

Is Histological Evaluation of Reduction Mammoplasty Specimens Worthwhile?

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Abstract

Background: Reduction mammoplasty (RM) is one of the most common plastic surgery procedures. Despite its cost, the total number of RM procedures continues to increase every year.

Objectives: The purpose of this study is to review the prevalence of benign and malignant breast lesions among women who live in the Aegean region of Turkey, based on our university hospital's records and to compare our results with those in the literature.

Methods: Seven hundred and thirty-three consecutive female patients who underwent RM between January 2003 and January 2017 in the Department of Plastic, Reconstructive, and Aesthetic Surgery were included in this study.

Results: One hundred and sixty-five patients (23.4%) had preoperative breast imaging results. According to the Breast Imaging Reporting and Data System (BIRADS), most of these patients had BI-RADS-2 and BIRADS-1 findings (41.21% and 40%, respectively). Fibrocystic changes were the most common lesions (81.3%). Sixty-eight patients (9.6%) had normal breast tissue on the right side and 34 patients (4.8%) had the same on the left side. Five patients (0.71%) had atypical ductal hyperplasia and no atypical lobular carcinoma. Four patients (0.56%) had occult breast cancer and one patient (0.14%) had benign phyllodes tumor.

Conclusions: RM is a good opportunity to detect proliferative lesions and occult breast cancer. While meeting the patient's aesthetic desires, the plastic surgeon should consider for histopathological evaluation. We suggest that every part of the breast tissue should be sent to pathological examination regardless of the weight of the specimen. Even if health insurance does not cover its cost, patients should be informed about the importance of this process.

Level of Evidence: 4



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Reduction mammoplasty (RM) is one of the most common plastic surgery procedures. According to The International Society of Aesthetic Plastic Surgery (ISAPS) 2016 global statistics, 18,480 RM operations were performed in Turkey and RM constituted 21.1% of all cosmetic breast surgeries.¹ Although patients who request RM experience physical symptoms such as neck and back pain, intertrigo, and poor posture, this operation is considered cosmetic and is not covered by health insurance. Despite being considered a cosmetic procedure and bringing economic burden to patients, the total number of RM procedures continues to increase every year.

Apart from the above-mentioned complications, low quality of life and reduced exercise capacity, the difficulty of finding suitable clothing, and problems experienced during mammography lead patients to seek remedy through surgery. RM has been shown to be an effective

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tool in alleviating many of these symptoms.^{2,3} Also, RM can be performed to the contralateral breast simultaneously with a subcutaneous mastectomy procedure based on the patient's preference or to obtain symmetry in the reconstructed breast after cancer surgery.

Breast cancer still has a high mortality rate among women aged 40 to 55 years.^{4,5} According to a very large cohort study analyzing breast cancer found at the time of RM, 5-year survival from breast cancer in women diagnosed at the time of RM (88%) was better than survival from breast cancer in the general population (77%). These findings suggest that cancers found in women at the time of RM are less advanced, possibly because they are diagnosed at an earlier stage. However, we should also consider that the overall survival rate is also related to the clinical and pathologic stage.⁶ The occurrence of incidental breast cancer or premalignant lesions in RM specimens is therefore not surprising, and several studies have shown its prevalence ranges from 0.06% to 3.8%.⁷

The purpose of this study is to review the prevalence of benign and malignant breast lesions among women who live in the Aegean region of Turkey based on the database of our university hospital, which is the largest in the said region, and to compare our results with those in the literature.

