

## Early mammographic screening after breast conserving surgery and radiotherapy: Is it necessary?

### Meme koruyucu cerrahi ve radyoterapi sonrası erken mammografik tarama: Gerekli mi?

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#### ÖZET

**GİRİŞ ve AMAÇ:** Bu çalışmanın amacı; meme koruyucu cerrahi ve radyoterapi tedavisi sonrasında yapılan ilk mammografik incelemenin daha ileri radyolojik incelemeler ve rekürren tümör tespiti üzerine etkilerini incelemektir.

**YÖNTEM ve GEREÇLER:** Meme kanseri nedeniyle meme koruyucu cerrahi ve radyoterapi uygulanmış ve ameliyat sonrası 2 yıllık süre içinde en az 1 kez bilateral mammografik görüntüleme yapılmış 278 hasta incelemeye dahil edildi. Radyoterapinin tamamlanmasından sonraki ilk 6 ayda mammografi yapılanlar Grup 1, 6 ay-2 yıl arasında mammografi yapılanlar Grup 2 olarak sınıflandırıldı.

**BULGULAR:** Grup 1'i oluşturan 197 hastaya ilk mammografik tetkik radyoterapiden ortalama 15 hafta sonra (6-24 hafta) yapılmıştı. Mammografideki anormal/şüpheli bulgular nedeniyle bu gruptaki 38 hastaya (%19.2) ilave meme ultrasonu, 7 hastaya da (%3.5) meme manyetik rezonans görüntüleme yapılırken, 8 hastaya eksizyonel biyopsi uygulandı ve hiçbirinin patolojisi malign değildi. Grup 2'deki hastaların sadece 15'ine (%10.4) ilave ultrason ve sadece 2'sine manyetik rezonans görüntüleme istendi. Grup 2'de sadece 1 hastaya şüphe üzerine biyopsi yapıldı ve sonucu malign olarak rapor edildi.

**TARTIŞMA ve SONUÇ:** Meme koruyucu cerrahiyle tedavi edilen hastalarımızın sonuçları, radyoterapinin tamamlanmasını takip eden 6 ay içinde yapılan mammografilerin gereksiz ilave radyolojik tetkikler ve gereksiz biyopsilere neden olduğunu ortaya koymaktadır.

**Anahtar Kelimeler:** Meme kanseri, meme koruyucu cerrahi, mammografi, takip görüntüleme

#### ABSTRACT

**INTRODUCTION:** The aim of this study is to reveal the impact of first mammographic screening timing after Breast Conserving Surgery (BCS) and Radiotherapy (RT) on further radiological evaluations, biopsies and recurrent tumor detection.

**METHODS:** Two hundred and seventy eight patients treated with BCS and RT with at least one bilateral mammography (MG) obtained within two years of postoperative period were evaluated. Patients screened with MG within 6 months of RT completion constituted Group-1 and the rest (6 months to 2 years) were grouped as Group-2.

**RESULTS:** One hundred and ninety-seven patients in Group-1 were screened with MG in a mean time of 15 weeks (6-24 weeks) after RT has completed. Additionally, 38 patients in this group were further evaluated with ultrasonography (19.2%) and 7 with breast Magnetic Resonance Imaging (MRI) (3.5%) due to abnormal/suspicious findings on MG imaging and 8 of them underwent excisional biopsy proving no malignant disease. Additional ultrasonography scans were needed in 15 patients (10.4%) and MRI (1.3%) for 2 patients in Group-2 and one biopsy was performed, confirming a recurrent tumor.

**DISCUSSION AND CONCLUSION:** Our study suggests early mammography within 6 months of RT completion may result in unnecessary additional radiological imaging and unnecessary biopsies after breast conserving therapy.

**Keywords:** Breast cancer, breast conserving surgery, mammography, follow-up screening

## Introduction

Currently, breast conserving surgery (BCS) and radiotherapy (RT) plays an important role in breast cancer treatment. Patient satisfaction has also been increased with the frequent use of oncoplastic surgery (OPS). Annual local recurrence rate of OPS is around 1% and detrimental role of local recurrence on survival is a well-known entity (1,2). The aim of mammographic screening after BCS is the early diagnosis of local recurrence and new primary breast cancer and to guide the adjuvant treatment. The surveillance program to this end and the timing of the first mammography (MG) specifically is not clear (3).

Breast radiologists prefer to have a baseline MG in the early periods of RT. However the issue of fact might be different for surgeons. The advantages of BCS are both ensuring cosmetically acceptable breast volume and thus decreased patient anxiety. Unnecessary breast biopsies performed during follow-up might result with cosmetic deformities and patients' dissatisfaction.

