A comparison of perioperative safety for breast augmentation in cis- *vs*. trans patients

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Background: Gender-affirming surgery provides a psychosocial benefit to transgender women. However, increased medical complexity within the transgender population has limited access for some transgender women. This study compared patient population comorbidities and 30-day peri-operative safety following primary augmentation mammoplasty between cis- and transgender women.

Methods: Data were extracted from the National Surgical Quality Improvement Program (NSQIP) database between 2007 and 2016. Transgender patients were identified using ICD-9 &10 codes for gender dysphoria. Categorical variables were compared using chi-squared and Fisher's exact tests while independent *t*-tests were used for continuous variables. Statistical significance was set at P<0.05.

Results: There were 4,234 breast augmentations identified in cisgender women and 137 in transgender women. Transgender women had a higher frequency of ASA-II and ASA-III patients (P<0.001), diabetes (P<0.001), hypertension (P=0.006), and active smoking status (P<0.001). Despite the higher comorbidity burden and routine use of hormonal therapy, there were no significant differences between populations in major or minor peri-operative complication rates.

Conclusions: Top surgery improves quality of life in transgender women. Despite the more complex pre-operative risk profile in the transgender population, there is no difference in peri-operative safety profiles. Plastic surgeons treating this patient population should consider more liberal surgical indications for reconstructive top surgery compared with cosmetic breast augmentation.

Keywords: Transgender; breast augmentation; outcomes; top surgery; gender transition

Submitted Apr 17, 2020. Accepted for publication Aug 14, 2020.

doi: 10.21037/atm-20-3355

View this article at: http://dx.doi.org/10.21037/atm-20-3355

Introduction

Extensive literature supports the significant role of hormonal therapy and gender-affirming surgery on the improvement of psychological functioning, sexual functioning, and overall quality of life in patients with gender dysphoria (1). Gender transition improves patients' ability to develop social and professional relationships thereby easing integration into society (2).

The 7th edition of the World Professional Association for Transgender Health's (WPATH) Standards of Care advocates for gender-affirming surgery as medically necessary to relieve psychosocial distress associated with gender dysphoria. Gender-affirming surgery has gained national momentum following the passage of the Affordable Care Act which banned discrimination on the basis of gender identity (3,4). As a result, increasing numbers of patients are seeking care for gender dysphoria nationwide (5). Yet, the true healthcare needs of transgender individuals are

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Table 1 Demographic characteristics of the study population

Characteristics	Value
Number of patients (SD)	4,645
Race, n (%)	
White	3,594 (77.4)
Black	186 (4.3)
Asian	128 (2.9)
Other	737 (15.9)
ASA Classification, n (%)	
No disturb	2,541 (56.5)
Mild disturb	1,878 (41.8)
Severe disturb	75 (1.7)
Life threat	2 (0.0)
Moribund	0 (0.0)
Age (years), mean (SD)	35.8 (10.7)

not completely known and some healthcare providers may find themselves unprepared.

Chest reconstruction ("top surgery") is an important part of the gender transition process for transgender females (TF). Hormonal therapy alone often yields inadequate breast volume necessitating breast augmentation (6). Top Surgery improves psychosocial well-being, satisfaction with breasts, and sexual well-being on standardized patient-reported outcome surveys such as the Breast-Q (7). These gains are evident as early as four months postoperatively and are sustained years following surgery (7).

When compared to the general population, TF are challenged with a higher prevalence of mental health illness (major depressive disorder, post-traumatic stress disorder, and suicide attempts), human immunodeficiency virus (HIV) seropositivity, and sexually transmitted infections (8-11). These factors have caused a social stigma which contributes to the disparities in healthcare utilization by transgender females (12). Due to these trends, surgeons should modify operative indications to reflect the reconstructive nature of top surgery when compared with aesthetic breast augmentation. The majority of outcomes research following top surgery has had low sample sizes (13-16). There has been scant investigation comparing peri-operative safety profiles between cis- and trans- gender females undergoing breast augmentation.

The chief aim of this study is to compare medical comorbidities and peri-operative safety profiles between cis and transgender women undergoing breast augmentation. We present the following article in accordance with the STROBE reporting checklist (available at http://dx.doi.org/10.21037/atm-20-3355).

Methods

The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was conducted in approval of Yale Ethical guidelines; consent was waived as this is a de-identified public database.

Exclusion criteria

Data was extracted from the National Surgical Quality Improvement Program (NSQIP) database between 2007 and 2016. NSQIP collects outcomes from over 200 hospitals in the United States and includes over 200 variables including demographics, comorbidities, complications, and outcomes.