METHODS

Seven hundred and four consecutive female patients who underwent reduction mammoplasty between January 2003 and January 2017 in the Department of Plastic, Reconstructive, and Aesthetic Surgery were included in the study. Patients with a previous history of breast cancer were excluded. The study design was retrospective, and all data were retrieved from the clinical electronic database. The ethics committee of Dokuz Eylul University Faculty of Medicine reviewed and approved the study. Indications for surgery were symptomatic macromastia and asymmetry of the breasts. Thirteen patients had a history of previous breast cancer and unilateral mastectomy. Reduction mammoplasty was performed to minimize the opposite side breast tissue according to the patient's desire. All the women were assessed before the surgery. Physical examination and preoperative imaging were performed. If any suspicion occurred before the operation, the patient was referred to the oncologic breast surgeon. Findings of preoperative imaging were classified according to the American College of Radiology Breast Imaging Reporting and Data System⁸ (Table 1). The lesions were categorized according to the Rosen classification.⁹ Histopathologically, lesions were classified into 3 groups: benign alterations, proliferative lesions, and tumors. Benign lesions included fibrocystic disease, sclerosing adenosis, fibroadenoma, ductal ectasia, and fat necrosis. Ductal hyperplasia

Table 1. Breast Imaging Reporting and Data System (BIRADS) Classification

BI-RADS	Description	Malignancy rate (%)
0	Needs additional evaluation	
1	Normal findings	0
2	Benign lesions	0
3	Probably benign lesions	<2
4	Low risk for malignancy	
	4a	2–10
	4b	10–50
	4c	50–95
5	High risk for malignancy	>95
6	Biopsy proven malignancy	100

without atypia, atypical ductal hyperplasia, intraductal hyperplasia with atypia, and ductal papillomatosis were the proliferative lesions. The malignant tumors detected in the study were ductal carcinoma in situ (DCIS) and invasive ductal carcinoma.^{9,10} All operations were performed by 4 plastic surgeons in the clinic. Different pedicle and scar types were used depending on the patients' and surgeons' preferences. Pathology specimens were assessed by breast pathologists. Five samples per breast were taken for examination. Hematoxylin and eosin were used for staining. Specimen weights were measured separately for the right and the left breasts. Weights were differed according to breast type, volume, patients' desire, and surgical approach.

RESULTS

A total 1408 breasts of 704 female patients were operated for mammary hypertrophy and concomitant ptosis. Ages of the patients ranged from 16 to 72 years (average, 42.2 ± 30.2 years). One hundred and sixty-five patients (23.4%) had preoperative breast imaging results. Of these, 68 patients (41.2%) had BI-RADS-2, 66 patients had BI-RADS-1 (40%), 26 patients had BI-RADS-3 (15.7%), and 5 patients (3.03%) had BI-RADS-0 findings. Four of 5 patients (80%) who had BI-RADS-0 findings underwent another breast imaging preoperatively, which revealed BI-RADS 1 findings. These results were obtained from breast USG, MRI, and mammography screenings. A total 259 radiological assessments were performed. Multiple diagnostic radiological methods were employed in 113 patients. Inconsistencies were seen in the MRI and mammography findings of 3 patients.

Weights of the specimens were divided into 2 groups as left and right. Mean tissue weight removed from the right breasts was 627.41 g (range, 452-2250 g) and from the left breasts was 612.38 g (range, 484-2200 g).

Fibrocystic changes were the most common lesions (82.8%). Sixty-eight patients (9.8%) had normal breast tissue on the right side and 34 patients (4.8%) had the same on the left side. Five patients (0.71%) had atypical ductal hyperplasia and no atypical lobular carcinoma. One patient (0.14%) had bilateral benign phyllodes tumor. The histopathological distribution of nonproliferative and proliferative diseases is detailed in Table 2. Four patients (0.56%) had occult breast cancer. The median age of women with incidental cancer at the time of reduction mammoplasty was higher (62 years) than of those without cancer lesions (42.2 years). Patient data are shown in Table 3. These 4 patients with breast cancer had negative imaging results. Concomitant benign breast neoplasms were found, mostly fibroadenoma. Only one patient had a hemangioma.

All 704 patients included in our study were scheduled for a routine follow-up after being discharged from the hospital. The mean follow-up time was 23.2 months (range, 6-84 months).

