



## Histopathological findings after breast reduction operations with inferior Pedicular techniques

Ümran Muslu<sup>1</sup>✉, Dilek Şenen Demirez<sup>2</sup>, Güven Güney<sup>3</sup>, Engin Şenel<sup>4</sup>

**Introduction:** Breast reduction mammoplasty is one of the most commonly performed cosmetic surgical procedures, which provide us with breast tissue for pathologic examination. In this study, we aimed to examine the breast tissue to detect histopathological abnormalities. **Material-Method:** It is a single-center, retrospective study designed in Antalya Education and Research Hospital between 2011-2014. 276 patients were included in this study. All patients underwent bilateral breast reduction surgery. Mean age of the patients was 42.5±12.0 years (median: 43, min: 17, max: 75). The patients were examined psychically, and then mammography, ultrasonography and MRI (older than 40 years) and breast ultrasonography and MRI (younger than 40 years) were performed. No evidence of tumor formation was seen in any of the patients who were included in the study. **Results:** All mastectomy specimens were evaluated histopathologically (n=552). The lightest specimen was 183 g., the heaviest specimen weight was 2800 g. 114 breast specimens were histopathologically normal, nonproliferative lesions were found in 349 breast specimens. A slight increase in risk was seen in 80 specimens. 80 specimens were found to be moderately increased risk. None of the patients showed any significant increased risk. Only one lobular carcinoma was detected. **Conclusion:** According to our findings, it is important to examine breast tissues for the detection of breast lesions. Breast reduction surgery may be useful for not only cosmetic concerns but also detection of proliferative, nonproliferative lesions, and even carcinoma.

### INTRODUCTION

Macromastia may cause some discomfort in women such as back and shoulder pain, skin lesions, exercise limitation, difficulty in finding suitable clothes as well as psychological problems. Breast reduction operations have been proven to be safe and successful to relieve most of the complaints. Therefore, breast reduction operation is one of the most performed cosmetic surgical procedures, and is the fifth most common reconstructive surgical procedure in the US (1).

Breast cancer is one of the most frequent malignancies and one of the most common causes of death in women (2,20,21). Although screening tests are available and easily performed, some breast cancers cannot be determined by screening tests. Also screening tests are not performed in young women. It is not surprising to detect abnormal histopathological findings and proliferative lesions in breast reduction specimens. Therefore, it is important to examine specimens after the surgery because of cancer risk. In a previous study, it was found that rate of malignancy in breast reduction pathologic specimens was about 0.6-1.4 % (3). Other studies found similar results, between the range of 0.3-1.4 % (4-10). In addition, benign lesions can be detected during pathological examination such as fibrocystic changes, fibroadenoma, proliferative ductal and lobular lesions.

In our study, we aimed to share our findings about histopathological lesions that were detected in breast tissue specimens and we would like to point out that the pathological examinations of the specimens are important for the detection of breast abnormalities.

### MATERIALS AND METHODS

The Antalya Education and Research Hospital Ethic Committee approved a retrospective chart review of patients who underwent breast reduction procedures from 2011 to 2014. 276 patients were included in the study. All of them were operated for cosmetic reasons due to macromastia. Mean age of the patients was 42.5±12.0 years (median: 43, min: 17, max: 75). None of the patients had previous breast surgery and none were using medication for breast or endocrine diseases. The patients had no complaints other than macromastia and macromastia-related symptoms. Written informed consent was taken from all patients before the surgery. The patients were examined psychically, and then mammography, ultrasonography and MRI (older than 40 years) and breast ultrasonography and MRI (younger than 40 years) were performed. No evidence of tumor formation was identified preoperatively in any of the patients who were included in the study. If breast lesions had detected by screening tests, they would have been excluded from the study and planned to refer to general surgery. In addition, there was no need to consult patient with general surgeons during all procedures. All patients were operated for macromastia bilaterally, so we had 552 breast tissue specimens to be examined. The cases were classified according to age, specimen weight and pathological findings. Breast tissues were categorized according to

