Buttock Augmentation with Silicone Implants: A Multicenter Survey Review of 2226 Patients

M. Mark Mofid, M.D.
Raul Gonzalez, M.D.
José Abel de la Peña, M.D.
Constantino G. Mendieta, M.D.
Douglas M. Senderoff, M.D.
Soheila Jorjani, Ph.D.

La Jolla and San Marcos, Calif.; São Paulo, Brazil; Huizquilucan, Mexico; Miami, Fla.; and New York, N.Y.

Background: Enhancement of buttock volume with gluteal silicone implants has been performed by surgeons for over 30 years, but no studies have examined complication rates or outcomes of more than single-surgeon experiences. Numerous technical differences in how gluteal augmentation surgery with implants is performed also exist, and to date, surgeon preferences for implant plane, incisional access, implant type, and drain use have not been quantified.
Methods: A 10-question survey was sent to 83 targeted members of the American Society of Plastic Surgeons requesting information about number of cases performed, duration of surgeon experience, implant placement plane and incisional access, implant type, length of typical surgery, use of drains and antibiotic irrigation solution, surgeon satisfaction and surgeon assessment of patient satisfaction, and number of complications experienced.
Results: Nineteen respondents (25 percent response rate) provided data on 2226 patients. Thirteen respondents (68.4 percent) favored the intramuscular plane of dissection over the subfascial plane. Preference for incisional access was nearly equally divided between a single incision in the gluteal cleft (10 respondents) and two incisions separated within the cleft (nine respondents). The total number of complications reported was 848 (38.1 percent).
Conclusions: Gluteal augmentation with silicone implants has gained popularity in the last decade. Despite this, no previous studies have examined multisurgeon experiences with this procedure to determine complication rates or surgeon technical preferences. The authors present data from a survey sent to experienced gluteal augmentation surgeons. Advances in technique and implant options are needed to improve complication rates experienced with this procedure. (*Plast. Reconstr. Surg.* 131: 897, 2013.)

The enhancement of buttock volume with silicone gluteal implants has rapidly gained in popularity over the past decade. For many leaner patients, gluteal augmentation with autologous fat grafting is not an option secondary to the lack of donor tissue. In those patients, gluteal augmentation with silicone implants is the only remaining option to increase buttock volume. According to the American Society of Plastic Surgeons, 1149 buttock augmentation procedures with implants were performed in 2011 by member surgeons, up from 542 procedures performed in 2005, the first year with recorded data for this procedure.[1] Gluteal augmentation surgery suffers from a reputation of high rates of complications, including infection and the need for implant removal, despite the fact that there have been no studies published to date to support this impression. Though many studies have documented complication and satisfaction rates for im-

From the Division of Plastic Surgery, University of California San Diego; Division of Plastic Surgery, University of Ribeirão Preto; private practice; and College of Business Administration, California State University.
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plant procedures of the breast and face, there have been no studies to date documenting more than single-author experiences of buttock augmentation procedures with silicone implants.

The desire to add increasing volume to the buttocks to improve the female body has undoubtedly been shaped by popular culture. In the United States, immigration and the changing ethnic balance may be tilting the perception of the ideal waist to hip ratio in favor of more pronounced curves and greater definition.[2] The majority of published reports in the plastic surgery literature to date on gluteal augmentation with silicone implants come from the South and Central American experience with this procedure.[3]

By way of anonymous survey, we sought to determine relative complications and to tabulate data on surgeon preference with respect to implant plane (subfascial versus intramuscular), incision used (single versus double), drain use, and textured versus smooth implants. We also tabulated data on all complications, including seroma formation, hematoma, infection, chronic pain, sciatic nerve symptoms, implant palpability, capsular contracture, need for revisionary surgery, and implant removal.

