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ORIGINAL ARTICLE

Pathological Changes Screening after Aesthetic Breast Surgery: a Retrospective Study and Systematic Review of Literature

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Abstract

Background: ***The goal of breast cosmetic surgery is to enhance the breast's features. Significant difficulties can arise from pathological alterations in women who have undergone cosmetic breast surgery.***

Aim and objectives: ***To screen postoperative pathological findings by retrospective study and systematic review of literature trying to set up a guideline protocol for patient follow-up after aesthetic breast surgery.***

Patients and methods: ***This study was conducted on 50 patients having aesthetic breast surgery in the Plastic Surgery Department Al-Azhar University Hospitals for a retrospective screening of postoperative pathological findings in the last five years (from 2018 to 2022). This systematic review included ten articles.***

Result: ***According to demographic data, the mean age was 33.13±10.10, mean weight was 78.8±8.69, mean height was 164.9±7.56 and mean body mass index (kg/m2) was 29.00±2.93, 70% of patients were females while other were males. According to the nipple-areolar complex, the most common shape of the nipple is protruding, the most common Texture of the nipple is firm, and the most common colour of the breast is pink; 4% had discharge, while others did not. The postoperative follow-up period was assessed for 664 patients who were included in four studies, and the results showed an overall effect estimate (ES:0.25; 95% CI [0.11,0.38]) for the Breast Imaging-Reporting and Data System (BI-RADS) index.***

Conclusion: ***There was evidence for pathological changes after aesthetic breast surgery in both genders. The most commonly performed aesthetic breast surgery among females was reduction mammoplasty and liposuction and disc delivery among males.***

Keywords: Pathological changes screening; Aesthetic breast surgery; Reduction mammoplasty (RM); Autologous fat graft

1. Introduction

For women who have had aesthetic breast surgery, pathological alterations can pose serious risks. However, if the female patients have dense breasts, it would be difficult to differentiate between newly developed pathology and normal parenchyma.[1]

Suppose an implant causes the breast size to expand during an augmentation mammoplasty. In that case, pressure will be applied to the chest wall and mammary gland, changing the morphology of the breast tissue.[2]

In plastic surgery, the autologous fat transplant or lipo-filling Procedure is frequently utilized for breast reconstruction. Nonetheless, questions have been raised about these techniques' possible carcinogenic dangers. Protumorigenic factors may be expressed by cells, stem cells may change within the transplant, or even this new tissue may impair our capacity to identify breast illness.[3]

Fat necrosis is common in reduction and mastopexy, and any surgical method may result in parenchymal deformation. [4]

Following mammography, the results may reveal increased opacity, microcalcification, lipid-containing complex cysts, fat necrosis (usually coarsely calcified nodules), or architectural deformation.[5]

However, the ultrasonographic results of fat necrosis might vary, showing anything from a superficial solid nodule to a complicated cyst. Solid lesions usually have well-defined edges, although sometimes the margins are spiculated or unclear, resembling cancer. Common cystic lesions include round anechoic lipid cysts, complex cysts with echogenic bands, or complex cysts with a mural nodule.[3]

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Numerous results can be obtained from breast MR imaging. An internal signal compatible with fat necrosis and benign would have features that are the same as those of the surrounding fat or show no improvement following the introduction of contrast material.[6]

After a breast reduction, significant fat necrosis is often minor and mainly occurs at the furthest reaches of the pedicle. Surgical treatment is usually recommended if they are significant.[2]

The work's objective is to screen postoperative pathological abnormalities by a systematic literature review and retrospective analysis to establish a guideline regimen for patient follow-up following cosmetic breast surgery.

2. Patients and methods

This study involved patients undergoing aesthetic breast surgery at Al-Azhar University Hospitals' Plastic Surgery Department. It examined postoperative pathological findings from the previous five years (2018 to 2022).

2.1.Inclusion criteria: Age and Sex: Adult male and female patients after aesthetic breast surgery.

2.2.Exclusion criteria: Breast reconstruction procedures and procedures for congenital breast anomalies.

2.3.Methods:

Retrospective part of the study:

In our university hospitals, cosmetic breast surgery is one of the most common procedures. In the past five years, 390 instances of breast surgery have been completed. Patients were asked to participate in a retrospective study, and 50 patients—35 female and 15 male—replied.