<sup>1</sup>Department of Plastic and Reconstructive Surgery, Hitit University Faculty of Medicine, 19200, Çorum, Turkey; <sup>2</sup>Department of Plastic and Reconstructive Surgery, Bahçeşehir University Faculty of Medicine, Antalya, Turkey; <sup>3</sup>Department of Pathology, Hitit University Faculty of Medicine, 19200, Çorum, Turkey; <sup>4</sup>Hitit University Faculty of Medicine, Department of Dermatology, 19200, Çorum, Turkey;

✉Corresponding author: Ümran MUSLU, MD, Assistant Professor of Plastic Aesthetic and Reconstructive Surgery, Department of Plastic and Reconstructive Surgery, Hitit University Faculty of Medicine, 19200, Çorum, Turkey. Tel. +90 364 2230300; Fax +90 364 2230323; E-mail: umrandr@hotmail.com

consensus statement outlines by the Cancer Committee of the College of American Pathologists in 1988 and its updates (11).

Patients were divided into two groups according to their age as older and younger than 40 years. Surgical procedures were performed by plastic surgeons, using the Wise-pattern inferior-pedicle technique.

All specimens were evaluated by pathologists. During macroscopic examination size and weight of the specimens were noted. Every specimen were sliced in a sagittal plane at 0.5-1 cm intervals. Tissues placed 10% buffered formalin for fixation for 24 hours and evaluated visually and by palpation for macroscopic lesions that are suspicious for neoplasm. Depending on the macroscopic features and the abundance of parenchyma, three to five samples were submitted for histopathological examination. After routine tissue processing and paraffin embedding, 4-5 micrometer sections were taken, stained with hematoxylin and eosin and examined under light microscope. If necessary additional sections were submitted.

Statistical analysis was performed with the statistical package for the social sciences (SPSS), version 22.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics (frequencies and percentages) were used to describe the histologic evaluation of specimens. Inferential statistics were used to examine differences between patients' pathologic findings and ANOVA, t- test, and nonparametric statistics were used when appropriate. All statistical procedures were performed using  $\alpha = 0.05$ , 2-tailed. The analysis was performed as patient based or specimen based wherever appropriate.

## RESULTS

276 patients were included in the study. All patients had undergone bilateral reduction mammoplasty. A total of 552 mastectomy specimens were evaluated histopathologically according to consensus statement outlines by the Cancer Committee of the College of American Pathologists in 1988 and its updates (Table 1, Figure 1). Histopathological findings were summarized in Table 2. Mean age of the patients was  $42.5 \pm 12.0$  years. While the youngest patient was 17 years old, the oldest was 75 years old. One hundred and sixtyfive patients were older than 40 years old and 111 were younger than 40 years old.

**Table 1** Histopathological evaluation of specimens (specimen based) (According to consensus statement outlines by the Cancer Committee of the College of American Pathologists)

Age	<40	40 >
Normal breast (n)	37	77
No increased risk/ Nonproliferative lesions (n)	150	199
Minimal increased risk / proliferative lesions (n)	37	43
Increased moderate risk (n)	2	6
Markedly moderate risk (n)	0	0
Invasive breast cancer (n)	0	1

There was no need to oncological procedures during the operations. The lightest specimen was 183 g., the heaviest specimen weight was 2800 g. The weights of the left breasts ( $773 \pm 374$  g.) and right breasts ( $781 \pm 356$  g.) were similar ( $p=0.39$ ). Also, there were no differences between BI-RADS score ( $p=1$ ) according to screening tests. Number of blocks submitted for histopathological evaluation were similar in left ( $4 \pm 3$ ) and right breasts ( $4 \pm 3$ ) ( $p=0.93$ ). Right and left breasts were similar in their histopathological risk groups ( $p=0.89$ ). Total weight of mastectomy specimens were higher in patients older than 40 years old

( $1704 \pm 736$ ) than those younger than 40 years old ( $1333 \pm 608$ ) ( $p < 0.001$ ). Total number of blocks submitted for histopathological evaluation were not different between age groups ( $9 \pm 6$  for  $<40$ ,  $8 \pm 6$  for  $\geq 40$ ,  $p=0.35$ ).

