranted to elucidate the impact of these two types of surgery on the QOL of the patients with breast cancer in a multicenter study with long follow ups.

This study had some limitation. The study was implemented in a large referral center and the patients might not be representative of all breast cancer patients in the community. It was not ethical to randomly allocate the patients to BCS and OBS, thus, the choice of surgeon and the patients' preference might have contributed to the outcome.

In conclusion, our results showed that patients who underwent BCS or oncolpastic surgery had similar patterns of change in different aspects and domains of the QOL one year after surgery.

References

1. Montazeri A. Health-related quality of life in breast cancer patients: a bibliographic review of the literature from 1974 to 2007. J Exp Clin Cancer Res 2008; 27: 32.
2. Montazeri A. Quality of life data as prognostic indicators of survival in cancer patients: an overview of the literature from 1982 to 2008. Health Qual Life Outcomes 2009; 7: 102.
3. Schain WS, d'Angelo TM, Dunn ME, Lichter AS, Pierce LJ. Mastectomy versus conservative surgery and radiation therapy. Psychosocial consequences. Cancer 1994; 73(4): 1221-8.
4. Al-Ghazal SK,Fallowfield L,Blamey RW. Patient evaluation of cosmetic outcome after conserving surgery for treatment of primary breast cancer. Eur J Surg Oncol 1999; 25(4): 344-6.
5. Cochrane RA, Valasiadou P, Wilson AR, Al-Ghazal SK, Macmillan RD. Cosmesis and satisfaction after breast-conserving surgery correlates with the percentage of breast volume excised. Br J Surg 2003; 90(12): 1505-9.
6. Al-Ghazal SK, Fallowfield L, Blamey RW. Does cosmetic outcome from treatment of primary breast cancer influence psychosocial morbidity? Eur J Surg Oncol 1999; 25(6): 571-3.
7. Dorval M, Maunsell E, Deschenes L, Brisson J, Masse B. Long-term quality of life after breast cancer: comparison of 8-year survivors with population controls. J Clin Oncol 1998; 16(2): 487-94.
8. Coates AS, Hurny C, Peterson HF, Bernhard J, Castiglione-Gertsch M, Gelber RD, *et al.* Quality-of-life scores predict outcome in metastatic but not early breast cancer. International Breast Cancer Study Group. J Clin Oncol 2000; 18(22): 3768-74.
9. Ganz PA, Rowland JH, Desmond K, Meyerowitz BE, Wyatt GE. Life after breast cancer: understanding women's health-related quality of life and sexual functioning. J Clin Oncol 1998; 16(2): 501-14.
10. Mols F, Vingerhoets AJ, Coebergh JW, van de Poll-Franse LV. Quality of life among long-term breast cancer survivors: a systematic review. Eur J Cancer 2005; 41(17): 2613-9.
11. King MT, Kenny P, Shiell A, Hall J, Boyages J. Quality of life three months and one year after first treatment for early stage breast cancer: influence of treatment and patient characteristics. Qual Life Res 2000; 9(7): 789-800.
12. Nissen MJ, Swenson KK, Ritz LJ, Farrell JB, Sladek ML, Lally RM. Quality of life after breast carcinoma surgery. Cancer 2001; 91(7): 1238-46.
13. Kiebert GM, de Haes JC, van de Velde CJ. The impact of breast-conserving treatment and mastectomy on the quality of life of early-stage breast cancer patients: a review. J Clin Oncol 1991; 9(6): 1059-70.
14. Rowland JH, Desmond KA, Meyerowitz BE, Belin TR, Wyatt GE, Ganz PA. Role of breast reconstructive surgery in physical and emotional outcomes among breast cancer survivors. J Natl Cancer Inst 2000; 92(17): 1422-9.
15. Aaronson NK, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez NJ, *et al.* The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. J Natl Cancer Inst 1993; 85(5): 365-76.
16. Montazeri A, Harirchi I, Vahdani M, Khaleghi F, Jarvandi S, Ebrahimi M, *et al.* The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30): translation and validation study of the Iranian version. Support Care Cancer 1999; 7(6): 400-6.
17. Fayers PM, Aaronson NK, Bjordal K, Groenvold M, Curran D, Bottomley A, on behalf of the EORTC Quality of Life Group. The EORTC

Quality of Life Group. The EORTC QLQ-C30 Scoring Manual (3rd Edition). Published by: European Organisation for Research and Treatment of Cancer, Brussels 2001.
18. Vickers AJ. Parametric versus non-parametric statistics in the analysis of randomized trials with non-normally distributed data. BMC Med Res Methodol 2005; 5: 35.
19. Shimozuma K, Sonoo H, Ichihara K, Tanaka K. The prognostic value of quality-of-life scores: preliminary results of an analysis of patients with breast cancer. Surg Today 2000; 30(3): 255-61.
20. Efficace F, Therasse P, Piccart MJ, Coens C, van Steen K, Welnicka-Jaskiewicz M, *et al.* Health-related quality of life parameters as prognostic factors in a nonmetastatic breast cancer population: an international multicenter study. J Clin Oncol 2004; 22(16): 3381-8.
21. Goodwin PJ, Ennis M, Bordeleau LJ, Pritchard KI, Trudeau ME, Koo J, *et al.* Health-related quality of life and psychosocial status in breast cancer prognosis: analysis of multiple variables. J Clin Oncol 2004; 22(20): 4184-92.
22. Kenny P, King MT, Shiell A, Seymour J, Hall J, Langlands A, *et al.* Early stage breast cancer: costs and quality of life one year after treatment by mastectomy or conservative surgery and radiation therapy. Breast 2000; 9(1): 37-44.
23. Engel J, Kerr J, Schlesinger-Raab A, Sauer H, Holzel D. Quality of life following breast-conserving therapy or mastectomy: results of a 5-year prospective study. Breast J 2004; 10(3): 223-31.
24. Veiga DF, Veiga-Filho J, Ribeiro LM, Archangelo I, Jr., Balbino PF, Caetano LV, *et al.* Quality-of-life and self-esteem outcomes after oncoplastic breast-conserving surgery. Plast Reconstr Surg 2010; 125(3): 811-7.
25. Broeckel JA, Jacobsen PB, Balducci L, Horton J, Lyman GH. Quality of life after adjuvant chemotherapy for breast cancer. Breast Cancer Res Treat 2000; 62(2): 141-50.