The overall complication rate was 8.6% (61 patients). Breast asymmetry (51 patients, 7.2%), wound dehiscence (38 patients, 5.3%), nonoperative hematomas (17 patients, 2.4%), fat necrosis (13 patients, 1.8%), localized infections (11 patients, 1.5%), and partial hypertrophic scar (2 patients, 0.28%) were the most common minor complications seen in the postoperative period. No major complications such as nipple-areola complex loss or skin necrosis were seen, except in one case (0.14%) who was a smoker. Patients with temporary nipple-areola sensitivity alterations (43 patients, 6.1%) had no complaints after the sixth postoperative month. Of these patients, 21 (2.9%) required minor revisional surgery under local anaesthesia.

DISCUSSION

Reduction mammoplasty is a commonly performed procedure among plastic surgeons. The number of procedures performed per year may vary by country. Although patients who demand this procedure experience medical issues such as back pain and intertrigo, it is considered as a cosmetic procedure and therefore not covered by health insurance plans.

Since the first substantive improvement in the 19th century, numerous breast reduction techniques were developed over the years, especially in the most recent decades. Types of resection and pedicle fall beyond the scope of this study; nevertheless, these are important specimens in the pathological examination. The weight of the resected breast tissue depends on the volume, scar,

and pedicle type. Therefore, analysis of these specimens offers a great chance for detecting an occult breast cancer in women who do not present with any symptoms or a palpable mass.

All breast tissue specimens were immediately placed in a container covered with formalin and sent to the pathology laboratory. During the histopathological evaluation process, the pathologists first macroscopically examine all breast tissue material. If they are suspicious about any mass formation, they obtain serial thin section cuts. Otherwise, they examine one cassette for each 1-cm width of tissue.

In Turkey, the Ministry of Health recommends to females older than 35 years to have breast ultrasonography. If any suspicious findings are detected in breast ultrasonography, mammography is also recommended. However, due to low socioeconomic level, health insurance problems, and other personal excuses, the breast imaging rate is quite low. This also shows the necessity of public education about this issue.

According to the literature, the incidence of in situ carcinoma and invasive breast carcinoma is 0.05% to 2.5%.^{11,12} In our study, we found 4 occult cancers in 3 breasts and 2 DCIS. The total rate of malignancy (breast carcinoma + DCIS) was 6/1408 (0.42%). However, the actual rate of true carcinoma was 0.28% and DCIS was 0.14%. These findings were comparable to those described in the literature. In the detection of incidental breast cancer or pre-malignant lesions in RM, different approaches have been reported in the literature.⁷ In our cases, after the presence of cancer was identified and the patient was evaluated by the breast surgeon, subcutaneous mastectomy and immediate reconstruction with the implant was performed. In addition to breast cancer, there are also high-risk lesions that increase the risk of cancer, such as atypical ductal hyperplasia (ADH) and atypical lobular hyperplasia. In our study, pathology specimens revealed ADH in 5 patients (0.71%). These patients were closely followed-up through annual screening, biopsy, and examinations. No atypical lobular hyperplasia was found in the cases included in the study.

The skin of RM specimens was also taken into consideration. Superficial vascular dermatitis was evaluated and noted on the right side in 44 patients (6.2%) and on the left side in 18 patients (2.5%). We experienced that minor complications such as suture reaction and wound-healing problems at junction points were higher in these patients than in other patients. This suggests that pathology results can be used as a guide for predicting these factors.

There are various studies reporting different results about reduction mammoplasty pathology specimens. Such differences may be due to the differences in study design. For instance, some authors advocate that breast cancer risk is elevated after the age of 40 years. Therefore, a thorough