METHODS

A 10-question survey (Table 1) was designed on SurveyMonkey (Palo Alto, Calif.), and sent electronically to 83 members of the American Society of Plastic Surgeons, including nine international members known to perform gluteal augmentation with silicone implants. Anonymous responses were received from 19 respondents (25 percent response rate) providing information on 2226 gluteal augmentation procedures. Included within the survey were questions designed to determine surgeon preference for implant plane (subfascial versus submuscular), duration of surgeon experience in years, incision preference (one- versus two-incision technique), and manufacturer of implants used, as well as all complications experienced.

Data were entered into an Excel spreadsheet (Microsoft, Seattle, Wash.), and statistical analysis was performed using IBM SPSS Statistics software (IBM Corp., Armonk, N.Y.). Descriptive statistics were used to summarize and calculate means and standard deviations. Pairwise analysis of proportions of various complications using different procedures described above was calculated and tested for significance. To determine relations and correlations between variables in the study, chi-square and Kendall's tau coefficients were calculated.

RESULTS

There were 19 respondents (25 percent response rate) providing information on 2226 patients. The number of patients reported by surgeons ranged from five to 1240 (average, 117.2 patients; median, 35 patients). Thirteen respondents (68.4 percent) favored the intramuscular plane of dissection over the subfascial plane. The majority of respondents (n = 12, 63.2 percent) had more than 5 years of experience with gluteal augmentation procedures using implants. The average duration of surgery was less than 3 hours for 15 respondents (79 percent). Antibiotic irrigation solutions were used by 84.2 percent of respondents (n = 16) to bathe implants or to irrigate the dissection pocket. Preference for incisional access was nearly equally divided between a single incision in the gluteal cleft (10 respondents) and two incisions separated within the cleft (nine respondents). The use of drains was identified by 84.2 percent of respondents (n = 16), with the majority using drains for 4 or more days (63.2 percent, n = 12). The majority of surgeons (n = 12, 63.2 percent) used textured implants, and the majority of surgeons responding used AART (Reno, Nev.) implants (n = 10, 52.6 percent).

The average rating for surgeon satisfaction with the procedure was 7.3/10, and the average rating for surgeon assessment of patient satisfaction was 8.5/10. The total number of complications reported was 848 (38.1 percent). The most common complication reported was incisional separation resulting in a wound (n = 175, 7.9 percent). Other common complications included need for implant revision (n = 111; 5.0 percent), acute prolonged pain lasting for more than 12 weeks postoperatively (n = 93, 4.2 percent), chronic seromas (n = 82, 3.7 percent), minor infection not requiring implant removal (n = 80, 3.6 percent), and excessive implant palpability (n = 75, 3.4 percent). Implant removal was necessary in 3.8 percent of patients (n = 85) for reasons including major infection, chronic pain, and chronic seromas.

DISCUSSION

There is a relative paucity of outcomes data and surgical technique data published on the subject of gluteal augmentation with silicone implants. The procedure itself suffers from a reputation for having exceedingly high complication rates, despite the fact that no data have been published to date to corroborate this impression among plastic surgeons. In fact, the incidence of

