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Silicone Breast Implant/Tissue Expander Applications and Complication Management: Retrospective Patient Analysis of 172 Patients

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ABSTRACT

Introduction: This study aimed to investigate the complications and their management following breast implant surgeries for patients undergoing breast augmentation, augmentation mastopexy and breast reconstruction.

Methods: One hundred and seventy-two patients were included in this study. The implants were used to increase the breast volume, treat ptosis and for breast reconstruction in patients who had breast tissue removed completely or partially.

Results: Overall complication rate was 76%. The complication rate in the breast augmentation group (n=60) was 76%. The complication rate in two session mastopexy augmentation groups (n=9) was 55%. The complication rate in the single session mastopexy augmentation group (n=27) was 66%. The complication rate in the breast reconstruction group (n=71) was 84.5%.

Conclusion: Despite high complication rates, successful results can be obtained using correct patient selection, correct planning, correct implant selection, correct surgical technique and appropriate management of complications during the postoperative follow-up. The compliance of the patients to recommendations given by the surgeon during the follow-up and treatment process also is central to increasing the success rates.

Keywords: Silicone breast implant, tissue expander, breast augmentation

Introduction

At the end of the 20th century, with the changing trends of the modern world, plastic surgery started to turn to aesthetic applications (1-3). silicone breast implants have been increasingly used in plastic surgical operations since the 1980s. Silicone breast implants have gained their place in plastic surgical operations for both aesthetic and reconstructive purposes. Today, silicone breast implants are preferred for immediate or late reconstruction purposes in breast cancer patients and for breast augmentation.

There are various types of silicone breast implant with different features and sizes according to their surface structures, anatomical shape, and internal structure. According to their anatomical shapes, silicone gel implants are available in anatomical and round shapes. They are produced in smooth and textured forms according to their surface structure. Depending on their internal properties, there are saline-inflatable, gel-filled, and semi-filled implant options such as "Becker" implants (4-6).

Considering the wishes of the patients, implant selections are made on the appropriate size and shape. Tissue expanders are implant materials inflated with saline, which are often used to create a suitable bed and to provide the width of the pouch before the permanent implant to be placed on the breast in patients who are planned for reconstruction and have a high probability of receiving radiotherapy.

The breast is a critical organ pair for women. It is one of the most important parts of a woman's body, both in breastfeeding and in terms of body image and psychological self-confidence development. As plastic surgeons, we encounter breast structures of various sizes, symmetry and shapes, with the effect of racial differences.

Patients who present with a complaint of developmental delay of the breast at a young age can request a breast augmentation with a breast implant. In older ages, patients who apply with the complaints of breast sagging and shrinkage along with factors such as breastfeeding, childbirth, weight changes, usually require the breast to be lifted and augmented at the same time.

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In another group of patients, reconstructive operation planning is performed in patients who have had all or part of their breasts removed due to breast cancer or for different reasons. In suitable patients, a silicone implant placement or a tissue expander placement before a permanent breast implant can be performed.

Although patient demands and cases are different, the main goal in aesthetic and reconstructive breast surgery should be to obtain the breast shape and symmetry suitable for the age and body structure of the woman. Before surgery, patients should be discussed in detail and detailed explanations should be given to the patient about the planned process. Patients should be informed beforehand about undesirable early and late complications that may be encountered in the perioperative and postoperative period. These explanations should be communicated to the patients not only verbally but also in writing. Photographs of the patients during the entire process, namely, preoperative, peroperative and postoperative, should be taken and archived.

Methods

The 172 patients included in the retrospective study who were operated by the same surgical team between the years 2010 and 2020. Written informed consent was received from the patients. This study was approved by the Ethics Committee of Universtiy of Health Sciences Turkey, İstanbul Training and Research Hospital (approval number: 223, date: 01.07.2022). The patient age ranged from 18 to 53. All patients were fitted with Food and Drug Administration and Conformite Europeenne approved breast implants from the same manufacturer (Table 1). The patients were evaluated in three groups: breast augmentation (n=60), augmentation mastopexy (n=36) and breast reconstruction (n=76) Complications and complication management were noted according to the groups.

