

## Radiologically innocuous breast reduction specimens. Should we send them to pathology lab anyway?

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**SUMMARY:** Radiologically innocuous breast reduction specimens. Should we send them to pathology lab anyway?

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*Breast Reduction (BR) is a common procedure around the world. Patients are screened for incidental carcinoma preoperatively by mammography or ultrasonography and BR specimens are sent for pathologic examination postoperatively. Since the incidence of incidental carcinoma*

*is very low, no consensus exist regarding efficiency of pathologic examination.*

*To assess the value of pathologic examination, we examined mammographically and ultrasonographically negative eighty BR specimens from 40 women.*

*Twenty seven women had pathological lesions in their specimens (67,5%). This indicates that, even mammographically and ultrasonographically innocuous, BR specimens may reveal important pathological diagnosis that alters patient management.*

KEY WORDS: Breast reduction - Pathology - Mammography - Costs.

### Introduction

Breast cancer is the most frequent cancer in women worldwide. Population-based studies showed that a lifetime risk of breast cancer is 1 in 8 women (1). Therefore, it is not surprising to detect incidental breast cancer in breast surgery materials done for cosmetic reasons or to improve patient's symptoms related to the weight of the breast.

Because of the risk of the detection of incidental carcinoma, preoperatively many plastic surgeons routinely perform breast examination, radiological screening by mammogram (MG) or ultrasonography (USG) and send the resected tissue to pathology laboratory (2).

Since the incidence of carcinoma is less than 0,5% in Breast Reduction (BR) material (1,3-5), examining BR specimen radiologically as well as histopathologically is costly, and if there is not any obvious clinical reason, and if radiology reveals benign findings - i.e.

findings with no clinical value like simple benign cyst, galactocele, benign calcifications - the importance of pathological analyze of every BR specimen has been widely discussed in several publications (6-10).

Retrospectively examined the BR specimens, patients with any findings as in BI-RADS (Breast Imaging-Reporting and Data System) 2 and 3 were excluded. Including patients with completely innocuous breast by MG and USG, we aimed to standardize cost-effective way of practicing BR specimens.

### Materials and methods

A retrospective study was performed on BR specimens collected in our hospital between 2011 and 2012. Study approved by the local ethical committee. Preoperative evaluation included assessment of breast cancer risk factors, review of previous breast operations, mammography, breast examination. Mammography and ultrasonography were done for all patient older than 35 years. Patients younger than 35 years were sent for ultrasonography and MRI. Resected specimen was weighted, labeled right and left and sent to pathology laboratory in fixation solution (%10 formaldehyde). Before slicing at 0,5-1 cm intervals, the pathologist performed gross examination of each specimen. For normal-appearing breast at gross examination, gray-white areas were sampled. Any abnormal-appearing area was sampled as well and submitted for microscopic examination. Records for gross examination were sourced from

pathology reports. All slices were re-analyzed histopathologically by a pathologist (BC) who was not apprised of the diagnosis. For every breast tissue, macroscopic appearance of sliced parenchyma (adipose, fibroadipose or fibrous), the presence of cyst or mass lesion were noted. Microscopically, any pathological lesion [i.e. fibrocystic disease (FCD), adenosis, duct ectasia as well as epithelial hyperplasia] and its grade were noted. Epithelial hyperplasia was classified as "usual, which is not considered premalignant" or "atypical, which is considered premalignant" (11). Usual hyperplasia is also graded as "mild, moderate, or severe".

## Results

Fourty patients with innocent radiological imaging without history of breast malignancy or previous surgery were included. The mean age at the time of BR was 45,6 years (range 20-59). The consistency of breast parenchyma was fatty in 19 and 20 out of 40 right and left breasts, respectively. Predominantly fibrosy breast was seen in 3 patients. No records was present for the consistency of 3 patients in the pathology report. The mean number of sample microscopically examined was 5,5 for right breast (range 2-13) and 5,7 for left breast (range 2-13). Gross examination revealed cyst in 3 breasts from two patients. The rest of the breasts were recorded macroscopically unremarkable.