Table 1. Buttock Augmentation Survey

Question	Answer Choices	Responses (n = 19)
1. How many buttock augmentation procedures have you performed using silicone implants?		Range, 5–1240 Average, 117.2 SD, 277.84 Median, 35 Total (all respondents), 2226
2. In what dissection plane do you perform the majority of silicone buttock augmentation procedures?	Subfascial	6 (31.6%)
	Intramuscular	13 (68.4%)
3. How long have you been performing buttock augmentation surgery with silicone implants?	1–2 years	2 (10.5%)
	3–5 years	5 (26.3%)
	>5 years	12 (63.2%)
4. How long does buttock augmentation surgery typically take you to perform?	≤2 hours	9 (47.4%)
	2–3 hours	6 (31.6%)
	3–4 hours	4 (21.1%)
	≥4 hours	0
5. Do you use antibiotic irrigation solutions to bathe your implants or to irrigate the dissection pocket?	Yes	16 (84.2%)
	No	3 (15.8%)
6. Do you typically perform buttock augmentation surgery using silicone implants by placing a single incision within the vertical cleft of the buttocks, or do you use two incisions within the cleft?	One incision	10 (52.6%)
	Two incisions	9 (47.4%)
7. If you do use drains when placing buttock implants, how long do they typically remain in place?	Do not use	3 (15.8%)
	<2 days	1 (5.3%)
	2–3 days	3 (15.8%)
	4–5 days	5 (26.3%)
	6–7 days	4 (21.1%)
	>7 days	3 (15.8%)
8. On a scale of 1 to 10, how would you rate the following?	Patient satisfaction with buttock augmentation using silicone implants	Average, 8.5
	Your satisfaction with buttock augmentation using silicone implants	Average, 7.3
9. Do you typically use textured or smooth silicone buttock implants?	Textured	12 (63.2%)
	Smooth	7 (36.8%)
What manufacturer of implants do you typically use?	Free response	AART: 10 (52.6%) Allied Biomedical: 3 (15.8%) Silimed: 3 (15.8%) Spectrum Designs Medical: 2 (10.5%) Pillar-Similax: 1 (5.3%)
10. Please provide numbers for the following complications that you have experienced.	Chronic seromas requiring frequent aspiration or drain placement	82 (3.7%)
	Hematoma	17 (0.8%)
	Minor infection not requiring implant removal	80 (3.6%)
	Major infection requiring implant removal	38 (1.7%)
	Wound separation	175 (7.9%)
	Acute prolonged pain (<12 weeks)	93 (4.2%)
	Chronic pain	16 (0.7%)
	Sciatic nerve symptoms	10 (0.4%)
	Implant asymmetry	37 (1.7%)
	Inferior implant displacement	16 (0.7%)
	Excessive implant palpability	75 (3.4%)
	Capsular contracture	13 (0.6%)
	Need for implant revision (for any reason)	111 (5.0%)
	Need for implant removal (for any reason)	85 (3.8%)
	Total complications	848 (38.1%)

overall complications with gluteal augmentation compares favorably to that for complications resulting from augmentation mammaplasty, a surgical procedure with a greater than 30 percent reoperation rate over 7 years and 45 percent complication rate over the same time period for primary augmentation in aesthetic surgery.[4] Though the interpretation of survey-based studies is limited by intersurgeon reliability of the tabulation of complications, at the very least, based on the large number of cases cited in the study, the relative numbers of different types of complications serve as a guide for how this surgical procedure can be improved.

The results of this study represent the common postoperative complications that are unique to buttock augmentation using an implant consisting of either silicone elastomer or gel. Implant infection, the most dreaded complication, has been reported at between 2 and 7 percent in other studies.[5–7] The infection rate calculated in this series of 1.7 percent for infections requiring implant removal and 3.6 percent for infections that did not require implant removal is consistent with the literature. The infection rate may be higher for surgeons who do not perform buttock augmentation routinely or have limited experience with this procedure. One of the coauthors of this survey has advocated several methods to reduce the infection rate, including the use of an alcohol-based body wash by the patient before surgery and a povidone-iodine surgical scrub before preparation with Betadine (Purdue Products, L.P., Stamford, Conn.). In addition, a sterile towel or adherent plastic drape may be applied to the field to reduce skin flora contamination of the operative field.[7] A single dose of cefazolin is recommended before incising the skin.

Another common complication of buttock augmentation with an implant is seroma formation. The 3.7 percent seroma rate determined in this survey requiring aspiration or drain placement is likely less than the seroma rate that U.S. surgeons actually encounter, since data from gel implants which are not available in the United States were included in this calculation. Seroma detection in patients with gel-filled implants would not be performed with needle aspiration due to the risk of implant puncture. It is also possible that gel implants do not produce seromas as often as solid elastomer implants do because of different tissue interaction. If left untreated, seroma formation may lead to implant displacement and asymmetry or even infection. For this reason, seromas should be aspirated until they are resolved. Larger seromas that do not respond to aspiration should be drained to allow the periprosthetic space to shrink around the implant and reduce the likelihood of implant migration. Seroma formation may be minimized by reduction of activity in the early postoperative period and by wearing compression shorts for several weeks postoperatively.

