INTRODUCTION

Gender dysphoria refers to distress experienced by individuals whose gender identity does not correspond with their natal sex.¹ For transfeminine patients, those who were assigned male gender at birth but identify themselves as female, the absence of sufficient breast growth or the presence of a masculine chest contour can be one source of substantial distress. As such, feminizing chest surgery is increasingly being performed as a component of gender-affirming medical care for these patients.² Efforts to achieve a feminine breast contour typically begin with a minimum of 12 months of gender-affirming hormone therapy, but many transfeminine patients express interest in surgical intervention to achieve sufficient breast volume and a satisfactorily feminine appearance.³,⁴

In comparison with cisgender women (those assigned female gender at birth with a female gender identity), transgender women presenting for gender-affirming breast augmentation represent a unique population in terms of their demographic, anatomic, and medical characteristics. Typically, these patients present older, with higher BMI, and with higher rates of certain comorbidities, including a history of smoking, depression, and...
anxiety. Preoperative chest measurements and contours also differ significantly between transgender and cisgender women. Transgender women often present with a more robust pectoralis muscle, shorter nipple-to-inframammary fold distance, and longer sternal notch-to-nipple, breast width, and nipple-to-midline distances. The chest anatomy of transfeminine patients is further characterized by the effects of varying durations of exposure to estrogen therapy, different levels of testosterone suppression, and heterogeneous responses to these exposures. These factors raise important considerations in determining which anatomical plane is optimal for implant placement in breast augmentation for transfeminine patients.

Throughout the past decade, breast augmentation for cisgender women has been the most common cosmetic surgical procedure in plastic surgery. There are several options for the anatomical plane of implant placement in this population, each with its advantages and drawbacks. A growing body of evidence suggests that use of the subfascial plane for breast augmentation, a technique first described by Ruth Graf 3 decades after use of the subglandular and subpectoral planes, offers several advantages over these techniques. Specifically, the subfascial plane has been associated with lower rates of capsular contracture, hematomata, and seroma in comparison with the subglandular plane. Use of the subpectoral plane has also been associated with lower complication rates in comparison with the subglandular plane; however, there remains concern regarding implant displacement and animation with pectoral muscle contraction using this technique. This has the potential to be of even greater concern for transfeminine patients due to their tendency toward a more robust pectoral muscle.

Use of the subfascial plane has been suggested as an approach that offers lower complication rates than the subglandular plane, while avoiding implant animation and displacement associated with the subpectoral plane. To our knowledge, existing studies have not yet addressed the question of breast implantation plane in the distinct context of the transfeminine population. The goal of this article is to emphasize the potential benefits of use of the subfascial plane for gender-affirming breast augmentation utilizing a case series of 5 transfeminine patients, and to review the literature on surgical techniques and outcomes in this population.

METHODS

A retrospective chart review of patients presenting for gender-affirming breast augmentation was performed. All patients were seen by a single surgeon for the purpose of gender-affirming breast augmentation in 2019. Information regarding patient demographics, past medical history, surgical materials and technique, and postoperative outcomes was abstracted from provider notes.

For the purpose of this study, a narrative literature review on surgical techniques and outcomes for gender-affirming breast augmentation was also conducted. The search was performed using keywords “transgender persons,” “transsexualism,” “mammaplasty,” “breast implantation,” “breast augmentation,” and variations of these terms in PubMed, Embase, LGBT Life, GenderWatch, and Google Scholar. Manual searches were also performed by reviewing the references of identified articles and relevant review articles. Included articles were those that contained primary data on breast augmentation in transfeminine individuals. Three articles appeared to have overlapping patient cohorts, but reported different information (surgical technique versus provider- and patient-reported outcomes); therefore, all were included. Articles were excluded if they did not pertain to gender affirmation in transfeminine patients, did not study primary breast augmentation in this population, or did not include information on surgical techniques or outcomes. Extracted information from these studies included general study information, characteristics of the study sample, surgical technique, patient- and/or physician-reported outcomes, complication types and rates, and satisfaction rates. The Institutional Review Board of the authors’ affiliated hospital determined that this protocol was exempt from review.