Besides its innocuous-looking macroscopically, microscopic examination yealded cysts, fibrocystic disease, fibroadenoma, epithelial hyperplasia, duct ectasia, sclerosing adenosis, lobular or periductal mastitis, lobular neoplasia in 27 women (67,5%) (Table 1); 20 of them had unilateral breast lesions. We noted that most of the histopathological lesions indicate benign lesions, i.e. fibrocystic disease (43,5%), adenosis and blunt duct adenosis (5%), sclerosing adenosis (2,5%), ductal ectasia (7,5%), ductal or lobular mastitis (8,7%), fibroadenoma (1,2%). Mild usual hyperplasia was found in 7 breasts (8,7%), moderate hyperplasia were found in 5 breasts (6,2%) from 5 patients who were 47, 56, 47, 38 and 59 years old, respectively, and low grade lobular neoplasia was found in 2 breasts (2,5%) from same patient who was 45-year old. We haven't seen severe or atypical hyperplasia or any invasive or in situ carcinoma and breasts from 13 women (32,5%) with completely innocuous breast tissue either radiologically and histopathologically.

## Discussion

Due to slight but definite incidence of premalignant and malignant lesions found at breast reduction materials, surgeons preoperatively perform a through breast examination and radiological test and then send BR specimens for histopathological analysis (2). There is

significant discrepancy between radiologic tests and histopathological analysis in practice (2, 8-10, 12).

Some surgeons prefer a mandatory mammograms in all patients undergoing BR irrespective of age and others prefer USG in patients under 30 years old or younger (6). The majority of the surgeon, on the other hand, prefer to send BR specimen to pathology laboratory. The proportion of surgeons who never send BR specimens for pathology laboratory has decreased from 11% to 1% during the last 15 years (2).

Our results indicate that 27 out of 40 radiologically innocuous breasts have pathological findings (Table 1). We observed that the highest number of histopathological lesions were found in women at 47,4 years of mean age. These are duct ectasia, mastitis, simple isolated cyst. These histopathological findings are described as "with limited or no clinical value, i.e. they are not associated with proliferated breast lesion or invasive carcinoma" (11, 13). Clinically important pathological findings were seen in 13 patients whose average age was 48,3 years (Table 2). These are sclerosing adenosis, fibroadenoma and epithelial hyperplasia. The component of FCD consists of cysts, fibrosis, epithelial hyperplasia, etc., and FCD itself is not associated with subsequent carcinoma. Only if an epithelial hyperplasia has been detected with in an ordinary FCD then we must alert that patient is associated with the elevated risk of breast carcinoma. Presence of mild epithelial hyperplasia is not critical for the patient management because it carries the same risk with general population. On the other hand, the relative risk for invasive carcinoma with moderate and severe hyperplasia, sclerosing adenoma and complex fibroadenoma is 1,5-2,0% and atypical hyperplasia carries 4-5 times risk of breast cancer 10-15 years post-biopsy (11).

Nearly 220,000 BR were performed in USA in 2007 and it was calculated that the total cost to the health care system for pathologic examination has been \$25 million annually, ie. the cost of detection of one breast carcinoma has been \$236,000 or £2400 (9, 10). Based on the lowest incidence of pathologically or clinically important lesion on BR specimens, surgeons consider not to send BR specimen to pathological examination if radiology reveales nothing bad for patients. Moreover, even if there is atypical hyperplasia which is missed by radiologically and clinically, surgeons may think that it is already removed by surgery. Although the price for pathology is higher than mammography, since false negative rate of MG is approximately 10%, radiology alone should not be the only option for preoperative evaluation of the breast (14).

