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Breast Augmentation Using Tumescent Technique in Asians

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Abstract

Background: Tumescent infiltration technique to obtain regional anesthesia and vasoconstriction of the skin and subcutaneous tissues is well adopted for several plastic surgery procedures. We have been performing subglandular breast augmentation using the tumescent technique for over 10 years.

Methods: 818 patients underwent bilateral subglandular breast augmentation, applying tumescent infiltration and conscious sedation between 2004 and 2017. Tumescent infiltration was delivered in the planned pocket area of each breast between the pectoral fascia and the mammary gland via a blunt cannula for liposuction. Breast augmentation was conducted using silicone gel implants. The patients then provided subjective assessments at 1 month post-treatment.

Results: The average amount of tumescent solution infiltrated and silicone implants were 199.5 mL, and 188.8 cc, respectively. Surgical drains were not used due to little bleeding. The operating time was within 60 min and the recovery room time approximately 50 min. Minor complications were observed in a total of 74 (9.0%) patients. Pain lasting for over 7 days, nausea, and fever during perioperative period were found in 28 patients (3.4%), 2 patients (0.2%), and 2 patients (0.2%), respectively. Surgery-related complications such as ecchymoses, contracture, infection, hematoma, hypertrophic scars and implant rotation were uncommon. No serious adverse events were observed. Ninety-eight percent of patients reported satisfaction with the results, and 92.5% with the convenience of the breast augmentation.

Conclusion: Breast augmentation using the tumescent technique provides safe procedure and an increased satisfaction. Because of these advantages, usage of the tumescent technique is recommended as a useful pretreatment for breast augmentation.

Keywords: Breast augmentation; Tumescent infiltration; Anesthesia

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Introduction

Breast augmentation is one of the most common cosmetic surgical procedures performed by plastic surgeons around the world [1], and is recently gaining more popularity among Asian patients. With increasing breast augmentation, prevention and management of pain and possible complications have also become of great interest. The tumescent technique was first described by Klein to obtain regional local anesthesia of the skin and subcutaneous tissues in 1987 [1-4]. The tumescent infiltration consists of large volumes of saline solution with lidocaine and epinephrine in the subcutaneous compartment and is routinely used for liposuction, hair transplantation, laser surgery, facelifts, abdominoplasties, brachioplasties, and other surgical procedures [5-8]. Regarding breast surgery, the tumescent technique has been used for mastectomy, breast reduction, and augmentation to decrease bleeding and postoperative pain, and to facilitate dissection [9-11]. Many studies suggest the efficacy of the tumescent technique, but this is the first report to quantitatively show the efficacy of the tumescent technique in Asian primary subglandular breast augmentation. The objective of this study is to review our cumulative experiences during the past 14 years.

Methods

Japanese Patients

An 818 Japanese female patients, aged 18 to 71 years (mean age, 34.9 ± 10.1 years), were enrolled

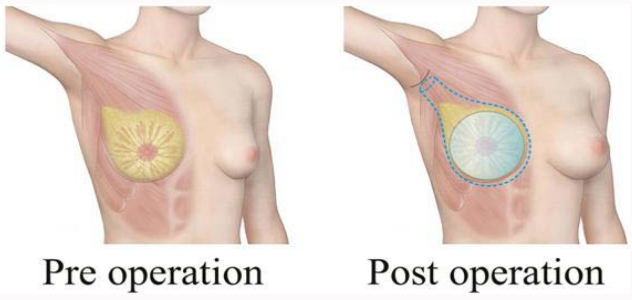

Figure 1: An Oblique anatomical perspective of the breast augmentation using the tumescent technique.

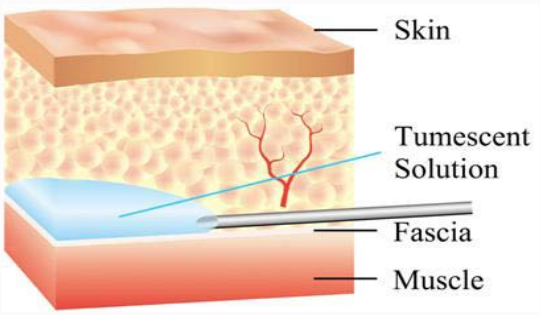

Figure 2: A schematic of the tumescent technique.