A total of 3 cases of gender-affirming breast augmentation are described (Table 1). All 3 patients underwent breast augmentation using subfascial implant placement with Mentor smooth round silicone implants (manufactured by Mentor Worldwide LLC, Irvine, Calif.). Patients were aged 18, 21, and 24 years at the time of surgery. Patients had body mass indices (BMIs) of 35.1, 21.4, and 23.6 and underwent estrogen therapy for a duration of 54, 16, and 30 months, respectively. Preoperative chest measurements, past medical history, and smoking history are further detailed in Table 1.

Before surgery, our team ensured that the criteria outlined in the World Professional Association for Transgender Health’s (WPATH) Standards of Care were met, including documentation of persistent gender dysphoria and collection of referral letters. As per the Standards of Care, patients were required to have undergone at least 12 months of hormone therapy before surgery, and patients were additionally required to avoid all first- and second-hand smoke exposure for 4 weeks before surgery.

Surgical Technique

Several implants were considered based on measurements carried out during the preoperative visit and on the patient’s desired breast size. As a general guiding rule, the patient’s breast width minus 10 mm should reflect the base of the selected implant. In the preoperative area, measurements were verified, and markings were made before the procedure, with the patient in the upright position. The procedure was conducted with the patient in supine position under general anesthesia. Prepping and draping included nipple–areolar complex coverage with a Tegaderm tape. After subcutaneous injection of 0.25% lidocaine with epinephrine and 0.5% Marcaine with epinephrine (ratio 1:1) to the incision site, a horizontal cut was made 1–1.5 cm below the current inframammary fold (IMF). Dissection was carried straight down where the lower insertions of the pectoralis major muscle were identified. The pectoral fascia was incised and the breast...
parenchyma was elevated with the pectoral fascia, directly above the pectoral muscle. A pocket was created in accordance with preoperative markings. Different silicone sizes were then inserted and the patient was elevated to a seated position to evaluate symmetry and proposed result. After final hemostasis and Bacitracin irrigation, the same local anesthetic solution was used to infiltrate the fascia to reduce postoperative pain. Permanent smooth round silicone implants were inserted using a Keller funnel. The incision was closed in layers and dressed, and a surgical bra was placed. Patients were discharged from the hospital the following day, with instructions to place ice packs on the breasts, and to use the surgical bra for 6 weeks.

RESULTS

Outcomes

Follow-up time ranged from 4 to 6 months following breast augmentation. No complications such as hematoma, seroma, infection, or other complaints were noted. Table 1 provides a more detailed overview of these cases. Preoperative and postoperative photographs for patient cases 2 and 3 are shown in Figures 1 and 2, respectively. Patient-reported outcomes were not formally assessed, but based on clinical notes, all patients expressed that they were very pleased with the outcome of the procedure.

Literature Review

From the literature search, a total of 12 articles with primary data related to breast augmentation in transfeminine patients were identified. 5,21–30 There were 5 retrospective cohort studies, 2 cross-sectional surveys utilizing retrospective cohorts, 1 prospective cohort study, and 4 case studies. Of the retrospective studies, 3 appear to pertain to the same cohort of patients. No studies documented the use of the subfascial plane. A total of 990 patients participated in these studies, of whom 802 were transgender women. Five cohort studies, inclusive of 716 transfeminine patients, reported complications, with rates ranging from 67% to 82%. A list of these studies is provided in Table 2.

DISCUSSION

In this study, we offer a review of our preliminary but potentially promising experience using the subfascial plane for implant placement in transfeminine patients undergoing gender-affirming breast augmentation. Prior studies of gender-affirming breast augmentation have not explicitly documented the use of the subfascial plane, and there remains a need for an expanded description of how the distinctive anatomical features of the transfeminine chest affect the use of various planes for implant insertion.

