One-Stage Mastopexy with Breast Augmentation: A Review of 321 Patients

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Background: One-stage mastopexy with breast augmentation is an increasingly popular procedure among patients. In the past 9 years, there has been a 506 percent increase in mastopexy procedures alone. Although some recommend a staged mastopexy and breast augmentation, there are currently no large studies evaluating the safety and efficacy of a one-stage procedure.
Methods: A retrospective chart review was conducted of 321 consecutive patients who underwent one-stage mastopexy and breast augmentation. Data collected included the following: patient characteristics, implant information, operative technique, and postoperative results. Complication and revision rates were calculated to evaluate the safety and efficacy of the one-stage procedure.
Results: No severe complications were recorded over an average of 40 months' follow-up. The most common complication was deflation of a saline implant (3.7 percent), followed by poor scarring (2.5 percent), recurrent ptosis (2.2 percent), and areola asymmetry (2.2 percent). Forty-seven patients (14.6 percent) underwent some form of revision surgery following the one-stage procedure. Thirty-five (10.9 percent) of these were for an implant-related issue, whereas 12 patients (3.7 percent) underwent a tissue-related revision. This 10.9 percent implant-related revision rate is less than a previously documented 13.2 percent 3-year reoperation rate for breast augmentation alone. The authors' 3.7 percent tissue-related revision rate also compares favorably to an 8.6 percent revision surgery rate in patients who underwent mastopexy alone.
Conclusions: Although it has been stated that the risks of a one-stage procedure are more than additive, the results of our review suggest otherwise. Although a revision rate of 14.6 percent is significant, it is far from the 100 percent reoperation rate required for a staged procedure. (*Plast. Reconstr. Surg.* 120: 1674, 2007.)

Although one-stage mastopexy with breast augmentation has received an increasing amount of attention at plastic surgery meetings, there is a dearth of literature documenting outcomes of the procedure. The operation has been performed by surgeons for decades and was first described[1–6] by Gonzalez-Ulloa and Regnault in the 1960s. With the increasing amount of breast surgery performed by plastic surgeons each year,[1] the need for data regarding complication and revision rates has become more pressing. Several recent studies advocate the judicious use of the combined procedure,[7–12] and others report that they commonly combine the procedures without adding additional risks.[13] The goal of this study was to review our experience with a large number of combined, one-stage mastopexy and breast augmentation cases. The safety and efficacy of the procedure were determined by evaluating our long-term complication and revision rates.

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PATIENTS AND METHODS

A retrospective chart review of 321 consecutive one-stage breast augmentation with mastopexy procedures was performed. All cases were completed at a single outpatient facility by one of two surgeons (W.G.S. or D.A.S.) over a 14-year period (1992 to 2006). The average follow-up period was 40 months, with a range of 6 months to 13 years.

All patients had preoperative and postoperative photographs, general anesthesia, lower extremity sequential compression devices before in-

duction of anesthesia, and perioperative antibiotics. During the procedure, extensive undermining of mastopexy flaps was avoided when possible and no drains were used. Patients were intermittently ambulated the day of surgery and maintained on oral pain medication.

All study patients were candidates for both breast augmentation and mastopexy, as defined by having significant breast ptosis and hypoplasia. Degree of breast ptosis was determined using the Regnault classification,[14] and any preoperative asymmetry was recorded. Each patient's age, body mass index, smoking status, and type of mastopexy (inverted-T, vertical, circumareolar, or crescent) was recorded. Implant-related data such as fill (saline versus silicone), shape, texture, volume, and position (submuscular versus subglandular) were also collected. Procedure-related data such as operating surgeon, length of surgery, American Society of Anesthesiologists level, and concomitant procedures were noted.

Follow-up data including incidence of complications, treatment of complications, number of revision procedures, reason for revision, and patient or surgeon dissatisfaction were also recorded. Safety and efficacy were determined by measuring complication and revision rates, which were calculated retrospectively. To better understand their cause, complications were divided into two categories: implant-related and tissue-related complications. Tissue-related complications included breast and areola asymmetry, poor scarring, recurrent and persistent ptosis, loss of nipple sensation, pseudoptosis, infection, hematoma, and depigmentation of the areola. Implant-related complications included saline implant deflation, capsular contracture, implant malposition, and palpability. Statistical significance of the data was determined using chi-square analysis and Fisher's exact test.