Statistical Analysis

Descriptive analysis was performed using GraphPad Prism version 8.00 for Windows (GraphPad Software, La Jolla California USA).

Results

Bilateral breast augmentation with silicone breast implant was applied to 60 of these patients. The same size and shape implant was placed on both breasts in 35 patients, and silicone breast implants of the same shape but different sized implants were placed in 25 patients. An anatomical implant pair was applied to 10 patients, and a round-shaped implant pair was applied to 50 patients. Of the round-shaped implants, 13 pairs had smooth surfaces and 30 pairs had textured surfaces. We placed gel-filled implants between 200 cc and 375 cc in breast augmentation surgery. The implants were placed in the submuscular dual plane through the inframammary fold incision. The drain was placed in 32 of the patients, and no drain was placed in 21 of them. Elastic bandages and sports bras were fitted to all patients at the end of the surgery (Table 2) (Figure 1).

Table 1. List of patients included in the study

	Number	Percentage
Breast augmentation with silicone implants	60	34.88%
Augmentation mastopexy	36	20.93%
Breast reconstruction with silicone	76	44.19%
Implants/tissue expanders	-	-
Total	172	-

One-session breast augmentation and mastopexy surgery was performed in 27 patients. Bilateral implants were applied to 24 patients and unilateral implants applied to 3 patients who underwent a single-session procedure. In unilateral implant patients, the implant was not applied to the other breast due to the size of the breast. The reduction is done. Among the patients who had bilateral breast implant in one session, 13 different size implants were placed and 11 the same size implants were placed. All implants placed in a single-session surgery were round in shape and textured surfaced. Two-session breast augmentation and lift surgery were performed on both breasts in 9 patients. In the two-session procedure, the same size, textured surface and round-shaped implants were used for both breasts. In the first session, the implants were placed in the submuscular dual plane by entering through the incision made in the inframammary fold. The final skin scars of single-session and two-session patients at the end of the second session were inverted-t and short inverted-t scars. The implant sizes used in our patient group with augmentation combined with mastopexy were in the range of 225-325 cc. Drain was placed and a sports bra was fitted in all the patients who underwent combined augmentation with mastopexy in one and two sessions (Table 3) (Figure 2, 3).

Table 2. Breast augmentation with silicone implants (n=60)

	Number	Percentage
The same size implants	35	58.33%
Different size implants	25	41.67%
Anatomic implants	10	16.67%
Round implants	50	83.33%
Smooth	13	21.67%
Textured	47	78.33%
Total	60	-

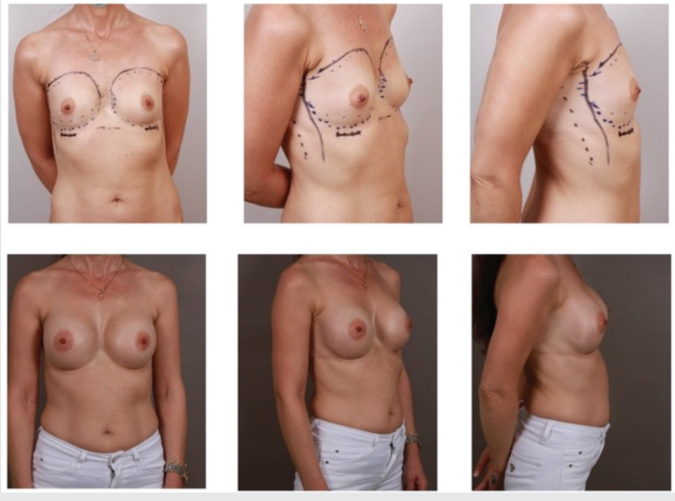

Figure 1. Preoperative (upper) and postoperative (lower) photographs of a patient undergoing breast augmentation with a silicone.
Written informed consent is obtained from the patient for demonstration

Of the 76 patients who were operated for reconstructive purposes. A bilateral breast implant was applied to 5 of these patients due to congenital tubular breast deformity. Bilateral the same sized textured surface round-shaped implants were used in 3 patients, and different size textured surface round-shaped implants were used in 2 patients (Table 4) (Figure 4, 5).