Every sufferer endured the following: A thorough history-taking process involves gathering the following information: personal data, medical and past medical history, past interventions history, family or personal history of breast cancer or masses, history of pregnancy and breastfeeding, the kind and timing of the aesthetic Procedure, the management of any postoperative complications, a thorough clinical examination (general, breast, and aesthetic breast examination), and any necessary investigations (breast ultrasound, mammography, contrast-enhanced mammography (CEM), breast MRI, and mammography). Moreover, an interventional plan

Interventional Procedure includes the study of cells. The medical procedures mentioned are fine needle aspiration, accurate cut biopsy, incisional biopsy, excisional biopsy, and oncoplastic repair.

2.4.Postoperative management

The early Phase includes assessing drains, monitoring nipple health, evaluating nipple condition, examining incisions and skin flaps, assessing breast symmetry, and identifying potential early problems (Delayed wound healing, impaired blood supply to the nipple, accumulation of blood under the skin, fluid under the skin, and infections).

The late Phase includes evaluating breast symmetry and form, sensitivity to the Nipple-Areola complex, patient and surgeon satisfaction, and potential late problems.

2.5.Ethical consideration: We obtained informed consent from each individual. The service and study procedures had no adverse effects on the participants. The lead investigators securely maintained individual data as private information.

2.6.Systematic review part of the study:

Data Management and Statistical Analysis:

The statistical package for the social sciences, or SPSS version 20, was used for data entry, processing, and statistical analysis. The following significant tests were applied: Spearman's correlation, Wilcoxon's, Chi-square, logistic regression analysis, and Kruskal-Wallis. Data were displayed, and appropriate analysis was carried out based on the kind of data (parametric and non-parametric) collected for every variable. In addition, the following metrics were employed: mean, standard deviation (± SD), range, median, and inter-quartile range (IQR), frequency and percentage, as well as the Kruskal-Wallis test, one-way ANOVA, and Mann-Whitney U test. P-values were considered statistically significant when less than 0.05 (5%).

3. Results

Retrospective part of the study:

Table 1. Demographic data of patients in this study.

	STUDIED PATIENTS (N=50)
AGE (YEAR) MEAN ± SD.	33.13±10.10
WEIGHT (KG)	78.8±8.69
HEIGHT (CM)	164.9±7.56
BODY MASS INDEX (KG/M2) MEAN ± SD.	29.00±2.93
GENDER	
FEMALE	35 (70%)
MALE	15 (30%)

According to demographic data, this table showed that mean age was 33.13±10.10, mean weight was 78.8±8.69, mean height was 164.9±7.56 and mean body mass index (kg/m2) was 29.00±2.93, 70% of patients were females while other were males.

Table 2. General examination of breast of the studied patients.

	STUDIED PATIENTS (N=50)
SHAPE	
ROUND	12 (24%)
ASYMMETRICAL	6(12%)
TEAR DROP	15(30%)
EAST WEST	2(4%)

ATHLETIC	14(28%)
PTOTIC	1 (2%)
TEXTURE	
SOFT	11 (22%)
NODULAR	4 (8%)
DENSE	35(70%)
MASSES	
YES	7(14%)
NO	43 (86%)
AXILLARY L.N	
YES	6 (12%)
NO	44(88%)

According to general examination of breast, this table show that the most common shape of breast is tear drop, the most common Texture of breast is dense, 86% not have masses in the breast and (88%) not involved axillary L.N.

Table 3. Nipple areolar complex of the studied patients.

	STUDIED PATIENTS (N=50)
SHAPE	
INVERTED	5 (10%)
FLAT	10(20 %)
PROTRUDING	35 (70%)
COLOR	
PINK	27 (54%)
BROWN	23 (46%)
TEXTURE	
SOFT	16 (32%)
NODULAR	3(6%)
FIRM	31(62%)
DISCHARGE	
YES	2 (4%)
NO	48(96%)

According to nipple areolar complex, this table showed that the most common shape of nipple is protruding, the most common Texture of nipple is firm, the most common color of breast is pink, 4% had discharge while other not.