Table 2. Histopathological Findings and Number of Patients

Right breast	Diagnosis	Number of patients (%)
Normal breast tissue	—	68 (9.6%)
Nonproliferative lesions	Fibrocystic change	575 (81.6%)
	Fibroadenomatoid change	78 (11.07%)
	Columnar cell change	81 (11.5%)
	Apocrine metaplasia	239 (33.9%)
Proliferative lesions without atypia	Columnar cell change with hyperplasia	51 (7.2%)
	Sclerosing adenosis	141 (20.0%)
	Intraductal papillomatosis	13 (1.8%)
	Ductal hyperplasia without atypia	227 (32.2%)
	Lobular hyperplasia without atypia	21 (2.9%)
Proliferative lesions with atypia	Atypical ductal hyperplasia Atypical lobular hyperplasia	5 (0.71%) —
Microcalcification		41 (5.8%)
Occult benign and malignant tumor	DCIS	—
	LCIS	—
	IDC	2 (0.28%)
	ILC	1 (0.14%)
	Phylloid tumor	1 (0.14%)
Left breast	Diagnosis	Number of patients (%)
Normal breast tissue	—	34 (4.8%)
Nonproliferative lesions	Fibrocystic change	591 (83.9%)
	Fibroadenomatoid change	87 (12.3%)
	Columnar cell change	91 (12.9%)
	Apocrine metaplasia	241 (34.2%)
Proliferative lesions without atypia	Columnar cell change with hyperplasia	52 (7.3%)
	Sclerosing adenosis	160 (22.7%)
	Intraductal papillomatosis	9 (1.2%)
	Ductal hyperplasia without atypia	240 (34.09%)
	Lobular hyperplasia without atypia	16 (2.2%)
Proliferative lesions with atypia	Atypical ductal hyperplasia	5 (0.71%)
	Atypical lobular hyperplasia	—
Microcalcification		24 (3.4%)
Occult benign and malignant tumor	DCIS	2 (0.28%)
	LCIS	—
	IDC	—
	ILC	1 (0.14%)
	Phylloid tumor	1 (0.14%)

Table 3. Patients with Benign or Malignant Tumors

	Age (years)	Right breast	Left breast	Total specimen weight
Patient 1	67	Invasive lobular carcinoma and invasive ductal carcinoma	Invasive lobular carcinoma	1936 g
Patient 2	58	—	DCIS	850 g
Patient 3	62	—	DCIS	643 g
Patient 4	54	Invasive ductal carcinoma	—	775 g
Patient 5	63	Benign phylloid tumor	Benign phylloid tumor	2144 g

Table 4. A Comparison Between Study Results

Study	No. of patients	Median age	Average specimen weight	ADH	ALH	DCIS	LCIS	Invasive carcinoma
Ambaye et al ¹⁴	202	44	555.3	3 (1.48%)	14 (6.93)	3 (1.48%)	2 (0.99)	2 (0.99%)
Demirdover et al ⁸	704	42.2	619.89	5 (0.71)	—	2 (0.28%)	—	3 (0.42%)
Desouki et al ¹⁹	2498 (NIBC) 179 (IBC)	43.6 54	878.6 NM	44 (1.76%) 7(3.91%)	39 5	4 (0.16%) 1 (0.55%)	15 5	2 (0.08%) 3 (1.67%)
Viana et al ¹⁵	274	34.8	NM	2 (0.72%)	—	1 (0.36%)	1	1 (0.36%)
Hassan et al ¹¹	1388	39	NM	NM	NM	5 (0.36%)	2	4 (0.28%)
Kececi et al ¹⁷	95	40.9	730	7 (7.3%)	1	—	—	—
Tadler et al ⁷	534	38 ^b	<500/>500	NM	NM	2 (0.37%)	3	—
Sorin et al ²⁰	2718	54/56	249/182	NM	NM	14 (0.51%)	1	25 (1.14%)

ADH, atypical ductal hyperplasia; ALH, atypical lobular hyperplasia; DCIS, ductal carcinoma in situ; IBC, invasive breast cancer history; LCIS, lobular carcinoma in situ; NIBC, noninvasive breast cancer history; NM, not mentioned.