Cases of breast augmentation were isolated utilizing procedural CPT code 19325 "Breast Augmentation with a Prosthetic Implant." Gender-affirming surgery was isolated using gender identity disorder and gender dysphoria codes in ICD-9 (302.0, 302.50, 302.51, 302.52, 302.6, 302.76, 302.85, 302.9) and ICD10 (F64.0, F64.1, F64.2, F64.8, F64.9, F66.0, Z87.890). Cisgender patients with breast augmentation were identified by ICD9 (V50.1) and ICD10 (Z41.1) codes for elective surgery. Concurrent mastopexies were identified utilizing CPT code 19316, so they could be excluded from the final analysis.

Statistical analysis

Patient demographics were analyzed using basic frequency demographics. Results were subdivided and analyzed based on cis- or transgender. An analysis was carried out comparing demographics, comorbidities, surgical factors, and outcomes. Categorical variables were compared utilizing chi-squared and Fisher's exact tests whereas continuous variables were compared utilizing independent *t*-tests. Statistical significance was set at $P<0.05$.

Results

Between 2007 and 2016, 4,234 breast augmentations in cisgender women and 137 chest reconstructions in transgender women were identified. Mean ages were similar between groups (35.8 *vs.* 36.7; P=0.355) (*Table 1*).

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Cisgender patients were significantly more likely to identify as White (83.2% *vs.* 51.8%; P<0.001) and less likely to be Black (3.9% *vs.* 16.1%; P<0.001). Transgender females had a higher prevalence of diabetes (2.9% *vs.* 0.9%; P<0.001), current smoking status (30.8% *vs.* 13.5%; P<0.001), and hypertension requiring medication (8.2% *vs.* 3.8%; P=0.006). Further, transgender women had significantly more women who were classified as ASA II (60.3% *vs.* 31.8%; P<0.001) and ASA III (10.3% *vs.* 1.7%; P<0.001) with proportionally fewer as ASA I (28.8% *vs.* 56.5%; P<0.001). While there were no significant differences in operative duration, transgender women had a significantly longer length of hospital stay (0.6 *vs.* 0.1 days; P=0.01) (*Table 2*).

Cisgender women had higher rates of concurrent mastopexy (7.1% *vs.* 1.4%; P=0.007). Cases of augmentation performed with concurrent mastopexy were excluded from the outcomes analysis.

Breast augmentation had comparable outcomes regardless of gender orientation across all peri-operative complications. There were no differences in minor complications such as surgical site infections (P=0.999), DVT/PE (P=0.999), and bleeding (P=0.0999). Thirty-day mortality (P=0.999), prolonged hospital admission (P=0.999), readmission (P=0.260), reoperation (P=0.324) and deep wound dehiscence (P=0.999) rates were similar between cohorts (*Table 3*).

Discussion

This study compared patient demographics, medical comorbidities, and peri-operative safety profiles between cis- and transgender women undergoing primary breast augmentation utilizing data from the National Surgical Quality Improvement Program. To date, this is the first study comparing comorbidities and peri-operative safety profiles stratified by this type of comparison.

These data confirm that primary top surgery can be performed safely in TF despite heightened medical comorbidities and surgical risk profiles. The transgender cohort had longer admissions on average, which may be a result of the multi-disciplinary nature of gender transition. Despite the heightened psychosocial and medical complexity of transgender women, peri-operative safety profiles are similar to the healthier cisgender cohort with elective indications (13-17).

The higher proportion of ASA II and III patients in the transgender group would typically be associated with an overall poorer baseline health and are an independent predictor of morbidity and wound complications following breast surgery (17,18). Despite the higher surgical risk posed by ASA scores, transgender women did not show any higher rates of 30-day peri-operative complications. Previous studies have shown that diabetes and hypertension—both significantly more prevalent in the transgender cohort—have odds ratios for developing postoperative complications of 3.1 and 2.4, respectively (19). In our study, these comorbidities did not impact safety profiles among transgender women in the first thirty days. Finally, transgender women had a much higher prevalence of active smoking status when compared to cisgender women (19-21). Given the benefits of surgery to patient satisfaction and psychological well-being with adequate peri-operative safety profiles surgeons should adopt more liberal operative indications for reconstructive top surgery than cosmetic breast augmentation.