RESULTS

A total of 321 patients underwent one-stage breast augmentation with mastopexy over the 14-year period. There were 25 unilateral and 296 bilateral cases, leading to 617 individual breast procedures. Of these patients, 118 patients had undergone some form of previous breast surgery and 203 were primary cases. The most common previous procedure was breast augmentation alone, which accounted for 79 of the 118 patients (67 percent). The majority of operations were for cosmetic concerns, whereas nine patients (3 percent) were undergoing reconstructive procedures.

The average age of women in our study was 39 years, the average body mass index was 22.7 $m/kg,^2$ 184 patients (57 percent) had delivered children, and of those, 161 (87 percent) had breast fed. Preoperative asymmetry was documented in 181 patients (56 percent), and 17 (5.3 percent) were diagnosed with tuberous breast deformity. Twenty-eight patients (8.7 percent) smoked cigarettes before surgery but agreed to stop smoking at least 2 weeks before the procedure. The average operation time was 128 minutes, which included 52 percent of patients having concomitant procedures.

Saline implants were used in 191 breasts (31 percent) and silicone implants were used in 426 (69 percent). Of the saline group, 13 patients received a Poly Implant prosthesis (Poly Implant, La Seyne-sur-Mer, France) or prefilled implants bilaterally. The average volume of implant was 317 cc for all types. The majority of implants were textured and round, with only five patients (2 percent) receiving anatomically shaped implants and 37 patients (12 percent) receiving smooth implants. Two hundred eighty patients (87 percent) had the implant placed in a submuscular pocket and 41 patients (13 percent) underwent subglandular placement. The distribution of the techniques for mastopexy was as follows: inverted-T, 60 percent; circumareolar, 21 percent; vertical, 15 percent; and crescent, 4 percent.

There were no incidences of death, myocardial infarction, pulmonary embolus, deep vein thrombosis, or major flap or nipple loss in any patients. The most significant complications were seen in four patients with submuscular implants who developed a postoperative infection, three of which required implant removal (0.9 percent) and subsequent revision. Saline implant deflation was the most common complication, occurring in 12 patients (3.7 percent) over 40 months, even though saline implants were used in only 191 breasts (31 percent). Complications were divided into implant-related versus tissue-related categories, and their distribution is listed in Tables 1 and 2.

Table 1. Implant-Related Complications

Complication	No. (%)
Deflation	12 (3.7)
Capsular contracture	6 (1.9)
Implant palpability	1 (0.3)
Implant malposition	1 (0.3)

Table 2. Tissue-Related Complications

Complication	No. (%)
Poor scarring	8 (2.5)
Areolar asymmetry	7 (2.2)
Recurrent ptosis	7 (2.2)
Breast asymmetry	5 (1.6)
Significant infection	4 (1.2)
Loss of nipple sensation	4 (1.2)
Persistent ptosis	2 (0.6)
Pseudoptosis	2 (0.6)
Hematoma	2 (0.6)
Partial areolar depigmentation	2 (0.6)

Recurrent ptosis was defined as an acceptable initial result that bottomed-out months after surgery. Patients with persistent ptosis had ptosis in the early postoperative period. Capsular contracture was defined as Baker grade II or higher.

In the 40-month follow-up period, 47 patients (14.6 percent) underwent some form of revision procedure. The most common indication for revision cited by patients was a desire to exchange their implants for a different size [$n = 14$ (4.4 percent)], followed by 11 patients (3.4 percent) with saline implant deflations. Interestingly, implant-related revisions accounted for 74 percent of all revision procedures. Thirty-five patients (10.9 percent) had a revision for an implant-related concern and 12 patients (3.7 percent) had a revision for a tissue-related complication. The incidence and distribution of revision procedures is displayed in Table 3.

