

# Mammoplasty for symmetry in breast reconstruction and histologic assessment

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**Background:** In breast reconstruction, complementary surgery on the contralateral breast is sometimes necessary to obtain a satisfactory aesthetic result. This complementary mammoplasty for symmetry gives the surgeon the opportunity to verify the state of the mammary glandular tissue to rule out a possible occult tumour in the contralateral breast. Our objective was to determine the prevalence of borderline lesions and of in situ and invasive carcinoma in specimens of the contralateral breast in a mammoplasty for symmetry in patients with breast cancer.

**Methods:** We conducted a retrospective study of 145 breast reconstructions with mammoplasty for symmetry conducted at the Tours Regional Teaching Hospital in France.

**Results:** The glandular histologic result after mammoplasty was normal in 45.5% of patients, with benign pathologies in 38.9% and borderline lesions in 15.6% of patients. No invasive or in situ carcinoma was detected.

**Conclusion:** Systematic histologic analysis of glandular mammary tissue sampled after reduction mammoplasty in the particular context of breast reconstruction after breast cancer makes it possible to discover lesions that were not seen in presurgical evaluation. The early management of these borderline occult lesions could reduce the incidence of breast cancer in these at-risk patients.

**Contexte :** Les reconstructions mammaires nécessitent parfois un geste complémentaire sur le sein controlatéral pour un résultat esthétique satisfaisant. Cette chirurgie de symétrisation a l'avantage de donner l'opportunité au chirurgien d'analyser l'état du tissu glandulaire pour éliminer une éventuelle tumeur controlatérale occulte. Notre but était de déterminer la prévalence des lésions frontières, des cancers in situ et invasifs dans les spécimens de plasties mammaires de symétrisation chez les patientes atteintes de cancer du sein.

**Méthodes :** Nous avons étudié rétrospectivement 145 reconstructions mammaires avec une plastie mammaire de symétrisation réalisée au centre hospitalier régional et universitaire de Tours.

**Résultats :** L'examen histologique des résections glandulaires réalisées après mammoplastie est revenue normale dans 45,5 % des patientes, avec des pathologies bénignes dans 38,9 % et des lésions frontières dans 15,6 % des patientes. Il n'a pas été retrouvé de carcinome in situ ou invasif.

**Conclusion :** L'analyse histologique systématique des tissus glandulaires prélevés après mammoplastie de réduction dans le contexte particulier de la reconstruction mammaire après cancer du sein permet de mettre en évidence des lésions qui ont échappé au bilan pré-chirurgical. La prise en charge précoce de ces lésions frontières occultes pourrait permettre de diminuer le nombre de cancers du sein incident chez ces patientes à risque.

An early diagnosis and the therapeutic approach to the management of breast cancer profoundly modify women's behaviour and their quality of life.<sup>1</sup> Moreover, mastectomy is often experienced as a self-image wound with an important impact on sex life. The fear of relapse is compounded in these patients by feelings of shame and guilt.

It has been suggested that patients who undergo a conservative treatment have a better quality of life than patients have mastectomies.<sup>2</sup> However, not all

authors have found this difference between both types of treatment in long-term follow-up (bias related to age at the time of cancer diagnosis or to the anxiety caused by the risk of relapse); however, they all agree that a conservative treatment has less impact on body image.<sup>2,3</sup>

For some 20 years, cancer surgery has improved with glandular modelling techniques borrowed from plastic surgery to reduce the consequence of radical breast surgery. It is now proven that breast reconstruction has a favourable incidence on quality of life, regardless of the technique used.<sup>2,4</sup> The surgical treatment of breast cancer presently includes as a matter of course the partial or total repair of the amputated breast. These surgical techniques have improved constantly since their inception.<sup>5</sup>

In breast reconstruction, complementary surgery on the contralateral breast is sometimes necessary to obtain a satisfactory aesthetic result. This complementary surgery gives the surgeon the opportunity to analyze the state of a specimen of glandular tissue to rule out a possible occult tumour in the contralateral breast.