^aPresented study. ^bMedian age of 407 patients.

evaluation should be performed after this age.^{13,14} On the other hand, there are those advocating the opposite in the literature.¹⁵ In our study, the mean age of patients was 42.2 years. After the age of 40 years, the probability of developing invasive breast cancer in the next 10 years is 1.45% or 1 in 69, and the risk increases with age.¹⁶ So, when we consider age and the rate of occult breast cancer, analyzing pathology specimens appears to be important. In addition, one of our patients who had atypical ductal hyperplasia was 20 years old. The risk for breast cancer of atypical epithelial proliferation is 2-fold in the presence of this lesion in women younger than 55 years of age. This finding makes the detection of atypical lesions especially important in younger patients.¹⁷ In our study, only 165 patients (23.4%) underwent breast imaging before surgery. Low socioeconomic level, health insurance problems, and other personal excuses are some of the reasons for a low breast imaging rate. Because breast USG, mammography, and MRI have different sensitivity and specificity levels, there is a risk of missing cancer if the result of the one is not verified with the other. In our study, we identified that one patient had DCIS, though the BI-RADS results

showed benign findings. Both nonproliferative and proliferative breast lesions increase the risk of breast cancer.¹⁷ Therefore, excluding those patients with normal breast tissue, all the other women in our study had a higher risk than normal. Especially those who are aged over 50 years and who have risk factors should be closely monitored.

Invasive ductal and lobular carcinoma can be bilateral. The rate of bilateral breast carcinomas is reported differently in some studies.¹⁸ This difference in rates may be due to the characteristics and age distribution of the study populations. If any findings for cancer are identified during the follow-up period, patients should be recommended subcutaneous mastectomy and immediate reconstruction with the prosthesis. In patients who demand RM on the opposite side, this should be always verified with the breast surgeon. It is also mandatory to have breast screening results in patients who have a cancer history.

In the literature, different studies reported their results based on the number of patients, median age, average specimen weight, and histopathological types of cancer.^{19,20} Overall, we found our results were similar to those reported in the literature (Table 4). Although

almost all studies that have analyzed reduction mammoplasty specimens have included occult breast cancer in their evaluation, there are differences in patient selection, histopathological sampling, and criteria comparison, depending on the method of these studies. Therefore, results related to each of these parameters should be assessed individually. In our statistical analysis, we combined the data such as patient age, weight of specimens, presence of previous cancer history, and histopathological results. Every study design is unique and compares different parameters. To summarize, we concluded that in cases where the patient is older than 50 years, has previous breast cancer and family history, or presents with abnormal imaging findings, the surgeon must be aware of a possible risk of cancer.

Patients who undergo RM have common complications that might be seen in any surgical intervention, such as hematoma, seroma, and infection. In our study, breast asymmetry, wound dehiscence, nonoperative hematomas, fat necrosis, localized infections, and partial hypertrophic scar were the most common minor complications seen in the postoperative period. The only nipple-areola loss was seen in a smoker patient. According to related literature, complications after RM show great discrepancy between different studies.^{21,22} Patient age, BMI, smoking status, weight of breast tissue resected, the medical condition of the patient, and surgical technique may affect the complication rate.²² Our complication rate stays between the range of postoperative complications reported in the literature.

One potential limitation to our study is that the rate of preoperative breast imaging is quite low. This should be increased by systematic public education programs and by the preoperative guidance of the surgeons. On the other hand, patients with personal and/or family history of breast cancer should be categorized preoperatively and the pathologist should be aware of potential risks of the specimens that they examine.

CONCLUSIONS

There is a lifetime risk for developing breast cancer, and 1 in 8 women in the world experiences this condition. Reduction mammoplasty is a good opportunity to detect proliferative lesions and occult breast cancer. While meeting the patient's aesthetic desires, the plastic surgeon should consider taking a sample for histopathological evaluation. We suggest that every part of the breast tissue should be sent to pathological examination regardless of the weight of the specimen. Even if health insurance does not cover the cost of this operation, patients should be informed about the importance of this process.

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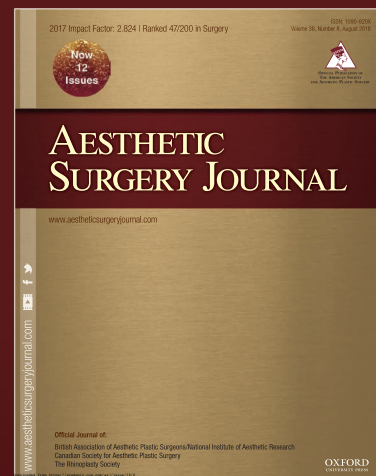
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