Systematic review part of the study:

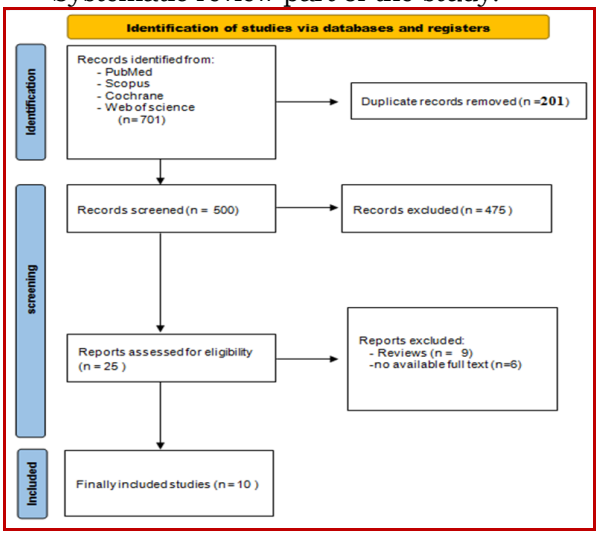

Figure 1. PRISMA flow chart represents selection process.

Table 4. Baseline characteristics of the included population

CHARACTERISTICS OF THE INCLUDED STUDIES

STUDY ID	Study duration	study design	Sample size	Age	Sex (M/F)	Time between surgery and postoperative mammogram	Type of intervention
CARVAJAL ET AL. 2008 [7]	1999 to 2006	Retrospective cohort	20	36.9	F	34.5	Breast Augmentation by Autologous Fat
SOSIN ET AL. 2018 [8]	2000 to 2013	case control	48	47.4	F	14year	Augmentation Mammoplasty
VEBER ET AL. 2011 [9]	2000 to 2008	Retrospective cohort	76	38.16	F	16.2 months	Breast Augmentation by Autologous Fat
CAKIR ET AL. 2015 [10]	2000 to 2010	Retrospective cohort	80	45	F	6 years	Reduction mammoplasty
KIM ET AL. 2013 [11]	2006 to 2012	Retrospective cohort	39	50.8	F	34 months	Reduction mammoplasty
MUIR ET AL 2010. [12]	Over 8 years	cross sectional	4743	59.3	F	NR	Reduction mammoplasty
ROBERTS ET AL. 2011 [13]	2001 to 2005	Retrospective cohort	87	50	F	64 weeks	Reduction mammoplasty
BAS ET AL. 2021 [14]	2013 to 2020	Retrospective cohort	477	42.4	F	3.8 years	Reduction mammoplasty
FISHER ET AL. 2020 [15]	2018	Retrospective cohort	155	38.1	F	12 months	Reduction mammoplasty
NERGIZ ET AL. 2022 [16]	2012 to 2021	Retrospective cohort	874	40	F	53.6	Reduction mammoplasty

Our comprehensive analysis included Ten studies These studies collectively involved 5311 patients with median age approximately 40 years we have four studies investigated pathological changes after Augmentation Mammoplasty and another five which assessed after reduction mammoplasty six studies were conducted only in females conversely, we only three conducted on males all characteristics of the included studies and patients are provided in Table 4.

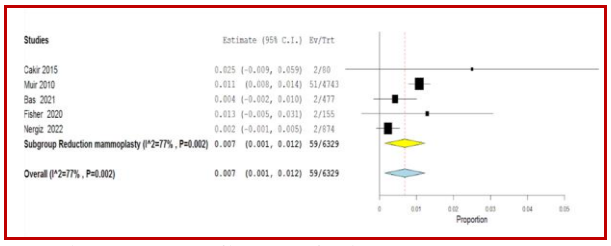

Figure 2. Malignant lesions.

Five studies totaling 6392 women were examined for malignant lesions found by mammography in the postoperative follow-up following reduction mammoplasty; our pooled proportion estimated ES: 0.007; [0.001, 0.012]. heterogeneity was significant among the pooled studies for this outcome with chi-p=0.002; I2=77%.

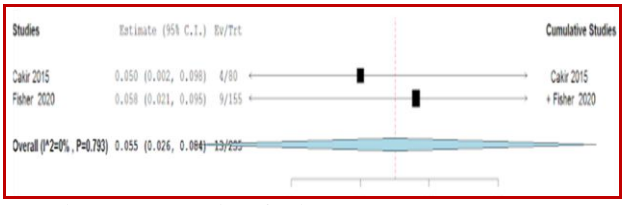

Figure 3. Benign lesions.