Several interesting and significant trends were noted on further review of the data. The use of saline implants, a circumareolar mastopexy, and a history of smoking were all associated with a statistically significant ($p < 0.05$) increase in the revision rate. Although saline implants were used only 31 percent of the time, they accounted for 49 percent of the total revision patients (23 of 47). This association is attributable to the number of deflations and the incidence of rippling and the patient's desire to exchange for silicone implants.

Table 3. Indications for Revision

Indications for Revision	No. of Patients (%)
Desire to change implant size	14 (4.4)
Implant deflation	11 (3.4)
Recurrent/persistent ptosis	6 (1.9)
Capsular contracture (grade III)	4 (1.2)
Poor scarring	3 (0.9)
Implant infection	3 (0.9)
Desire to remove implant for size	1 (0.3)
Implant rippling	1 (0.3)
Areola asymmetry	1 (0.3)
Implant malposition	1 (0.3)
Exchange for silicone implant	1 (0.3)
Unilateral reduction for asymmetry	1 (0.3)
Total	47 (14.6)

Of the 47 patients requiring a revision, 18 (38 percent) had undergone a circumareolar mastopexy, although they made up only 21 percent of total mastopexies. Therefore, the revision rate in circumareolar mastopexy patients (27 percent) was nearly twice as high as the overall revision rate of all patients (14.6 percent). Of the 28 patients who were smoking before surgery, eight (29 percent) required some form of revision procedure. Smokers made up 17 percent of all revision procedures but accounted for only 8.7 percent of the total patients in the study.

DISCUSSION

Although it is understandable that most patients would prefer a combined procedure, recent literature raises the question of whether it may be better to stage the procedures.[6] Most of our patients prefer a one-stage operation even knowing that a two-stage procedure may lead to a more predictable result. One-stage breast augmentation with mastopexy is certainly a difficult operation, with numerous potential challenges, and it is understandable that some say "surgeon beware!"[6] However, the procedure is well-described by these same authors.[8] The topic is further clouded by others who say that "simultaneous timing of these operations does not add any additional risks."[10]

Spear et al. state that "complications after augmentation and mastopexy combined are almost certainly more frequent and potentially disastrous" and suggests a higher rate of "major disasters" such as skin flap or nipple loss.[6] Although we have no reason to doubt these may occur, none of these severe complications were encountered in our series. The five most common complications in our series were deflation of a saline implant (3.7 percent), poor scarring (2.5 percent), areola asymmetry (2.2 percent), recurrent ptosis (2.2 percent), and capsular contracture (1.9 percent). Of note, four patients (1.3 percent) developed a late infection, of which three (0.9 percent) later required implant removal. One patient (0.3 percent) also developed superficial epidermolysis of the nipple-areola complex, with resultant depigmentation. The wound healed with local wound care and later underwent revision for hypertrophic scarring. Fortunately, no major disasters were encountered.

The risks of a one-stage procedure have been described as potentially being greater than the risk of each procedure alone.[8] To investigate this fur-

Table 4. Comparison of Revision Rates

	Tissue-Related Revisions	Implant-Related Revisions
Combined mastopexy and augmentation	3.7%	10.9% at 3.5 yr
Mastopexy alone	8.6%	
Augmentation alone (SPS)		13% at 3 yr 20% at 5 yr

SPS, Mentor's Saline Prospective Study.

ther, we compared our complication and revision data to that of mastopexy alone and breast augmentation alone (Table 4). Although it is a prospective study, we chose to use Mentor's Saline Prospective Study[4] as a comparison for augmentation alone, as these numbers are frequently quoted in the literature. We were surprised to be unable to locate a large series concerning mastopexy alone. Therefore, we conducted our own review of 150 consecutive mastopexy-only patients during this same time period. Both populations were found to have similar demographic information. In the mastopexy-only patients, the average 3-year follow-up revealed a revision rate of 8.6 percent.[5] This rate was more than twice the 3.7 percent revision rate for tissue-related complications in our combined augmentation with mastopexy patients.