Of the 76 patients, 71 had a diagnosis of breast cancer or a history of previous mastectomy. Late reconstruction planning was performed in 25 of 76 patients after mastectomy. A tissue expander was placed in all the patients who underwent late repair, and after at least 6 months of inflation and waiting period, they were replaced with a permanent implant. Immediate reconstruction with skin-sparing mastectomy was planned in 46 patients. A direct permanent implant was placed in 19 of the patients who were planned for immediate reconstruction, and a tissue expander was placed in 27 of them, which would later be replaced with a permanent implant. Round-shaped textured surface implant was used for all reconstruction patients. Implant sizes were in the range of 300-375 cc (Table 4).

The overall complication rate was 76%. The complication rate in the breast augmentation group (n=60) was 76%. The complication rate in two session mastopexy augmentation groups (n=9) was 55%. The complication rate in the single session mastopexy augmentation group (n=27) was 66%. The complication rate in the breast reconstruction group (n=71) was 84.5%.

Superficial cellulitis (incision site infection) which were treated with antibiotics occurred in 8 patients in the early postoperative period in 60 of the operated augmentation patients. No implant exposure was observed in these patients. Mild capsular contracture was encountered in the late period in 6 patients. Unilateral hematoma occurred in 7 patients. Unilateral self-limiting and resorbing hematomas were observed in 5 patients. In 2 patients, a case of hematoma requiring surgical evacuation was encountered in the unilateral breast. The drain was not used in only 2 of the hematoma cases. Five cases were the cases in which drains were used. Two surgically evacuated hematoma cases were also cases in which we used drains. A total of 8 stated that they noticed asymmetry but were not bothered enough to request surgery again. Self-limiting and resorbing seroma was seen in 5 patients in the early period. A case of late seroma was encountered in 2 patients. In these, thinning of the skin and implant exposure occurred because of the ongoing flow at the incision site. First, the implant was tried to be saved with antibiotic irrigation, but it was unsuccessful. Ultimately, total capsulectomy and implant replacement were performed in these 2 patients. Keloid occurred in the incision scar unilaterally in 6 patients

Table 3. Augmentation mastopexy (n=36)

	Number	Percentage
Single session	27	75.00%
Two session	9	25.00%
Bilateral	24	66.67%
The same size implants	13*	-
Different size implants	11*	-
Unilateral	3	8.33%
Total	36	-

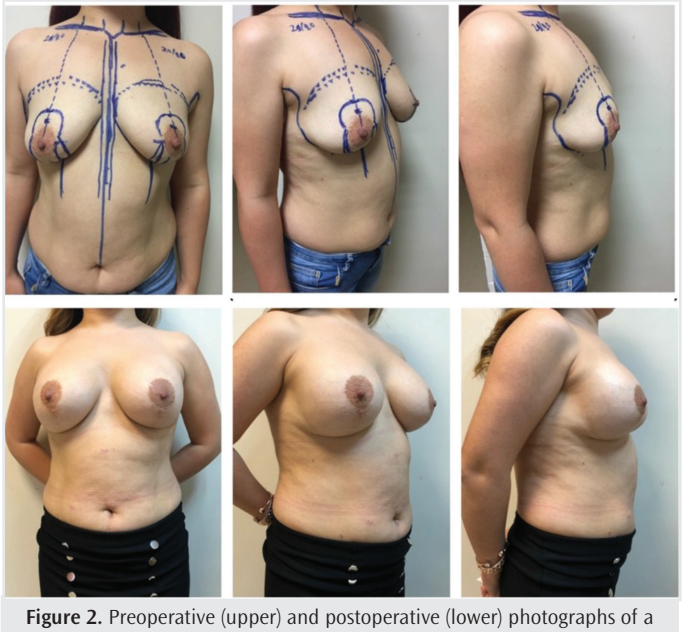

Figure 2. Preoperative (upper) and postoperative (lower) photographs of a patient undergoing single stage mastopexy and augmentation with silicone implant.
Written informed consent is obtained from the patient for demonstration