The objective of this study was to determine the prevalence of borderline lesions and of in situ and invasive carcinoma in specimens of the contralateral breast in mammoplasty for symmetry in patients with breast cancer. We analyzed 10 years of breast reconstruction practice in the gynecology department of the Tours Regional Teaching Hospital in France.

## METHODS

We conducted a retrospective cohort study for the period of Jan. 1, 1996, to July 31, 2006, in the gynecology department of the Olympe de Gouges Centre of the Bretonneau Hospital campus of the Tours Regional Teaching Hospital. The study examined the cases of all patients who underwent breast reconstruction for breast cancer, regardless of the technique used (simple prosthesis, latissimus dorsi musculocutaneous flap with or without prosthetics, transverse rectus abdominis musculocutaneous [TRAM] flap), associated with a mammoplasty for symmetry. This secondary surgery was systematically performed well after the conclusion of adjuvant treatments (chemotherapy and radiotherapy), on average after 44 (range 3–188) months. In this series there was breast reconstruction in the primary surgery.

Patients who underwent a mammoplasty without glandular resection (mastopexy, augmentation mammoplasty by simple prosthesis) and those who had a history of cancer of the contralateral breast were excluded from the study.

The presurgical screening of the contralateral breast was performed by mammography. The number of contralateral cancers that may have been identified by imaging before the surgery for symmetry, a result which would have excluded this surgery, could not be specified because of the retrospective nature of the study.

## Histopathologic analysis protocol of glandular resections during reduction mammoplasty

The resected glandular tissue was assessed for weight in the operating room, and it was sent without orientation marks to the pathology laboratory. The resected glandular tissue was submitted to macroscopic examination then fixated in 10% formalin for 24–48 hours. In the absence of a macroscopically detectable lesion, 3 samples were systematically obtained; otherwise, the macroscopically detectable lesion was totally removed. The histology samples were embedded in paraffin. Thin sections (4 µm) from the inclusion blocks were sliced with a microtome. The sections were stained with hematin-eosin-saffron and mounted with Eukitt medium. Histologic sections were examined with an optic microscope.

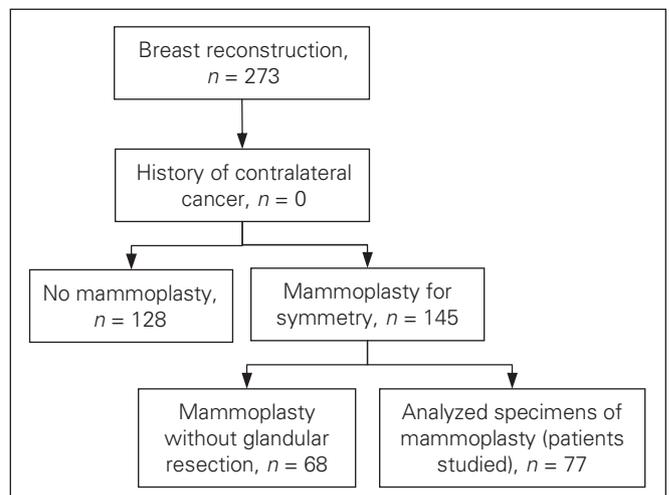
## Evaluation criteria

The histologic analysis of samplings helped us to classify them in 4 groups:

- normal tissue (absence of abnormalities),
- benign pathologies (benign mastopathies, simple ductal hyperplasia),
- borderline lesions (atypical ductal hyperplasia [ADH], intralobular neoplasia), and
- carcinomas.

## RESULTS

A total of 273 breast reconstructions were recorded during the study period; of these, 145 included mammoplasty for symmetry (mastopexy, reduction or augmentation mammoplasty) of the remaining breast (Fig. 1). A total of 68 records were excluded owing to the mammoplasty not including glandular resection and history of cancer.



**Fig. 1.** Patient inclusion criteria for a retrospective cohort study of 145 breast reconstructions with mammoplasty for symmetry conducted at the Tours Regional Teaching Hospital (France).

The epidemiologic characteristics of the 145 patients with breast reconstruction are summarized in Table 1. Histologic study of the cancer found predominantly invasive ductal carcinoma (60%). Among the patients, 71% had received an auxiliary treatment, mostly radiotherapy and chemotherapy.