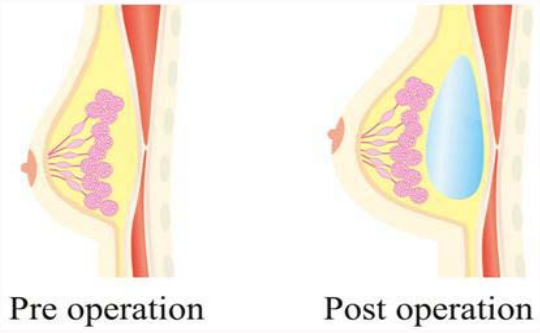

Figure 3: A sagital perspective of the pre- and post-breast augmentation using the tumescent technique.

between 2004 and 2017 in this study. Patients underwent a bilateral subglandular breast augmentation using the tumescent technique, an intravenous sedation, and inhaled anesthesia. The intravenous sedation was performed using Propofol and inhaled anesthesia was performed using nitrous oxide. All of the patients had visited the Tokyo Cosmetic Surgery to achieve breast augmentation. All patients gave their informed consent to the operation after being fully informed about the treatment risks, and agreed to publication of results and images. Textured silicone gel implants were used exclusively. All breast implants were round, or of moderate profile (Euro Silicone from 2004, and Euro Silicone and Motiva from 2014, Establishment Labs, FL, USA). Preoperative measures to best select the implant size were taken concerning each patient, including pinch tests, breast diameters, breast papillary distance, and anterior thoracic wall size. For an improved final size selection by the patients, different implant sizes and shapes were tried in front of a mirror with a sports brassiere. A pinch test resulting in less than 2 cm was considered not suitable for subglandular breast augmentation. The patients provided subjective assessments at 1 month post-treatment.

Operation technique

A single prophylactic dose of 1 g of cefazolin was administered intravenously to all patients unless contraindicated by an allergy status. The tumescent infiltration was prepared in the operating room, and composed of 50 mL of 1% lidocaine, 20 mL of 7% sodium bicarbonate, 1 mL of 0.1% epinephrine, 10 mL of 10% tranexamic acid, and 40 mg of triamcinolone acetonide in 500 mL of 0.9% saline solution. A cutaneous incision from 3 cm to 5 cm was performed in the axillary fold (Figure 1). Dissection until the superficial fascia of the pectoralis major muscle was performed to identify the plane between the gland and the superficial fascia of the pectoralis major muscle. The tumescent solution was delivered in the plane between the deep fascia of the pectoralis major muscle *via* caliber of the blunt cannula (2 mm diameter) for liposuction (Figure 2 and 3). The volume introduced, ranged from 50 mL to 450 mL per breast. Infusion was stopped when the breast seemed vasoconstricted, turgid, and firm. To allow the epinephrine and the lidocaine to take effect, there was a 15 min interval after the injection and before starting the surgical procedure. The pocket was customized within the boundaries of the mammary gland, matching the size of the diameters of the implants. Dissection was performed gently and completely by administering unipolar, hand-switching, and needlepoint radiofrequency forceps (standard and 30 cm long-type); and blood vessel coagulation was performed progressively during the pocket dissection. Standard and long-type fiber-optic retractors, with smoke evacuation capabilities, were used to make the dissection in the subglandular pocket more precise and to better visualize all perforating vessels. Dissection adjustments and hemostasis were made carefully prior to inserting of the implant to prevent secondary bleeding after the clearance of the vasoconstrictive effects of adrenaline. We can see inferior half of the pocket clearly with a long type of fiber-optic retractor without endoscope. The implant placement followed the standard hygienic guidelines: change of drapes, gloves, and instruments; and antiseptic pocket irrigation with cefazolin antibiotic. Surgical drains were not used. Closure of the wound was performed in layers, using resorbable sutures for the subcutaneous tissue and non-resorbable sutures for the skin. The wound was covered with a sterile dressing. The breasts were covered with an adherent sports brassiere, which was worn for 6 weeks. After less than 1 h of observation, the patients were dismissed. Postoperative follow-up was scheduled after 1 month.