Figure 3. Photographs of a patient undergoing two stage mastopexy and augmentation with a silicone implant. [Preoperative (upper), postoperative following the first stage augmentation with impact (lower left, lower middle) and postoperative following the second stage mastopexy surgery (lower right)].
Written informed consent is obtained from the patient for demonstration

Table 4. Breast reconstruction silicone implants (n=76)

	Number	Percentage
Congenital	5	6.58%
Immediate reconstruction	46	60.53%
Only implant	19*	-
Implant following expansion	27*	-
Late reconstruction	25	32.89%
Total	76	-

and bilaterally in 3 patients. The scar revision was performed in 2 patients. Others responded favorably to the local steroid injection. One patient was reoperated because of the suspicion of a unilateral capsule tumor. Capsulectomy and implant replacement were performed (Table 5) (Figure 4).

No major complications were observed in 9 patients who were planned for two sessions among the patients in whom mastopexy and augmentation were planned together. Three patients had hypertrophic scars and 2 patients had slight asymmetry. Of the 27 patients who underwent a single session mastopexy augmentation, 5 had unilateral seroma, 4 had unilateral hematoma, and 3 had unilateral limited superficial skin necrosis at the t-scar junction. Seroma in 1 patient and hematoma in 1 patient were surgically evacuated, and new drains were placed in the patients. Necrotic areas healed secondarily. Six patients were re-operated due to asymmetry and double bubble appearance (Table 6).

There were no complications and no reoperation planning in the patients who were operated due to tubular breast deformity among the patients who underwent implant for reconstruction purposes.

Reoperation was performed for repositioning the implant in 6 of the 71 patients who underwent breast reconstruction due to breast cancer, which were immediate reconstruction cases in which the implant was placed without expansion. Skin necrosis developed in 7 patients who underwent immediate reconstruction with implant, which were replaced with a smaller size implant and asymmetry correction was performed on the contralateral breast. Skin necrosis developed in 18 patients, who received radiotherapy during the postoperative period. The tissue expander was salvaged in 8 of these, but had to be removed in 10 of them. Capsular contracture of varying severity was observed in all patients who received postoperative therapy (Table 7) (Figure 5, 6).

Table 5. Complications of patients with breast augmentation with silicone implants (n=60)

	Number	Percentage
Superficial cellulitis	8	13.3%
Implant exposure	0	0.0%
Mild capsular contracture	6	10.0%
Unilateral hematoma requiring surgery	2	3.3%
Unilateral self-limiting and resorbing hematoma	5	8.3%
Minimal asymmetry	8	13.3%
Self-limiting and resorbing seroma	5	8.3%
Late seroma requiring implant replacement	2	3.3%
Hypertrophic scars in response to steroids	7	11.7%
The hypertrophic scar that required surgical revision	2	3.3%
Capsule tumor which required surgery	1	1.7%
Total	**46**	**76%**