**Table 2** Histopatology of specimens (specimen based)

Type	Age	Number of specimens
Normal histology	<40	35
	>40	79
Fibrocystic disease	<40	142
	>40	170
Sclerozanadenosis	<40	2
	>40	3
Ductal hyperplasia (nonatypical)	<40	20
	>40	37
Microcalcification	<40	6
	>40	17
Fibroadenoma	<40	7
	>40	1
Ductal ectasia	<40	3
	>40	4
Lipoid necrosis	<40	1
	>40	6
Atypical ductal hyperplasia	<40	2
	>40	6
Ductal carcinoma in-situ	<40	0
	>40	0
Ductal papillomatosis	<40	1
	>40	3
Intraductal papilloma	<40	2
	>40	2
Invasive ductal carcinoma	<40	0
	>40	0
Tubuler adenoma	<40	1
	>40	1
Invasive lobuler carcinoma	<40	0
	>40	1

Histopathological examination, weight of specimens, and patients' BI-RADS scores are shown in Table 3. Patients with normal breast and no increased risk were  $42.4 \pm 12.2$  years old, and patients with minimal, moderately, highly increased risk and invasive carcinoma were  $43.1 \pm 11.2$  years old. There was no statistically difference in histopathological findings between groups ( $p=0.67$ ), shown in Table 4.

Highest histopathologic risk group of any breast of a patient was not different between age groups ( $p=0.48$ ). Only one malignant tumor was detected in one breast of a patient who was older than 40 years old. She was diagnosed as lobular carcinoma and referred to General Surgery department after healing. 114 breast specimens were normal, 37 of whom were younger than 40 years. Nonproliferative lesions were found in 349 breast specimens, 150 of whom were under 40 years. A slight increase in risk was seen in 80 specimens. Of these, 37 were below 40 years of age, 43 were 40 years of age and over. 80 specimens were found to be moderately increased risk. Two of them were under 40 years of age, 6 of them were 40 years of age or older. None of the patients showed any significant increased risk.

Weight of mastectomy specimens were not found to be related to risk group of breast lesions. Those with normal breast and no increased risk were  $771 \pm 362$  grams and those with minimal, moderately, highly increased risk and invasive carcinoma were  $812 \pm 380$  grams ( $p=0.33$ ).