Patients' subjective assessments

Patients' subjective assessments were conducted using questionnaires, in which the patients were asked to give their degree of satisfaction in terms of the results, and convenience of the treatment based on a 5-point scale from 0 to 4 (0= worse; 1= little satisfaction or not satisfied; 2= fairly satisfied; 3= satisfied; and 4= very satisfied). Questionnaires were given 1 month after the treatment.

Results

All the surgical procedures were performed using the tumescent technique. Representative pre- and post-breast augmentations using the tumescent technique are shown in Figure 4 and 5. The average amount of tumescent solution infiltrated were 199.5 mL (50 mL to 450 mL). Infusion was delivered until the breast seemed vasoconstricted, turgid, and firm. Until then in some of our patients injected tumescent solution was leaked out from the armpit. No cases were aborted or converted to general anesthesia or deep sedation. None of the patients reported pain during skin

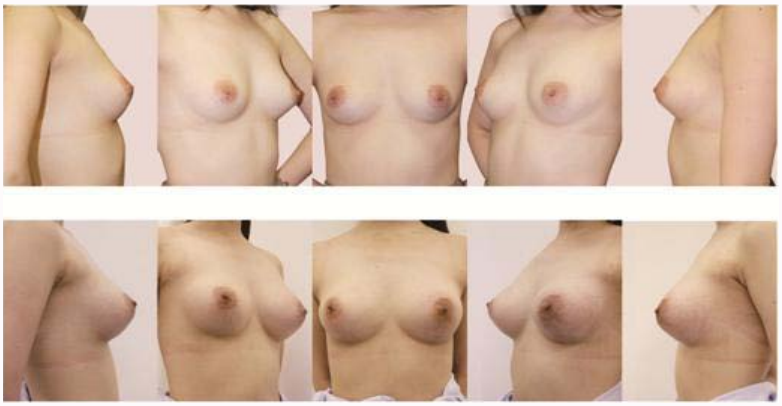

Figure 4: Representative photographs of our patients who underwent breast augmentation using the tumescent technique. A 25-year-old Japanese female. Preoperative view (*Above row*), Postoperative view (*Below row*).

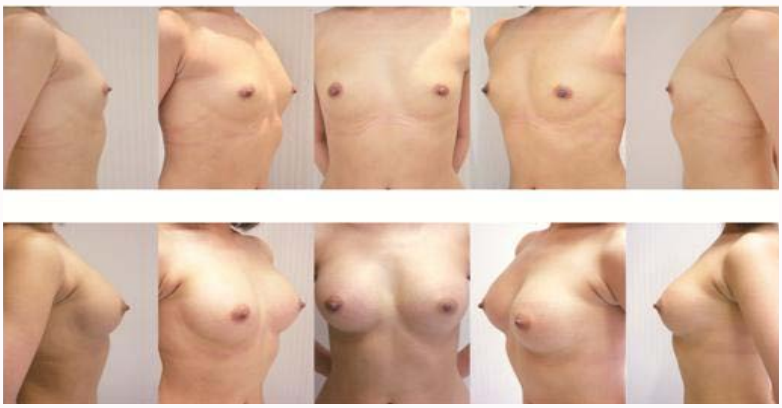

Figure 5: Representative photographs of our patients who underwent breast augmentation using the tumescent technique. A 30-year-old Japanese female. Preoperative view (*Above row*), Postoperative view (*Below row*).

cutting. The average silicon implants' size was 188.8 cc (120 cc to 400 cc). With all cases, blood loss was less than 5 ml per side and surgical drains were not used. The operating time was within 60 min and the recovery room time an average of 50 min. Most patients had no memory of the procedure. There were no major postoperative complications, such as deep venous thromboses, pulmonary emboli, hematomas, need of reoperation, or pneumothorax. Minor complications were observed in a total of 74 (9.0%) patients. Pain lasting for over 7 days, nausea, and fever during perioperative period were found in 28 patients (3.4%), 2 patients (0.2%), and 2 patients (0.2%), respectively. Ecchymoses, contracture, infection, hematoma, hypertrophic scars and implant rotation during the follow-up period were found in 14 patients (1.7%), 9 patients (1.1%), 7 patients (0.9%), 5 patients (0. 6%), 3 patients (0.4%), and 2 patients (0.2%), respectively. Transitory complications consisting of a slight pain sensation which resolved within 5 days after the surgery were observed in 61 (7.5%) patients. The rest of the patients (92.5%) reported to be satisfied with the tumescent technique procedure, particularly due to the absence of preoperative pain and the complete absence of pain after surgery. The patients' subjective assessments showed that 98 and 92.5% of patients reported satisfaction with the results, and convenience of the breast augmentation, respectively (Figure 6).