Benign Breast lesions detected by mammography mammoplasty operations were studied 235 women included in 2 studies with overall pooled estimate ES: 0.055; [0.026, 0.084]. homogeneity was showed among the pooled studies for this outcome with chi-p=0.8; I2=0%.

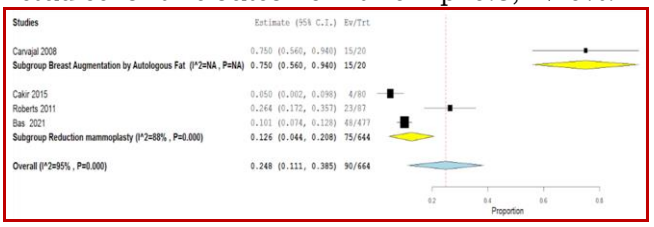

Figure 4. BI-RADS III.

The postoperative follow-up period was assessed for 664 patients who were part of four studies, and the results showed an overall effect estimate (ES:0.25; 95% CI [0.11,0.38]) for the Breast Imaging-Reporting and Data System (BI-RADS) index. The examination of this result revealed significant heterogeneity, thus we employed the random effect model (chi-p<0.0001; I2= 95%).

4. Discussion

Reduction mammoplasty (R.M.) is a surgical technique that is frequently used to reduce the volume in bothersome macromastia and to address breast asymmetry brought on by congenital conditions or cancer surgery.[17]

Retrospective part of the study:

Regarding demographic information, the current study revealed that the mean body mass index (kg/m2) was 29.00±2.93, the mean height was 164.9±7.56 cm, the mean weight was 78.8±8.69 kg, and the mean age was 33.13±10.10 years. Seventy per cent of the patients were female.

With 15.6% of all aesthetic operations performed, breast augmentations are the most sought-after cosmetic surgery globally. Implant augmentation or using autologous fat (lipofilling) are the options.[18]

However, the results of the current study indicated that reduction mammoplasty was the most prevalent aesthetic breast surgery performed on 62% of female patients and 26% of male patients, respectively.

The current study's general evaluation of the breast revealed that the teardrop form and dense texture are the most prevalent, that 86% of women do not have breast masses, and that 88% do not have axillary involvement. L.N.

Mammography breast density indicates the fibroglandularity of the breast tissue. A mammography's sensitivity to the early stages of breast cancer decreases with increased fibro glandular tissue or thicker breasts.[19]

In the current study, 14% of patients who underwent cosmetic breast surgery had breast masses discovered, and 12% had axillary L.N. involvement.

Additionally, based on the nipple-areolar complex, the current study revealed that the most frequent nipple shape is projecting, the most common nipple texture is firm, the most common breast colour is pink, and 4% of breasts had discharge, while the other breasts did not.

Systematic review part of the study:

Numerous investigations evaluated the frequency of pathological alterations following aesthetic breast surgery in women undergoing reduction mammography Nergiz et al.,[16] Upon enrolling 874 female patients who underwent reduction mammoplasty, it was shown that 64.2% of the patients had at least one histological abnormality. Fibrocystic alterations were the most prevalent lesion, accounting for 59.6% of benign findings in patients younger and older than 40. Usual ductal hyperplasia followed at 16.9%. In a reduction mammoplasty, invasive cancer was discovered in 0.2% of cases and substantial pathologic abnormalities in 3.5%.

Acevedo et al.,[20] 4775 individuals were recruited in the study, and it was shown that 337 (37.06%) of the procedures involved in reduction mammography had abnormal findings. Two hundred ninety-nine patients (6.26%) had benign high-risk lesions. Of the patients, 23 (0.48%) had ductal carcinoma in situ, and 15 (0.31%) had invasive cancer.

Significant difficulties may arise from pathological alterations in women who have undergone cosmetic breast surgery. However, it would be difficult to discern between freshly created disease and normal parenchyma in

female patients with high breast density.[1]

This systematic review included ten articles (Nergiz et al.[16]; Bas et al.[14]; Fisher et al.[15]; Sosin et al.[7]; Cakir et al.[10]; Kim et al.[11]; Roberts et al.[13]; Veber et al.[9]; Muir et al.[11]; Carvajal et al.[6]) these studies collectively involved 5311 patients with median age approximately 40 years we have four studies (Sosin et al.[8]; Cakir et al.[10]; Veber et al.[9]; Carvajal et al.[7]) investigated pathological changes after Augmentation Mammoplasty and another six studies (Nergiz et al.[16]; Bas et al.[14]; Fisher et al.[15]; Kim et al.[11]; Roberts et al.[13]; Muir et al.[12]) which assessed after reduction mammoplasty.