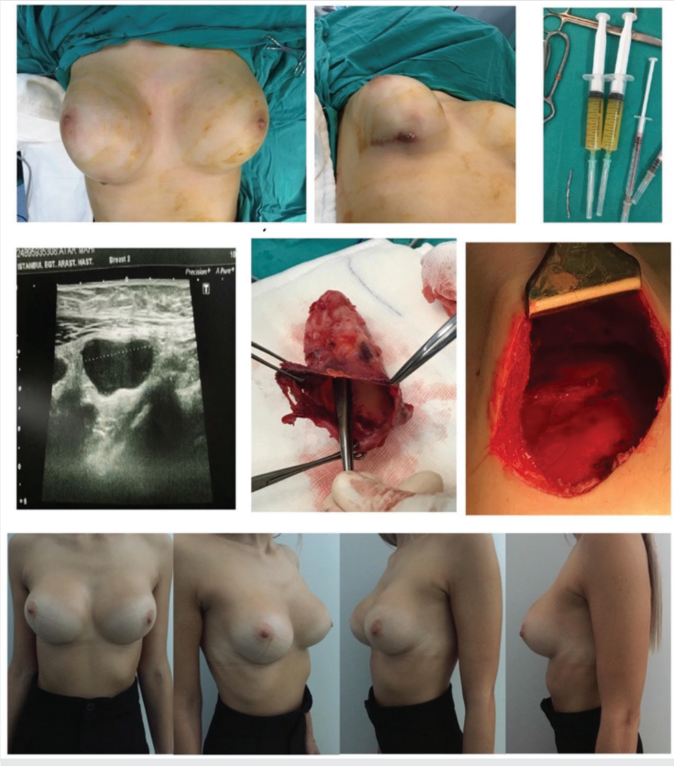

Figure 4. Photographs of a patient with complication following breast augmentation of the right breast. Photographs of the patient before revision surgery (upper). Seroma was drained. Capsulectomy was performed (middle). Photographs of the patients following the revision surgery (lower). Written informed consent is obtained from the patient for demonstration

Table 6. Complications of patients with single session augmentation mastopexy (n=27)

	Number	Percentage
Unilateral seroma, which was self-limited	4	14.8%
Unilateral seroma which required surgery	3	11.1%
Unilateral hematoma, which was self-limited	1	3.7%
Unilateral hematoma which required surgery	1	3.7%
Limited superficial skin necrosis	3	11.1%
Asymmetry	6	22.2%
Hypertrophic scar	2	7%
Mild capsular contracture	1	3.7%
Total	**21**	**77%**

Table 7. Complications of patients with breast reconstruction due to breast cancer (n=71)

	Number	Percentage
Implant malposition that required re-operation	6	8.4%
Skin necrosis on silicone implant that required implant replacement	7	9.8%
Skin necrosis on expander, which requires implant removal	10	14%
Skin necrosis on an expander in which implant was salvaged	8	11%
Mild capsular contracture	15	21 %
Hypertrophic scar	5	7%
Seroma	4	5.6%
Hematoma	5	7%
Total	**60**	**84.5%**

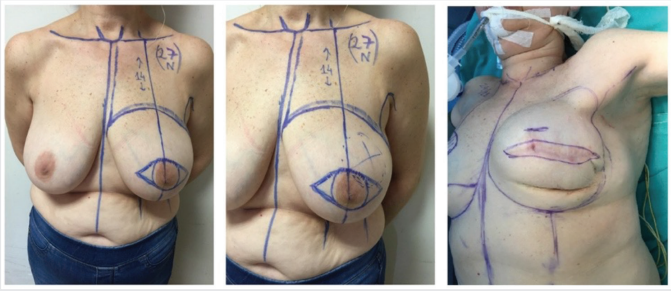

Figure 5. Photographs of a patient with breast reconstruction with expander placement before surgery (left, middle) and following the surgery with hypertrophic scar formation (right).
Written informed consent is obtained from the patient for demonstration

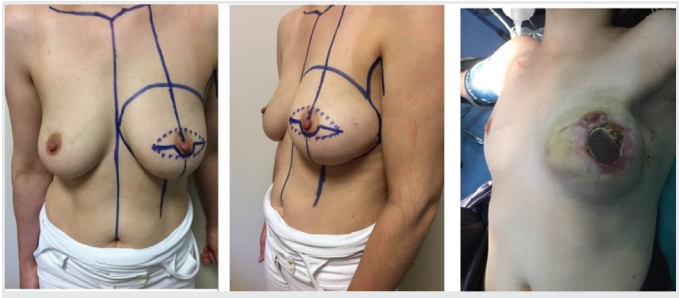

Figure 6. Photographs of a patient with breast reconstruction with silicone implant before surgery (left, middle) and following the surgery with exposed implant (right).
Written informed consent is obtained from the patient for demonstration