As it is revealed in our study, even mammographically and ultrasounographically innocuous breasts yield clinically important lesions and this findings alter patient management. Patient with atypical hyperplasia is

TABLE 1 - OVERALL HISTOPATHOLOGICAL FINDINGS IN 27 BR SPECIMENS.

age, ys	parenchyma		FCD-mm		epithelial hyperplasia		other lesions	
	right	left	right	left	right	left	right	left
36	FADI	FADI	4		mild		PM	PDM, 5x3 mm FA
52	adipose	adipose			mild			
41	adipose	adipose		13x7				
34	adipose	adipose		5x3				
47	FADI	FADI				moderate	DE	DE
50	adipose	adipose		2x1				
47	FADI	FADI		3	mild			
47	adipose	adipose	4x5	11x3				DM, LM
56	?	?		3x3	moderate			
39	fibrous	fibrous	5	3			DE	
46	FADI	adipose	3	3		mild	3x2 mm A, DE	3x2 mm A
45	fibrous	fibrous	4	6	mild+LN1	LN-1	LN-1	LN-1
56	?	?	17x7	11x8				
45	adipose	adipose	4	3				
47	adipose	adipose		3				
49	adipose	adipose		3x2			15x4 mm SA	
57	FADI	FADI		3x2			BDA	
54	adipose	adipose	7x4	4x3				
29	FADI	FADI		4x2				
54	adipose	adipose	3x2	11x7	mild			
56	adipose	adipose	3					
55	adipose	adipose	3x1	7x4				
52	adipose	adipose				mild		
47	FADI	FADI		6x4	mild-moderate		DE	
38	fibrous	fibrous	yes	yes	moderate			
59	FADI	FADI	yes		mild-moderate	mild		
42	FADI	FADI	yes	yes			LM,A	LM

FADI:fibroadipose, FA: fibroadenoma, LN:lobular neoplasia, DE:duct ectasia,  
DM:ductal mastitis, LD:lobular mastitis,PDM: periductal mastitis  
A:adenosis, SA: sclerosing adenosis, BDA:blunt duct adenosis

recommended more frequent screening for breast carcinoma and patient with in situ carcinoma treated with radiation has been found to reduce the rate of local recurrence in retrospective and randomized trials (15).

Radiological findings are also precious for pathologist while examining the specimen macroscopically. Generally small pathological specimen is sliced at 5 mm intervals to detect smaller carcinoma (Figure 1). Due

to its oily consistency and its huge size, it is not possible to slice BR specimens at 1 cm intervals (Figure 2). Since carcinoma smaller than 1 cm may be hidden within the sliced area, it is more confident while slicing at macroscopy room if he/she knows that there is no lesion detected radiologically.

Although pathological examination of BR specimen costs to the health care systems, it is also true for

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TABLE 2 - CLINICALLY IMPORTANT PATHOLOGICAL FINDINGS IN 13 PATIENTS.

age, ys	epithelial hyperplasia		other lesions
	right	left	
36	mild		fibroadenoma on the left breast
52	mild		
47		moderate	
47	mild		
56	moderate		
46		mild	
45	mild		bilateral lobular neoplasia-1
49			sclerosing adenoma on the right breast
54	mild		
52		mild	
47	mild to moderate		
38	moderate		
59	mild to moderate	mild	

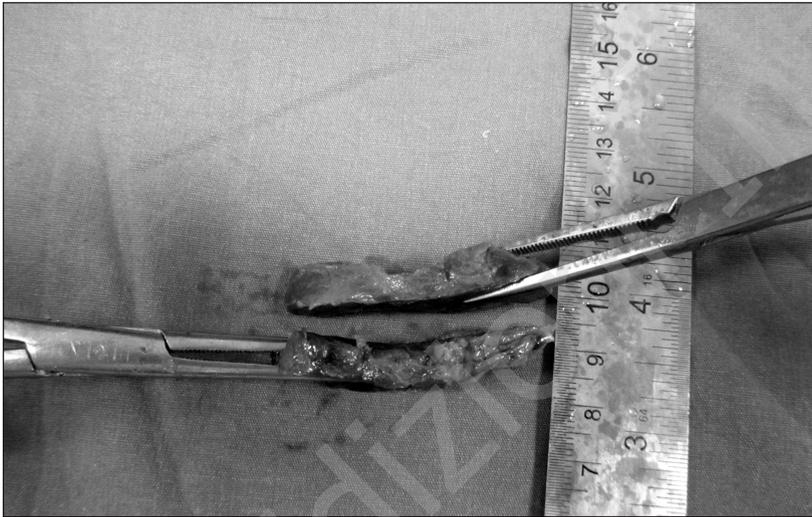


Fig. 1 - Ordinary thyroidectomy specimen sliced at 4-5 mm intervals.



