

Aim of the study: Postmastectomy reconstructive surgery for cosmetic satisfaction of patients is rapidly increasing. Postoperative complications such as infection, capsular contracture, implant loss are more common in patients who receive adjuvant radiotherapy (RT) than those who do not. Satisfaction levels in patients is still a controversial issue. Therefore, we wanted to investigate our patient population for the effects of RT and planned a study evaluating the satisfaction rates of our patients who received implants.

Material and methods: Seventy five breast cancer patients who went through mastectomy and went through reconstruction using expanders or silicone implants were surveyed. Complication and cosmetic satisfaction rates were separately compared between irradiated and nonirradiated implants. Responses of 46 patients who answered the survey were analyzed using χ^2 test and Mann Whitney U test. $p < 0.05$ was considered statistically significant.

Results: Thirty-one of the patients received adjuvant RT and 15 did not receive RT (NRT). There was no difference between the RT and NRT groups in the terms of touch, size, shape of silicones, pain and satisfaction level in look of clothing. Only satisfaction in symmetry was significantly lower in the RT group than in the NRT group ($p = 0.02$). Additionally, patients receiving chemotherapy were less satisfied with silicone size than those who did not ($p = 0.02$).

Conclusion: We did not find negative effects, other than symmetry, of adjuvant radiotherapy in breast cancer patients who underwent reconstructive surgery in terms of cosmetic satisfaction.

Key words: immediate implant, radiotherapy, patient satisfaction.

Contemp Oncol (Pozn) 2018; 22 (1): 27–30
DOI: <https://doi.org/10.5114/wo.2018.74390>

The satisfaction of patients with breast cancer undergone immediate reconstruction with implant and the effect of radiotherapy

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Introduction

Considering the cosmetic benefits of patients after mastectomy, the application of reconstructive surgery is increasing [1]. Immediate reconstruction can be performed either with autologous tissue or with silicone implant based techniques, depending on patient preferences, or the surgeons experience.

Adjuvant radiotherapy (RT) is recommended after mastectomy in order to increase local control and survival in patients with high-risk breast cancer [2, 3]. However, RT in patients undergone immediate reconstruction increases complications such as infection, pain, capsule contracture, and implant loss [4], significantly in patients who have undergone silicone based reconstruction [5]. The extent of post-implant complications, the effects of RT, and the cosmetic evaluations made by physicians have been frequently investigated. However, the answer of which extent increased complications affect patient satisfaction is controversial. There are studies showing that increasing complications due to RT adversely affect patient satisfaction [6], and there are studies that do not establish link between complication development and satisfaction level [7]. To investigate our own experience in this regard, we planned a study evaluating the satisfaction results of our patients with who underwent immediate silicone based reconstruction with or without radiotherapy.

Material and methods

Ethics Committee approval for the study was received from the Institution.

We sent a survey to measure satisfaction with the silicone by e-mail to 75 patients undergone mastectomy with expander or immediate silicone implant treated between the years 2012 and 2016 due to diagnosis of breast cancer. 46 patients responded to the questions asking for; the feeling of reconstruction in the patient, its cosmetic appearance and its usability in social life were privatized based on satisfaction studies in the literature and the Breast Q model [8, 9]. Answers were collected in 3 level as not satisfied (1), satisfied (2), and very satisfied (3). In addition, patients' early postoperative complications, chemotherapy (CT) and/ or hormonotherapy (HT), current smoking status, presence of expander or silicone implant during RT, RT field, and bolus use in planning were added to the analysis table.

Patients were scanned using computed tomography (CT), for planning prior to radiotherapy, in 3 mm segments on the breast board with their ipsilateral arm raised. Clinical target volume (CTV) was drawn in accordance with

breast contouring atlas of Radiation Therapy Oncology Group, along with modifications for silicone implants and expanders. PTV margins were not introduced. RT planning was made with static FIF IMRT technique using tangential zones. For patients with positive axillary lymph nodes, except those that underwent axillary dissection, complete peripheral lymphatics were irradiated. For dissected patients, RT field included supraclavicular lymph node region but for patients with tumors located in central, medial quadrant the field included internal mammaria lymph node region. Axilla, also, was irradiated for patients who underwent SLNB subsequent to neoadjuvant chemotherapy. Total of 50 Gy, in 25 Gy fractions, was administered to all patients on the chest wall (CW) and peripheric lymphatic region. There were no patients with skin involvement or positive surgical margins, therefore, boost was not administered. Irradiated fields were controlled using kV-kV imaging daily and mV-mV imaging weekly for all patients.