The anatomy of the chest differs in a variety of ways between transgender and cisgender women. The chest of a cisgender woman typically features a narrower sternum, shorter distance between the nipple–areolar complexes, wider areolas, more glandular tissue, longer nipple-to-inframammary fold distance, and less robust pectoral muscle and fascia. 34,35 More specifically, one study comparing cisgender and transgender women presenting for breast augmentation found longer sternal notch-to-nipple, breast width, and nipple-to-midline distances in the transgender cohort. 5 These differences are vital to consider when seeking to achieve aesthetically natural breast augmentation for transfeminine patients.

Historically, smooth implants have been available for a longer period of time and are more commonly used than textured implants in the United States. 32,33 More recently, textured implants have also been associated with the rare, but documented complication of BIA-ALCL. 34,35 Smooth implants were the implant of choice for the senior author.

A variety of factors motivated the senior author to consider the subfascial plane of implant placement for gender-affirming breast augmentation. For a number of reasons, the subglandular plane was not considered ideal for gender-affirming breast augmentation. Subglandular placement of smooth implants is potentially associated with a higher rate of capsular contracture in comparison with textured implants. 36–38 Smooth, round implants in the subglandular plane may also produce a less natural breast shape in comparison with textured anatomic implants, particularly for transfeminine patients who have limited

Table 1. Patients Undergoing Gender-affirming Breast Augmentation Utilizing the Subfascial Plane

| Patient ID | Age at Surgery (yr) | Height, Weight (cm/kg) | BMI | Comorbidities | Smoking History | Hormone Therapy | Duration (mo) | Chest Measurements | Follow-up Time (mo) | Complications | Implant size (cc) |
|------------|---------------------|------------------------|-----|---------------|----------------|----------------|--------------|-------------------|-------------------|--------------|-----------------|
| 1          | 21                  | 172 cm 63.4 kg         | 21.4| None          | None           | None           | Estrogen, 16 | Spironolactone, 16 | SN-N 19.5         | 13           | None            |
| 2          | 24                  | 184 cm 80 kg           | 26.3| ADHD†         | Anxiety        | Marijuana      | Estrogen, 30 | Progesterone, NA   | N-IMF 5           | 16           | None            |
| 3          | 18                  | 171.5 cm 103.2 kg      | 35.1| Anxiety       | h/o self-harm  | Nicotine       | Estrogen, 54 | Leuprolide, 57     | N-IMF 7R, 5.5L   | 15           | None            |

*SN-N, sternal notch to nipple; N-IMF, nipple to IMF; BBW, breast base width.
†Attention-deficit/hyperactivity disorder.
There is additionally an increased risk for visible rippling with subglandular implant placement in individuals who have had insufficient breast growth while on feminizing hormone therapy.

The subpectoral plane also presented several drawbacks for transfeminine patients, although it had been previously used in this patient population by the senior author. The more developed pectoralis major muscle seen in transfeminine patients raises concern for implant distortion or displacement using subpectoral implant placement. Aesthetically, the bulk of the pectoralis major may also blunt breast borders or result in wider-appearing breasts. Additionally, the broader breast width of the transfeminine chest typically necessitates the use of wide implants. Such wider implants would be accompanied by lower projection in the less pliable subpectoral pocket, contributing to difficulty achieving a favorable aesthetic outcome.

A previously described alternative to subglandular and subpectoral implant placement is dual plane placement. Dual plane implant placement is defined as a combination of subglandular and partial subpectoral pocket locations to optimize the benefits of each pocket location, while limiting the tradeoffs and risks of a single pocket location. One study quantified dynamic breast deformity following dual plane breast augmentation and reported that no patients in the sample complained of or required reoperation for animation deformity. In our experience, dual plane implant placement in transfeminine patients presents...
disadvantages similar to subpectoral implant placement, due to the robustness of the pectoralis major muscle and the limited breast tissue present. In previous cases using the dual plane technique, we found that the implant was at risk of being flattened by the muscle, and may even give rise to two eminences, similar to the “double bubble” deformity.