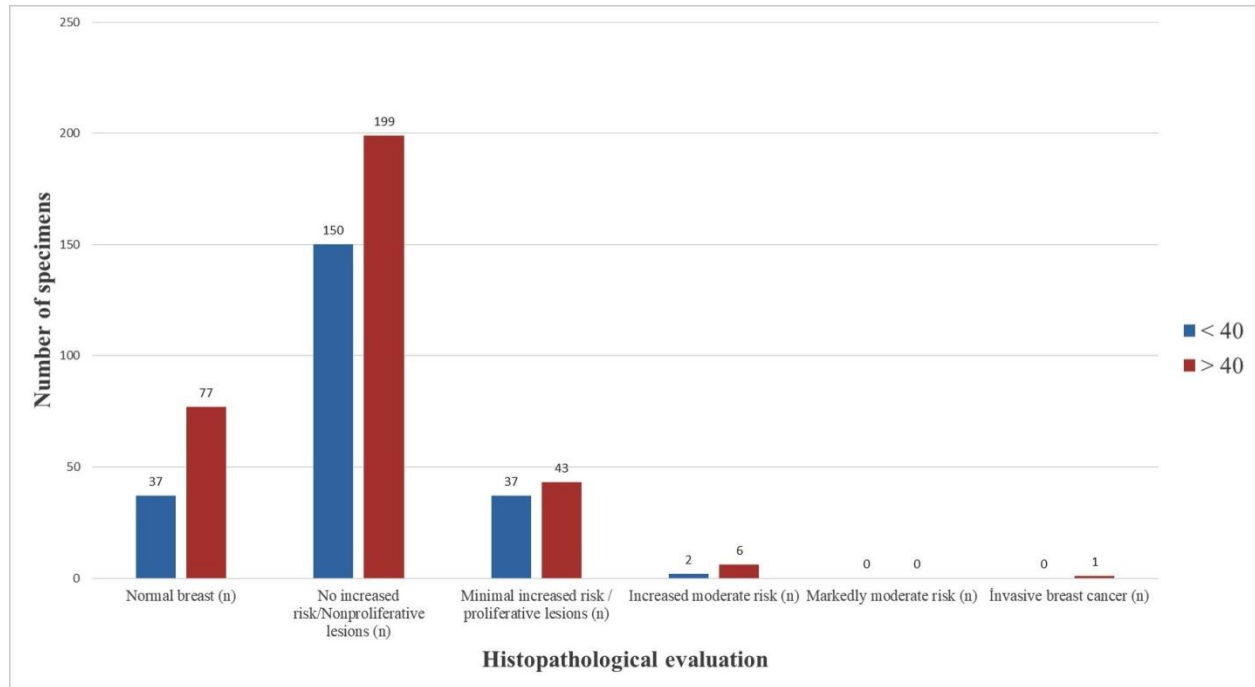


Figure 1 Histopathological evaluation of specimens

Table 3 Histopathologic findings, BI-RADS scores, and weight of specimens (specimen based)

		Left Breast (n=276)	Right Breast (n=276)	Total (n=552)
<b>Weight of Mastectomy Specimen grams (Mean±SD, min, max)</b>		773±374 (183-2800)	781±356 (200-2130)	777±365 (183-2800)
<b>BI-RADS score</b>	1	97	97	194
	2	123	123	246
	3	47	47	94
	4	1	1	2
	5	0	0	0
<b>Histopathologic Risk Group</b>	<b>Normal breast (specimens based)</b>	56 (20.3%)	58 (21%)	114 (20.7%)
	<b>No increased risk / nonproliferative lesions</b>	176 (63.8%)	173 (62.7%)	349 (63.2%)
	<b>Minimal increased risk / proliferative lesions</b>	39 (14.1%)	41 (14.9%)	80 (14.5%)
	<b>Moderately increased risk</b>	4 (1.4%)	4 (1.4%)	8 (1.4%)
	<b>Highly increased risk</b>	0	0	0
	<b>Invasive carcinoma</b>	1 (0.4%)	0	1 (0.2%)

Table 4 Between ages and normal Minimal, Moderately, Highly Increased Risk and Invasive Carcinoma findings

	Normal Breast and No Increased Risk N=218 (79%)	Minimal, Moderately, Highly Increased Risk and Invasive Carcinoma N=58 (21%)	Total N=276 (100%)	p
<b>Age (Mean±SD)</b>	42.4±12.2	43.1±11.2	42.5±12.0	0.67

Number of blocks submitted for histopathological evaluation were found to be higher in those with minimal, moderately, highly increased risk and invasive carcinoma (5±4), than those with normal breast and no

increased risk (4±3) (p<0.001). The results remained the same after the breast with invasive tumor was excluded from the analysis.

## DISCUSSION

There are few studies about the incidence of breast tumors in breast reduction specimens, esp. benign and precancerous lesions (4,6,7,10, 12,13). Our study was designed to detect breast lesions in breast reduction tissue, retrospectively. The histopathological examination of the massive breast masses which may be susceptible to trauma and various stimuli are important. In addition, big breasts are not so easy to be examined and it is hard to detect breast lesions in them. A previous study found that 13.3 percent of patients would be accepted as having at least a slightly increased risk of breast cancer, and 6.2 percent would have pathologic findings, increasing the risk of breast cancer (3). Also, some autopsy studies suggest that few patients had normal breast tissue (14). According to another study, only 3.7 % of breast reduction tissues were found to be normal (10). But another study found that 29% of patients had breast lesions, while another two studies found the percentages were 1.4 % and 1.6 % (6,7). A wide spectrum is available for non-pathological findings in literature. Albayrak et al. 5.6%, Pitanguy et al. 3.7%, very paradoxically to this, Clark et al. 41.8% (3), and Bondeson et al found 29% (15). These differences may be due to number of samples taken for microscopic examination as well as interobserver variability among pathologists and variation among the details of histopathological reports.