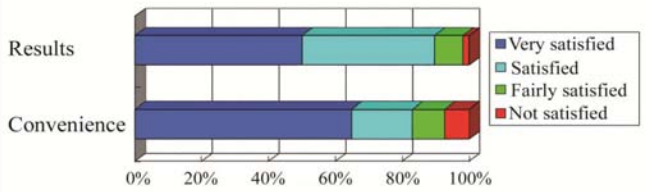

Figure 6: The patients' subjective assessments showed that 98 and 92.5% of patients reported satisfaction with the results, and convenience of the breast augmentation using the tumescent technique, respectively.

Discussion

During this 14-year period, 818 primary breast augmentations using the tumescent technique were performed. Usage of the tumescent technique effectively reduces bleeding, pain, infectious complications, the operating time and the recovery room time. Breast augmentation using the tumescent technique provides safe procedure and an increased satisfaction. Because of these advantages, usage of the tumescent technique is recommended as a useful pretreatment for breast augmentation. General anesthesia appeared to be the common anesthetic method for breast augmentation, however applying local anesthesia and sedation with the tumescent technique are becoming common to decrease bleeding, postoperative pain, and possible complications. Jabs et al. reported that the tumescent technique quantitatively decreased perceived postoperative pain uniformly, and significantly decreased the use of postoperative pain medication in the immediate perioperative period [11]. They noted that the patients, during the postoperative period, were more comfortable due to the decreased amount of postoperative

narcotics, which resulted in less pain, nausea, and vomiting [1,11]. The tumescent technique's complications or toxicities depend on the systemic effects of lidocaine and adrenaline [1].

Lidocaine toxicity is closely correlated with its plasma levels, but the threshold for lidocaine toxicity is not well defined [1]. Toxicity may result from an overdose, an excessively rapid systemic uptake of an otherwise safe volume, impaired liver metabolism, or drug interactions [1,4]. It may be argued that tumescent technique causes significant tissue distortion, especially initially (with the implant often smaller that the infiltrate volume), making intraoperative aesthetic judgments almost impossible [1]. The volume of the tumescent solution infiltrated, and the silicon implants' size in our study were relatively smaller (average amount; 199.5 mL, 188.8 cc, respectively) compared to other studies, tissue distortion due to the tumescent solution infiltrated was not a problem, and most of the patients were very satisfied with the results and the absence of pain. These results suggest that usage of the tumescent technique, even though with relatively smaller amount, appears to be a useful pretreatment for breast augmentation. With all cases, blood loss was less than 5 ml per side and surgical drains were not used, which also potentially decreases the infectious complications. Infiltration of epinephrine also induces significant vasoconstriction of the perforating branches of the internal thoracic artery and vein [12]. Vasoconstriction of these perforators reduces blood loss because the superomedial perforator supply from the internal thoracic vessels accounts for up to 60% of the total blood supply to the breast [12]. This also explains why proper dissection of the breast pocket using the tumescent technique produced minimal blood loss per side [12]. There are a number of benefits with the usage of the tumescent technique instead of general anesthesia or deep sedation. The possibilities of the complications often seen with a general anesthetic, such as adverse cardiopulmonary effects, postoperative nausea, vomiting, and deep venous thrombosis could be decreased. Keeping the patient conscious enables meeting their requests during operation, contributing to increased satisfaction. Most of the patients reported satisfaction with the convenience of the breast augmentation as well as the results. In terms of costs, the tumescent technique is less expensive than general anesthesia.

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