The most common indications for revision in all patients were implant-related, as seen in the original study by Spear et al.[7] Mentor's Saline Prospective Study revealed a revision rate of 13.2 percent at 3-year follow-up for breast augmentation alone,[4] which is higher than our implant-related

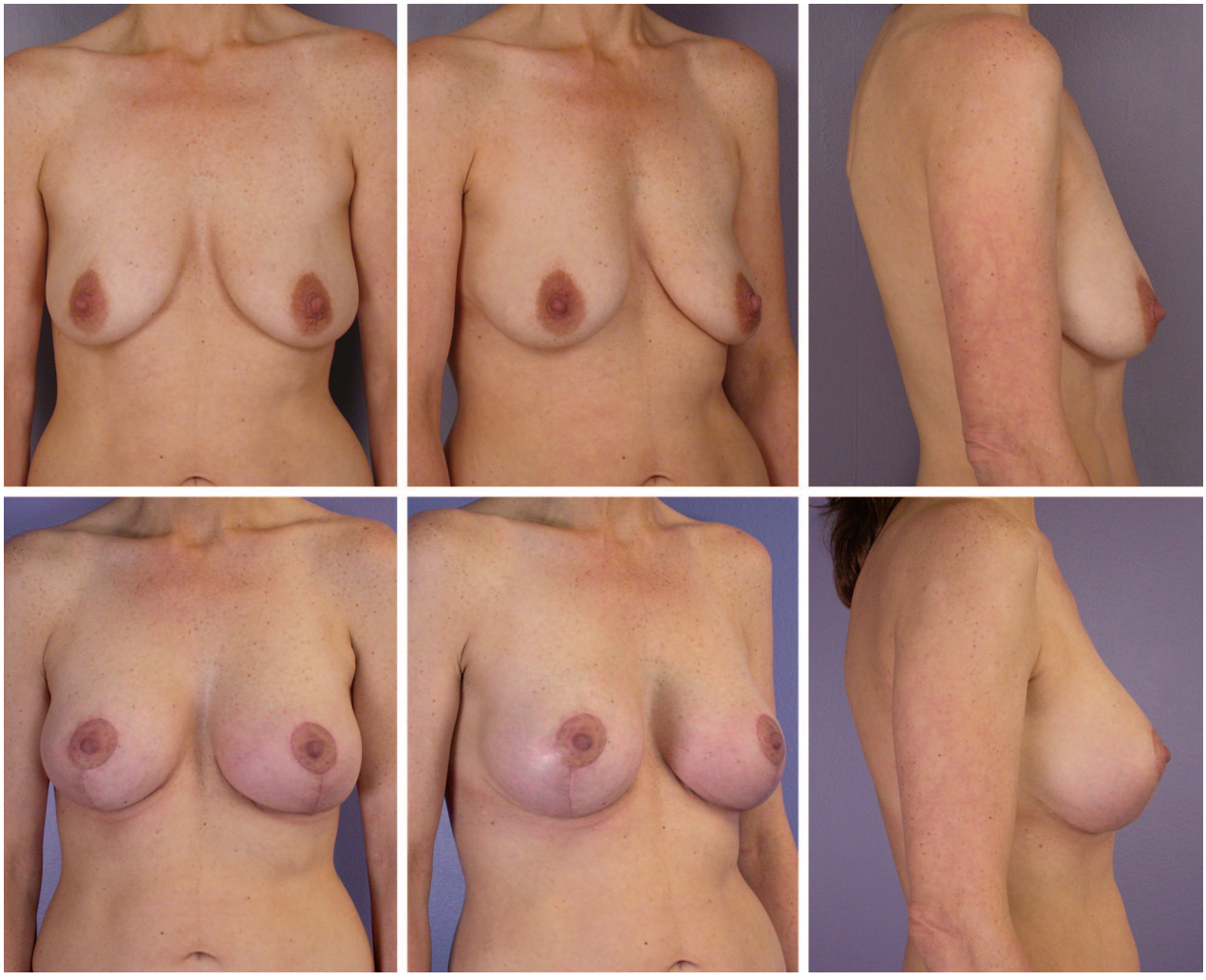

Fig. 1. (*Above*) Preoperative views of patient 1, a 35-year-old mother with mild scoliosis and mild pectus excavatum. (*Below*) Postoperative views 5 weeks after one-stage mastopexy and augmentation with Mentor 200 cc Moderate Plus Profile gel implants (Mentor Corp., Santa Barbara, Calif.) placed in a subpectoral pocket. Mastopexy scars are in an inverted-T pattern.