In our analysis, subfascial placement seemed to be the best option for transfeminine patients, given the potential disadvantages associated with subglandular, subpectoral, and dual plane implant placement. This approach took advantage of the added coverage of the fascial layer, without the additional bulk of the pectoralis muscle. The subfascial pocket is pliable, allowing for the choice of implants with greater projection for any given width. The pliability of the pocket also enables proper implant placement with low risk of implant edge visibility, particularly in the upper pole. As previously mentioned, in comparison with the subglandular plane, the subfascial plane presents lower risk of capsular contracture, hematoma, and seroma. In comparison with the subpectoral plane, the subfascial plane presents lower risk of implant dislocation, animation, and bulkiness.\textsuperscript{12,17-20} Notably, the technique of hybrid breast augmentation combines the use of implants and fat grafting, which helps generate more substantial

\begin{figure}[h]
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\includegraphics[width=\textwidth]{figure2.jpg}
\caption{Patient photographs of an 18-year-old transgender woman, 54 months of Estrogen, BMI 35.1. Preoperative (A), 1-month postoperative (B–D), and 4-month postoperative (E–G) photographs of an 18-year-old patient (Case 3) who underwent subfascial breast augmentation.}
\end{figure}
glandular tissue coverage. For transgender women with less glandular tissue, this technique may offer an important area for further study.

Our study population was younger than those described by previous studies of breast augmentation in transfeminine patients. The prevalence of mental health diagnoses in our study population was consistent, with evidence demonstrating the increased risk for depression, anxiety, and other mental health comorbidities that transgender individuals face in comparison with cisgender peers. Complications associated with breast augmentation, such as hematoma, seroma, capsular contracture,
and infection, were not observed in our patients, who were followed for a minimum of 4 months. Based on our review of the literature on breast augmentation in transfeminine patients, complication rates and frequency of reoperation span a wide range. However, a larger, population-based study suggests that 30-day complication rates for transfeminine patients following breast augmentation are comparable to those for cisgender patients.5

Our review of the literature discussing surgical technique and outcomes for gender-affirming breast augmentation reveals a need for further study in this field. One-third of identified studies were single-patient case studies. Apart from these, several studies were published in the last 2 years following an almost 20-year gap in the literature examining breast augmentation technique in the transfeminine population. Prior studies involved implant placement only in the subglandular and subpectoral planes. None of the studies discussed use of the subfascial plane for implant placement. The inframammary incision site was most commonly used across studies. Variation in the type of implant was also observed, as both anatomic and round implants were used. Notably, textured implants were more commonly used than smooth implants across these study populations. For example, Miller et al. use textured anatomic implants in the subpectoral pocket for three-quarters of their patients, explaining preference for this technique “due to the lack of overlying glandular tissue and to provide naturally shaped feminine breasts without the appearance of overly full superior pole.”72 In this sense, the option of using textured anatomic implants is important to consider, for achieving natural-appearing breast augmentation for transfeminine patients. Given the potential for an improved aesthetic outcome and the low overall incidence of BIA-ALCL, providing patients with the option of textured implants, along with information regarding risks and benefits, may be appropriate. Reported complication rates ranged from 0% to 33%. This range may be explained in part by the absence of a standardized definition for this outcome. All 4 case studies discussed the long-term, rare complication of BIA-ALCL.

There are several limitations of this case series. First, the sample size is small, and the same lead surgeon was responsible for all cases. Second, the duration of follow-up is very short, although there is evidence to suggest that a majority of complications would arise within the first 6 months following breast augmentation.16 However, a longer duration of follow-up would be preferable to capture and account for longer-term outcomes, including capsular contracture. Finally, our review of the literature focused purposefully and specifically on prior studies that included information regarding surgical planning, technique, or outcomes. As a result, studies documenting relevant pre-surgical considerations such as hormone therapy are not included here.

CONCLUSIONS

The subfascial plane represents an option for implant placement in gender-affirming breast augmentation for transfeminine patients that merits further investigation.

In considering the unique anatomical characteristics of this population, the subfascial plane offers the potential to minimize complications, while optimizing aesthetic outcome. As gender-affirming breast augmentation becomes more common, there is an increasingly pressing need for further research regarding surgical technique and its effects on both patient- and provider-reported outcomes.

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