Five studies examined malignant lesions identified by mammography during the postoperative period following reduction mammoplasty (Nergiz et al.[16]; Bas et al.[14]; Fisher et al.[15]; Cakir et al.[10]; Muir et al.[12]), totalling 6392 women our pooled proportion estimated E.S.: 0.007; [0.001, 0.012]. Heterogeneity among the pooled studies for this outcome was significant with chi-p=0.002; I2=77%. The total event rate was 59/6392 (0.9%).

Nergiz et al.[16] enrolled 874 females with reduced mammoplasty and revealed that Invasive carcinoma was found in 0.2% and significant pathologic lesions in 3.5%.

Benign breast lesions detected by mammography post-reduction mammoplasty operations were reported in 2 studies (Fisher et al.[15]; Cakir et al.[10]), including 235 women, with an overall pooled estimate E.S.: 0.055; [0.026, 0.084]. Homogeneity was shown among the pooled studies for this outcome, with chi-p=0.8 and I2=0%. The total event rate was 13/235 (5.5%).

Fisher et al.[15] Nine individuals (5.8%) had proliferative lesions out of the 155 patients who underwent 310 reduction mammaplasties, according to the pathologic evaluations. Eleven patients (7.1%) showed positive findings.

The postoperative follow-up period was assessed for 664 patients who were part of four trials using the Breast Imaging-Reporting and Data System (BI-RADS) index (Bas et al.[14]; Cakir et al.[10]; Roberts et al.[13]; Carvajal et al.[7]) with overall effect estimate (ES:0.25; 95% CI [0.11,0.38]). Significant heterogeneity was detected during the analysis of this outcome, so we used a random effect model (chi-p<0.0001; I2= 95%).

Cakir et al.[10] revealed that the rate of BI-RADS III was 4(5%) among 80 patients with reduced mammoplasty. Also, Roberts et al.[13] reported that 23 (26.4%) out of 87 patients have BI-RADS III. Furthermore, There was no statistically significant difference in the incidence of abnormal first postoperative mammography (BIRADS 0, 3–6) between patients who underwent reduction mammoplasty and the control group (n 5 23, 26% vs 8, 27%, respectively, P 5 1.00).

Limitations: The present investigation was restricted by its small sample size, single-centre design, absence of a control group, lack of histological evaluations, and retrospective nature.

4. Conclusion

The current study showed that there was evidence for pathological changes after aesthetic breast surgery in both genders. In our institution, the most commonly performed aesthetic breast surgery among females was reduction mammoplasty and liposuction and disc delivery among males. Breast masses were detected among 14%, axillary L.N involvement was found among 12%, and 4% had nipple discharge post aesthetic breast surgery.

In this study, we performed a review assessing the potential pathological changes after aesthetic breast surgery. Breast augmentation by autologous fat may be associated with microcalcifications, radiolucent oil cysts, coarse calcifications and BI-RADS III. Reduction mammoplasty may carry BI-RADS III risk in addition to the possibility of malignant tumours.

Benign breast lesions detected by mammography after post-reduction mammoplasty operations were reported in 2 studies (Fisher et al.15; Cakir et al.10), which included 235 women. The total event rate was 13/235 (5.5%).

Five studies, totalling 6392 women, looked into mammographically diagnosed malignant tumours during the postoperative period following reduction mammoplasty (Nergiz et al.16; Bas et al.14; Fisher et al.15; Cakir et al.10; Muir et al.12). The total event rate was 59/6392 (0.9%).

4.1Recommendations

To validate our findings and pinpoint the risk factors for pathological alterations, more prospective research with a bigger sample size and a longer follow-up period is required..

Disclosure

The authors have no financial interest to declare in relation to the content of this article.

Authorship

All authors have a substantial contribution to the article

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Conflicts of interest

There are no conflicts of interest.

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