Discussion

Silicone breast implant applications have now become a routine of plastic surgery. Although the ranking varies from country to country, it is among the top five most frequently performed surgical applications (7-9). It is the most commonly used for breast augmentation. The implants were inserted through different incisions. Although inframammary, areolar, axillary and umbilical incisions are available according to the content structure of the implant, gel-filled implants are preferably placed through inframammary and areolar incisions. Preferred incisions have advantages and disadvantages compared to each other (10-12). We preferred inframammary incision in all of our cases. Our main reason for choosing this mode was the advantage of easier intervention in cases of complications and problem solving.

Augmentation cases combined with mastopexy is one of the most difficult and challenging procedures in plastic surgery. Especially the difficulty level of the single-session procedure is quite high. Although two-session applications require a longer process, they are less difficult and less likely to be revised. One-session mastopexy augmentation applications were the aesthetic procedures that we had the most difficulty with and we were the least satisfied with the results. Combined augmentation with mastopexy is similar to reduction surgery. A nipple-areolar complex carrier pedicle is designed. If a wise pattern drawing is made on the final closure scar, inverted t-scar results in short inverted t-scar, particularly in more drooping breasts. In cases with a lower degree of ptosis, it results in a periareolar scar or vertical scar, j scar, l scar suitable for vertical planning. In various literature studies of the procedure, the patient satisfaction rate and surgical success results are the most variable in the surgical group (13-15).

The use of silicone breast implants in oncoplastic surgery for reconstruction purposes is perhaps the most psychologically beneficial practice for the patient. Systemic and regional treatments such as chemotherapy and radiotherapy, which patients receive because of their existing oncological diseases, cause us to encounter serious postoperative recovery problems and complication processes. However, even the hope that the image of the breast will be maintained in place of the organ lost by the woman who has gone through a traumatic process such as cancer gives the patient a positive power and endurance to fight the process. In these cases, the event is actually the psychological beneficial gains of surgery. The absence of a breast causes the woman to collapse not physically, but mainly spiritually. Of course, it also has the obvious benefit of eliminating the asymmetrical appearance order to prevent postural disorders (16-18).

Study Limitations

This study has several limitations. This was a retrospective study and the patient data were collected from a single-center. Patient standardization is unideal and prospective randomized studies must overcome these limitations.

Conclusion

Breast implant surgery is an operation where the complication rate can be minimized and the existing complications can be managed in the most accurate way, owing to the surgical teams kneaded with experience that requires care and attention at all stages.

First all, these procedures should not be seen as simple. Including aesthetic cases, it is necessary to look at the cases from a reconstructive perspective. We accept that complications are in this job, but to minimize these rates, we should experience choosing the right patient and applying the right procedure.

There are critical studies in which the complication rates are minimized in the case series conducted around the world and presented in the literature. By openly sharing our current complications in our own studies, we will have taken the most important step toward a successful surgical process management and we will have the opportunity to lower our complication rates over time. Surgery and plastic surgery, which is a part of it, is a world where learning never ends and we should constantly gain new experiences and gains. A successful plastic surgeon is not a person who feels that he or she is the best and is experienced enough to perform every case, but is someone who can apply the right procedure in the right patient, has developed the ability to analyze and transfer the case to a more experienced physician when necessary not to harm the patient.

Ethics Committee Approval: This study was approved by the Ethics Committee of Universtiy of Health Sciences Turkey, İstanbul Training and Research Hospital (approval number: 223, date: 01.07.2022).

Informed Consent: Written informed consent was received from the patients.

Peer-review: Internally peer-reviewed.

Authorship Contributions: Surgical and Medical Practices: D.A., M.S., G.T.; Concept: D.A., M.S., G.T.; Design: D.A., M.S., G.T.; Data Collection or Processing: D.A., M.S., G.T.; Analysis or Interpretation: D.A., M.S., G.T.; Writing: D.A., M.S., G.T.

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