Statistical analysis

Statistical Package for the Social Sciences, (SPSS-IBM Corporation; Armonk, New York, USA) was used for statistical analysis. The analysis results were reported using the percent, average, mean, standard deviation, χ^2 test and Mann-Whitney *U* tests. $p \leq 0.05$ was considered statistically significant.

Table 1. Patients characteristics

Patients characteristics	All patients n (%) 46 patients	RT group n (%) 31 (67)	NRT group n (%) 15 (33)
Age	Median 43 (min. 28 – max. 66)	Median 43 (min. 28 – max. 66)	Median 46 (min. 28 – max. 63)
Menopause			
Pre-menopause	32 (69)	23 (74)	9 (60)
Post-menopause	14 (31)	8 (26)	6 (40)
Chemotherapy			
Yes	34 (74)	26 (84)	8 (53)
No	12 (26)	5 (16)	7 (47)
Hormonotherapy			
Yes	40 (87)	26 (84)	14 (93)
No	6 (13)	5 (16)	1 (7)
Smoking			
Yes	19 (41)	15 (48)	4 (27)
No	27 (59)	16 (52)	11 (73)
RT during			
Expander	–	15 (48)	–
Silicone Implant	–	16 (52)	–
RT Field			
Chest wall	–	8 (26)	–
Chest wall and RL	–	23 (74)	–
Bolus in RT			
Yes	–	18 (58)	–
No	–	13 (42)	–

RT – radiotherapy; NRT – did not received radiotherapy; RL – regional lymph nodes

Results

A total of 46 patients' characteristics and responses were evaluated. The mean age was 43 years. Of these patients, 31 (67%) received postmastectomy RT and 15 (33%) did not receive radiotherapy (NRT). Twenty patients (65%) of the RT group were stage 2, and 11 (35%) were stage 3. The NRT group included 7 (47%) stage 1 and 8 (53%) stage 2 patients. Five (16%) of the patients in the RT group who did not receive CT, started treatment within 6 weeks after surgery. Twenty-six (84%) patients who received CT, treatment began within 4 weeks after the completion of CT. Anthracycline and taxane regimes were administered to 3 (9%) patients as neoadjuvant and to 31 (91%) patients as adjuvant. Twenty-three patients (74%) also received regional irradiation (RL) in addition to the chest wall. Bolus was used in 18 (58%) patients and 13 (42%) were treated without a bolus. Twelve patients (48%) received radiotherapy with expanders and 16 (52%) had after permanent silicone prosthesis. The evaluation of patients' implant satisfaction in the RT group was performed at an average of 16 months (min. 1 – max. 59) after the end of RT.

Of the 15 NRT patients, 13 (87%) had permanent implants placed during mastectomy and 2 (13%) had tissue expanders. These 2 patients had permanent implants placed postoperative in the 2nd and 11th months respectively. Seven of the fifteen patients (47%) did not receive CT. The evaluation of patients' implant satisfaction in the NRT group was performed at an average of 19 months (min. 3 – max. 24) after the operation date. The clinical characteristics of the patients in both groups are summarized in Table 1.

When postoperative complications were questioned, hematoma, infection and delayed wound healing were reported in 2 (4.3%), 1 (2%) patient and 7 (15%) patients, respectively. Silicone loss was detected in 1 patient (2%) of 31 patients receiving RT, but was not detected in the NRT group.

Table 2. Survey questions and answers

Satisfaction degree*	1* n (%)	2* n (%)	3* n (%)	<i>p</i>
Symmetry				
RT group	15 (48)	10 (32)	6 (20)	0.02
NRT group	4 (27)	2 (13)	9 (60)	
Touch				
RT group	19 (61)	7 (23)	5 (16)	NS
NRT group	10 (67)	2 (13)	3 (20)	
Size				
RT group	11 (35)	6 (20)	14 (45)	NS
NRT group	1 (7)	5 (33)	9 (60)	
Shape				
RT group	12 (39)	6 (20)	13 (41)	NS
NRT group	4 (27)	4 (27)	7 (46)	
Look of clothing				
RT group	8 (26)	4 (13)	19 (61)	NS
NRT group	1 (7)	4 (27)	10 (66)	

RT – radiotherapy; NRT – did not received radiotherapy

* 1 – not satisfied, 2 – satisfied, 3 – very satisfied

There was no difference between the RT and NRT groups in the statistical analysis of the sense of touch, size, shape and clothes stance of the implants. Only symmetry satisfaction was found to be significantly lower in the RT group than in the NRT group ($p = 0.02$; Table 2). These evaluations were also made in the presence of expander or permanent implants during RT and no difference was found.