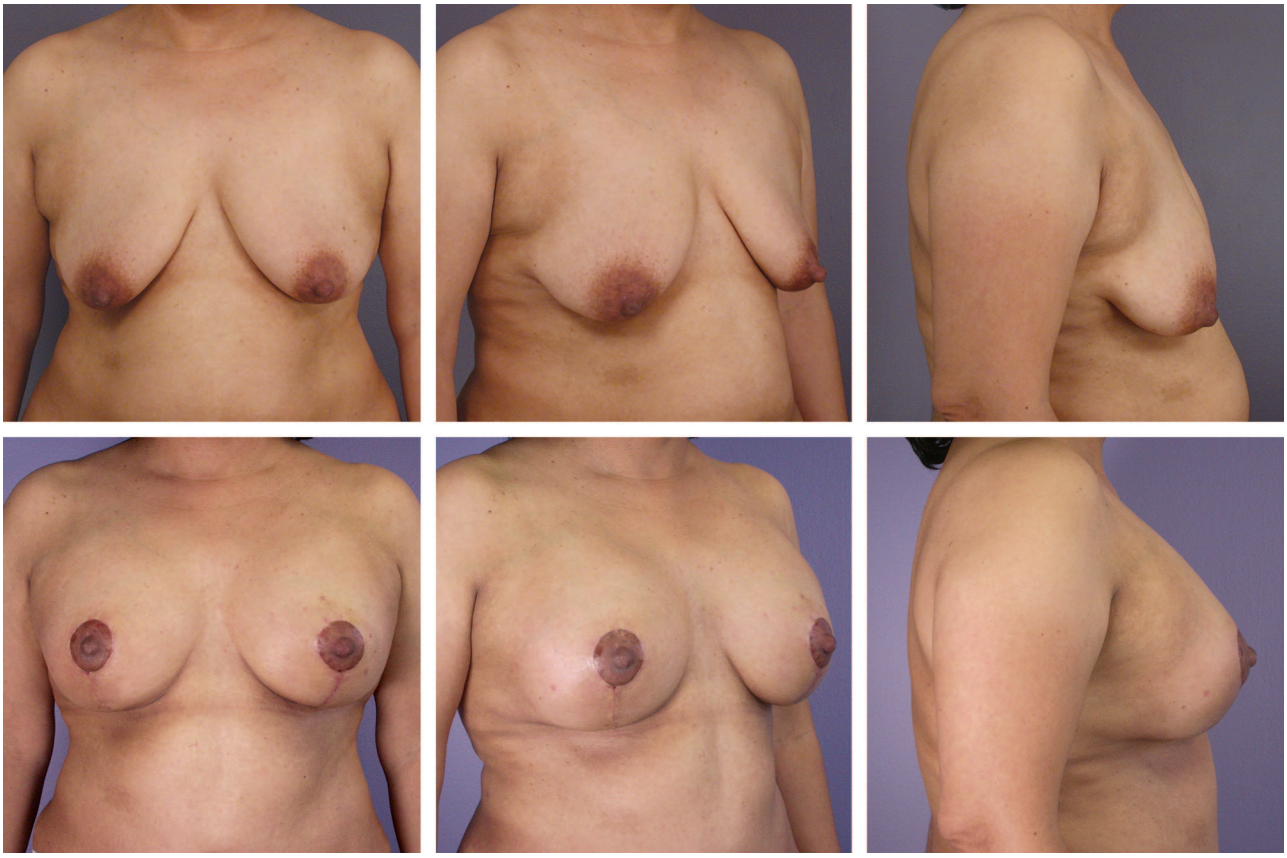

Fig. 2. (*Above*) Preoperative views of patient 2, a 45-year-old mother. (*Below*) Postoperative views 1 month after one-stage mastopexy and augmentation with Mentor 375 cc Moderate Plus Profile gel implants (Mentor Corp., Santa Barbara, Calif.) placed in a subpectoral pocket. Mastopexy scars are in an inverted-T pattern. She also underwent an abdominoplasty and liposuction 2 weeks before the breast surgery.