The aim of this study is to reveal the impact of first mammographic screening timing after Breast Conserving Surgery (BCS) and Radiotherapy (RT) on further radiological evaluations, biopsies and recurrent tumor detection.

## Materials and Methods

Two hundred and seventy eight patients treated with BCS and RT with at least one bilateral mammography (MG) obtained within two years of postoperative period were evaluated retrospectively from their medical charts. Patients diagnosed with insitu carcinoma, bilateral breast cancer and with no preoperative mammographic evaluation were excluded. The tumor characteristics and stages, the timing of first mammographic evaluation and MG findings, the pathological diagnosis of biopsies performed after BCS/RT and additional radiological evaluations were recorded. The patients screened with MG within 6 months of RT completion constituted Group-1 and the others with late MG were classified as Group-2. The reason for patients having baseline mammographies at different periods following

RT was that they were followed by either surgeons, medical oncologists or radiotherapists and there was no standard algorithm for radiological follow-up for these patients at the time.

RT was performed in a conventional fashion; brachytherapy was not used in any patient. None of the patients in the study groups were given neoadjuvant therapies.

Statistical analysis was done with SPSS v22 (SPSS INC., IBM). Mann – Whitney U test was used to compare non-normal continuous data while Chi-squared test was used to compare categorical variables. The Fisher's exact test was used to determine if there was a relationship between groups and tumor recurrence.

## Results

The median time for initiation of RT after surgery was  $3.9 \pm 0.9$  months. The distribution with respect to age, body mass index (BMI), tumor size, lymph node involvement, grade and receptor status were homogenous in two groups (Table 1). One hundred and fifty seven patients in Group-1 were screened with MG in 15 weeks (6-24 weeks) after RT. Additionally, 34 patients in this group were further evaluated with ultrasonography and 6 with breast MRI according to the abnormal findings on MG. Eighty eight patients among 157 patients in Group-1 had been operated with traditional BCS techniques and 66 patients with OPS techniques such as reduction mammoplasty and intraglandular flaps. Six patients with alerting findings like calcifications, nodules and undefined postoperative changes detected in MG and/or further radiologic evaluations underwent excisional biopsies after stereotactic guide wire localization. Biopsy materials of these 6 patients showed no signs of malignant disease. The pathology results of these patients were fibrocystic changes (n=2), ductal hyperplasia without atypia (n=2), fat necrosis (n=1) and calcified fibroadipose tissue (n=1). Four of the six patients that required biopsy had already been operated with OPS. Postoperative biopsy rates in our BCS and OPS patients were 6% and 2.2%, respectively. But, this difference was not statistically significant (p=0.2). There were no additional suspicious lesions, apart

from the malignant, in preoperative MG's of the 6 patients biopsied.

One hundred and twenty-one patients in Group-2 were screened with MG in 32 weeks (24-62 weeks) after RT. Additional 11 ultrasonographies and only 1 MRI were needed for further evaluation after MG's. OPS was performed in 40 patients among 121 patients in this group. Excisional biopsy was needed due to a calcified breast nodule for only one patient

treated with OPS in Group-2 and it was proven to be malignant.

The patients in Group-1 had been found to be evaluated with more additional radiological interventions than the patients in Group-2 ( $p=0.01$ ). The general characteristics of the patients were outlined in Table-1. There were no differences with respect to tumor recurrence in between the groups ( $p=0.1$ ). The rate of recurrence in a median 18 months (9-40 month) of follow-up was 0.35 %.

**Table-1.** Tumor and patient characteristics

	Group-1 (n:157)	Group-2 (n:121)	p value
Age	52±9.8	51±11.8	n.s
BMI	27.8±0.73	28.2±0.77	n.s
Tumor size (median)	2.4 cm	2.6 cm	n.s
Axilla (+)	50 (%32)	36 (%29.7)	n.s
Grade (%)			n.s
I	21	19	
II	40	37	
III	39	44	
Additional radiologic intervention	40 (25.4%)	12(9.9%)	0.01
OPS	66 (42%)	40(%33)	n.s
Benign biopsy	6 (%3.8)	0 (%0)	N/A