The results for the specimens concerned 77 women who underwent a mammoplasty of the contralateral breast with glandular resection. Among these women, 55.3% had a mammoplasty of the right breast compared with 44.7% who had a mammoplasty of the left breast. During these mammoplasties, on average, 143.4 (range 30–1720) g of glandular tissue was resected.

Table 2 presents the results of the histologic analysis: normal in 35 (45.5%) women, benign pathologies in 30 (38.9%) women and borderline lesions in 12 (15.6%) women. No invasive or in situ carcinoma was detected.

## DISCUSSION

Few authors have assessed the incidence of occult lesions in the other breast in this particular context of mammoplasty with a treated cancer of the contralateral breast. Ricci and colleagues<sup>6</sup> have carried out a study similar to ours by comparing prospectively the detection of synchronous and metachronous cancer in the contralateral breast. The authors reported rates of 1.8% for invasive carcinoma and 2.6% for in situ carcinoma among synchronous cancers and of 1.8% for metachronous cancers. The difference could be related to patients' preoperative management, to a recruitment bias or to the impact of auxiliary treatment.

The importance of glandular resections and the number of blocks in histology can also influence the results considerably, particularly when there are no macroscopic abnormalities.

The limited glandular volume and size of the specimens in our series did not make it possible to reveal occult carcinomas.

Nevertheless, the presence of borderline lesions (15.6%) demonstrates the importance of histologic verification in these at-risk women.

Two studies<sup>7,8</sup> have mentioned the opportunity offered by mammoplasty for the diagnosis of occult borderline breast lesions in these women who present a risk of breast cancer.

Cook and Fuller<sup>7</sup> conducted a global study of 1289 specimens from reduction mammoplasties conducted for both aesthetic and breast reconstruction reasons. They found borderline lesions in 26 (2%) patients, in situ or micro-invasive cancer in 4 (0.3%) patients and invasive cancer in 1 (0.08%) patient. This cancer was diagnosed in a woman who had undergone breast reconstruction after breast cancer.

The contralateral breast presents a high risk of asynchronous or even bilateral location of the primitive tumour. The probability of cancer in the contralateral breast after a primitive tumour of the breast is 2–6 times higher in comparison to the general population of women, hence the recommendation of pre- and postoperative assessment of this breast.<sup>9,10</sup>

In the context of aesthetic surgery with lower risks of breast cancer, occult lesions have nevertheless been discovered, as shown in several studies.<sup>8,11</sup> Dotto and colleagues<sup>8</sup> assessed 516 reduction mammoplasties over a 15-year period and found only borderline and benign lesions like the ones in found our series.

Other authors, including Viana and colleagues,<sup>11</sup> have reported carcinomas (in situ carcinoma 0.3% and invasive carcinoma 0.3%). Kakagia and colleagues<sup>12</sup> reported the results of a histologic analysis of 314 reduction plasties in women without any family history of breast cancer. The authors found invasive lobular carcinoma in 0.6% of patients, ductal carcinoma in situ in 0.3% of patients and ADH in 1.6% of patients. Colwell and colleagues<sup>13</sup> analyzed a larger sample (800 women) and found invasive carcinomas in 0.4% and carcinoma in situ in 0.4% of patients. Colleau and colleagues<sup>14</sup> reported invasive lobular carcinoma in 2 (0.2%) patients, carcinoma in

**Table 1. Epidemiologic, histologic and therapeutic characteristics of patients who underwent mammoplasty for symmetry between Jan. 1, 1996, and July 31, 2006**

Characteristic	No. (%) <sup>*</sup>
Age, mean (range) yr	53.8 (33–75)
Histologic characteristics of cancer	
Invasive ductal carcinoma	88 (60.7)
Invasive lobular carcinoma	13 (8.9)
Ductal carcinoma in situ	43 (29.7)
Mucinous carcinoma	1 (0.7)
Previous adjuvant treatment	
Radiotherapy	95 (92.2)
Chemotherapy	77 (74.8)
Hormone therapy	51 (49.5)
Techniques of breast reconstruction	
Simple prosthesis	47 (32.4)
Latissimus dorsi musculocutaneous flap	79 (54.5)
TRAM flap	19 (13.1)

TRAM = transverse rectus abdominis musculocutaneous.  
<sup>\*</sup>Unless otherwise indicated.