revision rate of 10.9 percent at 3.3 years. The implant-related revision rate was inflated markedly by 14 patients (4.4 percent) desiring to exchange their implants postoperatively for size concerns. Some may even argue that these patients should not be included in a revision calculation, which would have led to an implant-related revision rate of 6.5 percent.

When one looks closely at Table 4, it is apparent that the risks of our one-stage procedure are not more than additive. Our hypothesis is that a combined procedure may be performed with similar complications and revision rates to both procedures alone without adding the risks of a second anesthesia and recovery.

Of note, 12 patients (3.7 percent) developed a saline implant deflation over the average 40-month follow-up period. The large number of deflations contributed appreciably to both the complication and revision rates, accounting for nearly one-fourth of all revisions. When evaluated as a percentage of saline implants used, this rate is significantly higher than what we have reported previously.[15,16] This rate is also high compared with a 3 percent deflation rate at 3 years reported in Mentor's Saline Prospective Study.[4] Investigating further, we discovered that a significantly higher number of our deflations occurred in patients with Poly Implant Prostheses implants, which we have documented previously.[15] Four of the 11 patients (36.4 percent) who had a revision for a saline implant deflation had Poly Implant Prostheses saline implants. The use of saline implants in general was found to contribute significantly to the chance of a revision procedure. If complications unique to saline implants were excluded (deflation, wrinkling, exchange for silicone), the total revision rate for all patients would be 10.3 percent. This finding seems to favor the use of silicone implants in combined augmentation and mastopexy procedures.

In this study, we have only addressed the safety and efficacy of a combined mastopexy and breast augmentation procedure. We did not intend to

address technical concerns or aesthetic outcomes in this article. Patient satisfaction questionnaires would be an interesting focus for future study, as seen in other reports. We have been pleased with our aesthetic results from one-stage procedures and have included some recent photographs as representative samples (Figs. 1 and 2).

Instead of patient surveys, we used calculated revision rates to determine the efficacy of the combined procedure. Our overall revision rate of 14.6 percent at 3.3 years compares favorably with Mentor's study, which showed reoperation rates of 13.2 percent at 3 years and 20 percent at 5 years for augmentation alone.[4]

We have seen in our practice a five-fold increase in the number of one-stage augmentation and mastopexy procedures, and we find that each case poses unique challenges. Although our review supports the idea that a one-stage procedure has acceptable complication and revision rates, we are not implying that it is a simple procedure. Without a doubt, the one-stage augmentation with mastopexy is one of the more challenging procedures we perform. The operative plan invariably requires a three-dimensional approach and a delicate balance between the breast volume and contour in addition to the height and shape of the nipple-areola complex. Our current revision rate of 14.6 percent is not insignificant, and the possibility of a secondary procedure should be explained to each patient. However, by avoiding some identified risk factors such as saline implants, it is possible to obviate a second operation for over 90 percent of patients who undergo combined augmentation and mastopexy.

CONCLUSIONS

This large retrospective review of consecutive one-stage breast augmentation with mastopexy procedures demonstrates several interesting findings. Although further study is needed to examine the cause of these findings, a significant increase in the probability of a revision was found to be related to the following three factors: a history of smoking, the use of a saline implant, and the performance of a circumareolar mastopexy. Although a one-stage procedure is technically difficult, in our series, the complication and revision rates compare favorably with rates seen with either procedure alone. Patients should be counseled that a second-stage revision procedure is frequently needed. However, this revision rate is substantially smaller than the 100 percent of patients who would have at least a second operation for a planned two-stage breast augmentation and mastopexy. On the basis of data from this large retrospective study, we feel that one-stage mastopexy with breast augmentation is safe and effective.

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DISCLOSURES

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