OPS; Oncoplastic surgery

BMI; Body mass index

n.s: Not significant

N/A: Not applicable

## Discussion and Conclusion

Mammography still keeps its importance as a basic radiological intervention for screening and surveillance in patients with breast cancer. The incidence of breast cancer in screening programs among healthy women is 2.3-4.7 per 1000 mammographies (4). Nowadays breast cancer is diagnosed at earlier stages with the regular use of high quality MG giving surgeons

the opportunity to perform BCS in majority of the cases (5). Local recurrence after BCS is a factor for decreased overall survival and early treatment of local recurrence increases survival (6,7). Although it has been reported that local recurrence rate after BCS is roughly 1% per year, the distribution of this rate is not proportional among following years of treatment. The risk gradually increases in the first two years reaching the highest contingency

at the end of second year and then declines (8). Approximately 35% of local recurrences can be diagnosed solely with MG (9,10). While the incidence of local recurrence is 1.9 per 1000 mammographies performed in the first year after surgery, this rate increases to 4.9 in the second year (11). This rate in the second year is higher than the incidence of malignancy diagnosed with screening of healthy women. There is a general consensus about annual mammographic screening after second year of surgery. ASCO recommends MG no later than one year after surgery and at the earliest after 6 months of RT and then annual mammographic screening is recommended (12). NCCN is also in favor of annual screening (13). The main argument on this subject is about the intervals of MG in the first two years and the timing of first MG in the early period of surgery.

The common advantages of early baseline mammographies stated in studies promoting this idea are the diagnosis of recurrent tumor at its smallest diameter and early detection of new lesions that could arise in the follow-up period (10,14). Arasu et al. stated that the recurrent tumors diagnosed with mammographic surveillance with 6 months intervals are smaller in size and have low rate of axillary involvement (15). Hassel et al. also reported that false positive images in the lumpectomy field and benign biopsy rates could be decreased with frequent use of MG screening (14). It was also claimed that the patients feel more confident with frequent interventional follow-up (16)

The low rates of recurrence in the first year of surgery and the reports about the median 18-24 months for recurrence after adequate surgery and RT make the need for early MG disputable. Structural changes should be expected in breast tissue during healing period of surgery and RT. Dershaw et al. argued that structural distortion, thickening of the skin and increased density are all normal after RT and the majority of calcifications and spiculated mass lesions are related to fat tissue necrosis and scarring (17). It was also stated that, these changes could be persisted for about 2 years after completion of RT (18). Baseline MG could be helpful for differential diagnosis of new lesions that will develop during follow-up but Buckley et al. reported that as the effects of surgery and RT on breast tissue would not be

subsided, the early screening does not have any value for differentiation of new lesions (19).

In many studies, the recurrence rates detected with early mammographic screening was not higher than the malignancy rates detected with mammographic screening among healthy women. In a series of 789 patients by Lewis et al., it was stated that early MG performed within 8 months of RT did not alter the local recurrence and overall survival rates when compared with late MG(7). In a series of 399 patients by Mc Naul et al., early MG resulted in unnecessary biopsies and additional evaluations. In their series, the rate of recurrence detected with MG was 0.35% (20). In one of the largest series with 1435 patients by Hymas et al., MG obtained within 6 months of RT was stated to be futile (11) and Lin et al. also suggested that first MG should be planned after 12 months of RT(21). Also in our series, any value of early MG by means of early detection of recurrent or de novo tumors could not be revealed.

At that point, other issues that should be considered are the increased cost of additional radiological studies, unnecessary biopsies and their emotional and cosmetic effects on the patient. Additional studies like ultrasonography and MRI were needed to clarify the lesions detected with early MG and if the suspicion persists to exist, excisional biopsies were performed. The principle advantage of BCS and OPS over traditional mastectomy is the cosmetic outcome. In studies conducted by radiation oncologists and radiologists, the poor cosmetic results of benign biopsies were not taken into consideration. On the other hand, the patients experience some degree of pain during MG and early mammographies are more painful (22). Additionally, it is well known that frequent radiological evaluations after surgery increases the patients' anxiety (23,24). It was also stated that the microtrauma caused by early MG in the presence of seroma, might contribute to cellulitis (25).

In conclusion, structural distortions seen after surgery and RT lead to diagnostic challenges in radiological studies performed in early periods of these interventions. Besides, the value of early baseline MG in detecting possible new lesions is controversial. Therefore, early MG screening does not provide expected benefits and results in increased expenditure

and unnecessary biopsies. Elapsed time after RT, rather than after surgery should be taken into account for the timing of initial MG screening after BCS and the earliest MG should be obtained after 6 months of RT. Although the groups in our study were homogenous with respect to tumor features, the risk of local recurrence for each patient was not taken into consideration. According to the recurrence

score, the follow-up intervals of the patients might also be different. Therefore, further prospective and well-designed studies are needed to describe follow-up programs in accordance with recurrence risk scores.

**Conflict of interest:** None

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