**Table 2. Histologic findings of glandular samplings after reduction mammoplasty**

Histology	No. (%)
Normal tissue	
Normal parenchyma	35 (45.4)
Benign mastopathy	20 (26.0)
Benign pathology	
Simple ductal hyperplasia	10 (13.0)
Intralobular neoplasia	8 (10.4)
Borderline lesions	
Atypical ductal hyperplasia	4 (5.2)
Carcinoma	
Ductal carcinoma in situ	—
Invasive carcinoma	—
Total	77 (100)

situ in 4 (0.5%) patients and a lobular carcinoma in situ in 1 (0.1%) patient.

The probability of discovering occult lesions during breast plasties increases with age. Hage and Karim<sup>15</sup> estimated that the risk of discovering a carcinoma increases from 0.05% to 0.11% in women over the age of 50 years.

An assessment of the impact of cancers discovered fortuitously was conducted by Ricci and colleagues,<sup>6</sup> who showed that there was no impact on patient survival. However, because of the limited number of patients, this conclusion cannot be considered firm.

There have been many discussions of the results of histologic analyses, particularly of ductal and lobular epithelial proliferations. Discussions have concerned their classification and significance with regard to a later occurrence of an invasive lesion. Several concepts that had been previously considered established are presently questioned. Most authors consider that simple ductal hyperplasia does not present a substantial increase of the risk of onset of invasive carcinoma and therefore do not consider it as a precursor (relative risk 1.2–2). Conversely ADH presents a relative risk factor of 4–5. An invasive carcinoma will develop in a mean period of 8.3 years in 4%–22% of women who are carriers of ADH.<sup>16</sup>

Concerning lobular proliferations, their nomenclature and classification are disputed. It is recognized that lobular neoplasias are an indicator of the risk of invasive carcinoma. However, they are not considered true precursors. Some studies have questioned this view. They are difficult to evaluate because these are lesions that have no clinical, radiologic and even macroscopic translations. According to the studies, their incidence varies from 0.5% to 3.8% of biopsies.<sup>17</sup>

The management of all of these borderline lesions is not codified and varies according to the teams. In our series, the margins of resection of occult lesions discovered on the operative specimens were negative.

To reduce the incidence of these occult tumours, authors insist on the preoperative assessment of patients. Some argue that a systematic mammography is required,<sup>7</sup> whereas others argue that systematic mammography be reserved to women aged 40 years and older.<sup>16</sup> However, they all agree on the histologic assessment and on the orientation and marking of all tissue fragments obtained.

The improvement of screening techniques should eventually help reduce the number of occult invasive or in situ carcinomas discovered at mammoplasty.<sup>7,14</sup> Some authors have suggested systematic reduction mammoplasty for prevention in women who have a family history of breast cancer.<sup>18</sup>

What could magnetic resonance imaging (MRI) contribute to presurgical detection of occult lesions in the contralateral breast? Brennan and colleagues<sup>19</sup> tried to answer this question by conducting a meta-analysis of 3253 women. They found that MRI had a 47.9% (confidence inter-

val [CI] 31.8–64.6) positive predictive value when considering all data, an additional detection rate of cancers of 4.1%, and a rate of false-positive and false-negative results of 9.3% (CI 5.8–14.7). Therefore, MRI can detect an important proportion of occult lesions, but the high rate of false-positive results makes it necessary to use additional means of investigation.

## CONCLUSION

A systematic histologic analysis of glandular tissue obtained during reduction mammoplasty in the particular context of breast reconstruction after breast cancer helps discover lesions that were not detected in the presurgery assessment. The early management of these occult borderline lesions could help reduce the number of breast cancers in these at-risk patients.

**Competing interests:** None declared.

**Contributors:** Drs. Horo, Acker and Body designed the study. Dr. Horo acquired the data, which he and Drs. Acker and Roussel analyzed. Dr. Horo wrote the article, which all other authors reviewed. All authors approved the final version for publication.

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