Wound dehiscence was determined to be the most common complication in this study. A review of the literature revealed wound dehiscence rates of up to 30 percent.[8,9] Our 7.9 percent incidence of wound dehiscence does not distinguish between superficial spreading of the incision and deep wound separation requiring surgical repair. This complication can lead to implant exposure and infection if healing does not occur. In an attempt to reduce wound dehiscence, half the surgeon respondents in this survey report using two parallel incisions within the gluteal cleft in comparison to a single midline intergluteal incision. Wound dehiscence can be minimized by a careful, atraumatic technique and by minimizing contamination of the wound. During wound closure, each side of the incision should be tacked down to the presacral fascia to avoid wound tension. The use of multiple layers of absorbable sutures and obliteration of dead space, along with deep dermal sutures, are advocated. In our opinion, use of implants that are 375 cc or less in volume can diminish the incidence of wound dehiscence by reducing wound tension. Compression shorts and very limited physical activity in the immediate postoperative period can also reduce wound-healing complications.

Gluteal augmentation with an implant can be performed in either the subfascial or intramuscular space with an acceptable complication rate, as revealed in this survey and in the plastic surgery literature.[10,11] While this survey did not compare results from these two surgical techniques, the majority of respondents (68.4 percent, $n = 13$) favored the intramuscular placement of buttock implants. In a recent study, the infection rate was not significantly different between intramuscular and subfascial implants.[7] In this survey, capsular contracture was less than 1 percent for implants in either plane. Intramuscular implant placement is useful in patients with thin subcutaneous tissue where palpability is a concern. Subfascial implant placement may provide better augmentation of the lower pole of the buttock, especially in patients with a long buttock. Patients with buttock ptosis are not good candidates for buttock implants. The reasons for choice of implant placement were not

addressed in this survey. Surgeons should be familiar with both intramuscular and subfascial buttock implant techniques, as there are patients who may require one of these two approaches to gluteal augmentation based on their anatomy or desired results.

A further limitation to this study is that soft, solid silicone implants are used in the United States due to Food and Drug Administration restrictions on the use of gel implants for this procedure, whereas silicone gel implants are often used in Central and South America. The data in this study have been pooled from surgeons utilizing both types of implants, and it is possible that the risk profile for gel-filled implants may, in fact, be different from that for solid silicone implants. The surgical techniques that are used to advance gel-filled versus solid implants into their respective pockets are, in fact, different. Though a description of the differences in the methods for insertion of solid and gel-filled implants is outside the scope of this study, it remains to be determined whether the actual differences in the implants available for use have an impact on outcomes from the procedure and overall complications. Lastly, rupture rates for silicone gel implants available outside of the United States are also important to determine with future studies.

Given the survey-based nature of this study, we did not seek to determine relative complication rates when comparing surgeon outcomes to compare intramuscular versus subfascial planes for implant placement, years of experience with the procedure, numbers of procedures performed, use and duration of drains, use of antibiotic irrigation solution, or single- versus double-incision procedures. We felt that rigorous scientific analysis of outcomes- and complication-based data would best be served by a prospective study and standardization of controls to examine each variable.

CONCLUSIONS

Gluteal augmentation with silicone implants has rapidly gained in popularity over the past decade. We present the results of outcomes and techniques associated with a survey-based study of 19 member surgeons of the American Society of Plastic Surgeons providing data on 2226 patients. We found that gluteal augmentation with silicone implants is a safe and effective procedure with high patient satisfaction in comparison to other implant procedures of the face and body, including breast augmentation. Advances in technique and implant options are needed to improve complication rates experienced with this procedure. Further studies are needed to compare relative complication rates for the intramuscular versus subfascial plane of placement, use of drains, location of access incisions, and use of antibiotic irrigation solutions.

M. Mark Mofid, M.D.
Division of Plastic Surgery
University of California San Diego
4150 Regents Park Row, Suite 300
La Jolla, Calif. 92037
drmofid@mofidplasticsurgery.com

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