The participants of the RT group responded the question "Do you think the radiotherapy has deteriorated the appearance of your prosthesis?" The answers to the question were 45% "yes" and 55% "no". This group responded the question that "Would you recommend a friend a silicone prosthesis in case of need?", The answers to the question were 74% "yes" and 26% "no". Likewise, the responses of the NRT group to the question of suggestion to a friend were 73% "yes" and 27% "no". Pain feelings were similar in both groups.

The satisfaction level of silicone size was higher in patients who did not receive CT ($p = 0.02$) than those who received CT.

Discussion

Mastectomy and implantation are frequently performed in the surgical treatment of breast cancer, taking into account tumor features and patient expectations [10]. Concerns about the combination of implant and RT; are in the direction that the complications associated with surgery will increase, cosmetics and patient satisfaction will decrease [11, 12]. Although studies have shown that RT increases complications such as infection, fibrosis and skin edema, it has been shown that capsular contracture or loss of implant often occurs in the presence of certain factors [13, 14].

It has been reported in a prospective and multicenter study that T3, T4 tumor presence, cigarette smoking, hormone therapy and axilla positivity in patients undergone reconstruction and received RT are predisposing factors for implant loss [13]. Furthermore, studies report that irradiation in the presence of expanders increases the rate of implant loss compared to irradiation with silicone implant [15]. The RT group in this study includes 1 patient who has lost an implant in the third year after treatment but there was no statistical difference in terms of complications. On the other hand, the loss of an implant in the third year following RT suggests that the average follow-up period (16 months) for our study is not satisfactorily long to evaluate all complications and in-depth patient satisfaction.

In patients undergone reconstruction, the importance of these complications is controversial in terms of patient satisfaction [16, 17]. The results of Bernard and his colleagues are noteworthy in their studies [18]. The rates of complications between the two groups in which the autologous implant was placed before and after RT and the third group in which only the implant was placed and RT was not given were found to be higher in the first two groups as expected than in the non-RT group. However, in terms of patient satisfaction, no difference was found between the autologous implant group after RT and the silicone implant group with no RT. Patient's satisfaction was

found to be lowest in the autologous implant group before RT, where at least complications were seen. There was no correlation between complication rates and patient satisfaction. In another study done in this respect, although the rate of permanent implant replacement was found to be 22% in the RT group and 4% in the non-RT group, there was no difference in evaluating patient satisfaction in both groups [19].

Berbers *et al.* [7], who reviewed 37 studies in the literature, published their meta-analysis in 2014. In this meta-analysis, the relation of RT timing to complications and the effect of these complications on patient satisfaction were investigated in 4 groups. The necessity of revision surgery was found to be 8.5% for the group that silicone implant was placed before RT (group 1) and 42.4%, for the group that silicone implant was placed after RT (group 2). In the case of autologous implant placement before RT (group 3) or after RT (group 4), the need for revision surgery did not differ. However, fibrosis development in autologous implants was reported as 36% in the implant group before RT and 2.7% in implant group after RT. In terms of patient satisfaction, the authors did not find any statistical difference between the four groups, although there was a slightly lower satisfaction in the silicone implant group after RT.

No significant risk of wound healing and infection was detected in patients with implants undergone neoadjuvant or adjuvant CT [20–22]. However, there are also studies showing that it is linked to implant loss [20]. The effect on degree of patient satisfaction is not obvious. In our study, patients who received CT were found to have a lower satisfaction level in terms of implant size, regardless of RT.

Waking up with a straight chest wall after mastectomy, missing body image cause psychosocial disorders such as depression and sexual dysfunction [23]. The implantation in the same session is medically suitable for most patients. However, the implant is considered a contraindication in patients who need adjuvant RT. For this reason, early implant utilization rates are still very low [24, 25]. However, studies show that the patients' satisfaction levels are high regardless of the complication rates.

In conclusion, in the current study where results of implant satisfaction survey on breast cancer patients who have undergone breast reconstruction surgery with immediate implant and adjuvant radiotherapy, low complication rates are found. In this retrospective study conducted with a limited number of patients, it is also observed that, other than the asymmetry due to RT, no negative cosmetic effects arise. Additionally, it has been determined that CT has a negative effect on implant size independent of RT.

The authors declare no conflict of interest.

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Submitted: 7.10.2017

Accepted: 4.03.2018