Fig. 2 - Ordinary mammoplasty specimen sliced at 1-1,5 cm intervals.

anal fistula. This ordinary lesion is caused by abscess. However, it may also be a manifestation of tuberculosis (TBC). Even the incidence of TBC as a cause of anal fistula is less than 1%, tissue obtained from an anal fistula is submitted to pathology laboratory to detect TBC. There are also other specimens being sent for pathologic examination without any obvious clinical reason, ie. gallbladders, nasal polyps, tonsils and appendices (13).

## References

1. Ozmen S, Yavuzer R, Latifoğlu O, Ayhan S, Tuncer S, Yazici I, Atabay K. Specimen radiography: an assessment method for reduction mammoplasty materials. *Aesthetic Plast Surg* 2001 Nov-Dec;25(6):432-5.
2. Hennedige AA, Kong TY, Gandhi A. Oncological screening for Bilateral Breast Reduction: a survey of practice variations in UK Breast and Plastics surgeons 2009. *J Plast Reconstr Aesthet Surg* 2011 Jul;64(7):878-83. Epub 2010 Dec 31.
3. Samdanci ET, Firat C, Cakir E, Ak M, Sayin S, Nurkabal Z. The incidence of non-proliferative and precancerous lesions of reduction mammoplasty: evaluation of 273 cases. *Eur Rev Med Pharmacol Sci* 2011 Oct;15(10):1207-11.
4. Colwell AS, Kukreja J, Breuing KH, Lester S, Orgill DP. Occult breast carcinoma in reduction mammoplasty specimens: 14-year experience. *Plast Reconstr Surg* 2004 Jun;113(7):1984-8.
5. Dotto J, Kluk M, Geramizadeh B, Tavassoli FA. Frequency of clinically occult intraepithelial and invasive neoplasia in reduction mammoplasty specimens: a study of 516 cases. *Int J Surg Pathol* 2008 Jan;16(1):25-30.
6. Viana GA, Pitanguy I, Torres E. Histopathological findings in surgical specimens obtained from reduction mammoplasties. *Breast* 2005 Jun;14(3):242-8.
7. Clark CJ, Whang S, Paige KT. Incidence of precancerous lesions in breast reduction tissue: a pathologic review of 562 consecutive patients. *Plast Reconstr Surg* 2009 Oct;124(4):1033-9.
8. Hassan FE, Pacifico MD. Should We Be Analysing Breast Reduction Specimens? A Systematic Analysis of Over 1,000 Consecutive Cases. *Aesthetic Plast Surg* 2012 Jun 8.
9. Cook IS, Fuller CE. Does histopathological examination of breast reduction specimens affect patient management and clinical follow up? *J Clin Pathol* 2004 Mar;57(3):286-9.
10. Koltz PE, Giroto JA. The price of pathology: is screening all breast reduction specimens cost effective? *Plast Reconstr Surg* 2010 May;125(5):1575-6; author reply 1576-7.
11. Rosen PP. Ductal Hyperplasia: usual and Atypical; in Paul Peter Rosen (editor): *Rosen's Breast Pathology*. Third Ed. Lippincott, Williams & Wilkins, 2009, pp230-263.
12. Bondeson L, Linell F, Ringberg A. Breast reductions: what to do with all the tissue specimens? *Histopathology* 1985 Mar;9(3):281-5.
13. The Royal College of Pathologists. *Histopathology and cytopathology of limited or no clinical value*, 2nd edn. 2005. <http://www.rcpath.org/resources/pdf/HOLNCV-2ndEdition.pdf>. Accessed 24 July 2012.
14. Ramani SK. Writing a Mammography Report. *Breast* 2003;13(3):323-325.
15. Amichetti M, Vidali C. Radiotherapy after conservative surgery in ductal carcinoma in situ of the breast: a review. *Int J Surg Oncol* 2012;2012:635404.