Ayhan et al. found that 61 % of patients had histopathological abnormality, and fibrocystic changes were 47.1 %, while incidence of invasive carcinoma was 0.7 % (16). Also, another study reported that breast abnormality was 60.4%, and carcinoma was 0.6 %. On the other hand, Clark et al found 14% in situ ductal and 3% lobular carcinoma. They cited that higher incidence was due to extensive sampling. In our study, we found that normal breast was 20.7 %, no increased risk/nonproliferative lesion was 63.2 %, minimal risk/proliferative lesion was 14.5 %, moderately increased risk was 8 %, highly increased risk was 0%, and invasive carcinoma 0.2 % according to specimen based analysis, which was similar to previous studies. Number of blocks submitted for histopathological evaluation were found to be higher in those with minimal, moderately, highly increased risk and invasive carcinoma (5±4), than those with normal breast and no increased risk (4±3) (p<0.001). The results remained the same after the breast with invasive tumor was excluded from the analysis. Although this may seem to suggest that there is a correlation between number of samples taken and the histopathological finding, the number of blocks vary from 1 to 17 in non-risk group and 1 to 22 in risk group. Whether the lesions were determined macroscopically, or whether they were apparent on the first sample, or whether they were identified in re-sampling is not known due to the retrospective design of this study. To identify the minimal required number of samples to be taken, a prospective study noting the radiologic, macroscopic findings as well as the order and reason of macroscopic sampling is necessary.

In our study, there was no increased risk in total 463/552 (83.8%) specimens of the performed breast reduction operations. There is an increased risk in the presence of breast lesions (16.2%). Of these specimens, 39 specimens were under 40 years and 50 specimens were 40 years and over. The increased cancer risk with age is also parallel to other literature findings. This ratio was lower in Ishac et al., 9.3% (6), Pitanguy et al., 4.3% (10), Samdanci et al., 33.2% and Albayrak et al., 22.8% (17) studies.

In our study, mean age of the patients was 42.5±12.0 years, which was similar to previous studies. There was no difference in histopathological findings in breast tissues between age groups (p=0.67). Also, we could not correlate breast anomalies with previous breast

surgeries because there was no surgical history in all patients. But, it is important to know previous surgeries to draw attention of pathologist for extensive sampling.

In our study, fibroadenomas were lower than 1 cm and could not be detected by ultrasonography before the surgery. It was reported that the incidence of fibroadenoma was about in 9-25% in an autopsy study (18). In a previous study, the incidence of fibroadenoma was 2.7% (19) In our study, we found that the incidence of fibroadenoma to be 1.4 %.

Some studies found that the incidence of fibrocystic changes were 36.8 % and 46.8% (10,16). We found that the incidence of fibrocystic changes were 56.5 %. It might seem to be higher, but an autopsy study found the incidence as 54%.

A previous study reported that ductal carcinoma in situ, lobular carcinoma in situ were not detected (19). In addition, we could not find any cases of ductal carcinoma. Only one lobular carcinoma was found in a patient over 40 years and referred to General Surgery. In literature (17), Synderman and Lizardo found the breast cancer incidence as 0.038 % in 5008 patients.

The results from different studies are varied but generally similar. These differences might be explained by patients' population, sampling (routine or extensive), previous surgery, and histopathologic classification criteria.

## CONCLUSION

Our study is a retrospective study including 276 patients with macromastia at a single institution between 2011 and 2014. Nonproliferative lesions were found to be the most common lesion, and the incidence of fibrocystic changes was 56.5 %. Only one carcinoma was detected. But we could find any ductal carcinoma in situ, which might be referred to advanced screening tests, esp, mammography. Recently, breast reduction operations have gained much popularity. The management should require a teamwork including surgeon, radiologist, and pathologist. Before the surgery, all screening tests should be performed, and pathologists should be informed for an extensive examination if any lesions detected by screening tests. All tissues must be sent to pathological examination. Pathologist should examine all tissues appropriately regardless of weight of specimens and age of patients. In conclusion, breast reduction surgery may be useful for not only cosmetic concerns but also detection of proliferative, nonproliferative lesions, and even carcinoma. Further studies are needed regarding the efficacy of breast reduction surgery to detect breast lesions.

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