As per WPATH guidelines, patients undergoing surgery usually receive hormonal therapy to maximize natural breast development (22,23). Exogenous estrogens place patients at increased risk for thromboembolic events, cardiovascular, and cerebrovascular complications in the post-operative period (22,24,25). These risks are greater in transgender women when compared to cisgender patients27 and are further increased in the presence of diabetes, hypertension, and active smoking status (26-30). A Dutch study found the incidence of thrombotic events was 20 times greater in the first two years following the initiation of estrogen replacement therapy (31). Despite this heightened risk, no significant differences were observed in thromboembolic events or cardiac arrest. The recommendations regarding continuing hormonal therapy in the perioperative period are controversial with some anesthesia providers recommending cessation of hormone replacement therapy 2–4 weeks prior to surgery (32). However, the decision to stop hormone therapy varies widely by surgeon (33). While this analysis suggests that patients did not have a higher incidence of thromboembolic events, whether these patients halted hormone therapy prior to surgery was unavailable.

Concurrent augmentation-mastopexies were more prevalent in cisgender women than transgender. Given that the mean age of both cohorts was in the mid-thirties, cisgender breasts were exposed to longer periods of breast ptosis, cyclic hormones, and weight fluctuations which could account for greater rates of ptosis and mastopexy. Further, transgender females undergo breast augmentation for inadequate breast size and, often, associated skin (4).

This study was not intended and does not address

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Table 2 Medical comorbidities stratified by cis and trans gender patients

Demographic	Cis	Trans	P
N (number of patients)	4,234	137	
Race, n (%)			<0.001
White	3,523 (83.2)	71 (51.8)	
Black	164 (3.9)	22 (16.1)	
Asian	122 (2.9)	6 (4.4)	
Other	425 (10.0)	38 (27.7)	
Comorbidities, n (%)			
Diabetes mellitus with insulin	19 (0.4)	0 (0.0)	<0.001
Diabetes mellitus with non-insulin	21 (0.5)	4 (2.7)	<0.001
Current smoker	606 (13.5)	45 (30.8)	<0.001
Dyspnea on exertion	9 (0.2)	1 (0.7)	0.274
Steroid use	21 (0.5)	2 (1.4)	0.162
Ventilator dependence	0 (0.0)	0 (0.0)	0.999
Severe COPD	5 (0.1)	0 (0.0)	0.687
Ascites	0 (0.0)	0 (0.0)	0.999
CHF 30 days before surgery	2 (0.0)	0 (0.0)	0.999
Hypertension requiring meds	169 (3.8)	12 (8.2)	0.006
Dialysis	0 (0.0)	0 (0.0)	0.999
Disseminated cancer	0 (0.0)	0 (0.0)	0.999
Open wound	2 (0.0)	0 (0.0)	0.999
>10% weight lose	2 (0.0)	0 (0.0)	0.999
Bleeding disorders	10 (0.2)	1 (0.7)	0.999
Transfusion >1 unit	0 (0.0)	0 (0.0)	0.999
Systemic sepsis, n (%)			0.937
Sepsis	1 (0.0)	0 (0.0)	
SIRS	3 (0.1)	0 (0.0)	
ASA Classification, n (%)			<0.001
No disturb	2,541 (56.5)	42 (28.8)	
Mild disturb	1,878 (41.8)	88 (60.3)	
Severe disturb	75 (1.7)	15 (10.3)	
Life threat	2 (0.0)	0 (0.0)	
Moribund	0 (0.0)	0 (0.0)	
Age (years), mean (SD)	35.8 (10.7)	36.8 (13.1)	0.355
Length of stay (days), mean (SD)	0.1 (2.8)	0.6 (2.2)	0.010
Operative time (minutes), mean (SD)	95.3 (67.6)	96.7 (76.0)	0.790

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Table 3 Surgical complications stratified by cis and trans gender patients

Complication	Cis, n (%)	Trans, n (%)	P
Complications			
In hospital >30 days	0 (0.0)	0 (0.0)	0.999
Death in 30 days	0 (0.0)	0 (0.0)	0.999
Superficial incisional SSI	9 (0.2)	0 (0.0)	0.999
Deep incisional SSI	3 (0.1)	0 (0.0)	0.999
Organ SSI	4 (0.1)	0 (0.0)	0.999
Deep wound dehiscence	0 (0.0)	0 (0.0)	0.999
Pneumonia	0 (0.0)	0 (0.0)	0.999
Unplanned intubation	0 (0.0)	0 (0.0)	0.999
Pulmonary embolism	3 (0.1)	0 (0.0)	0.999
DVT/thrombophlebitis	2 (0.0)	0 (0.0)	0.999
Post-op ventilator	0 (0.0)	0 (0.0)	0.999
Renal insufficiency	0 (0.0)	0 (0.0)	0.999
Renal failure	0 (0.0)	0 (0.0)	0.999
Urinary tract infection	8 (0.2)	0 (0.0)	0.999
CVA/stroke	0 (0.0)	0 (0.0)	0.999
Cardiac arrest	0 (0.0)	0 (0.0)	0.999
Bleeding	0 (0.0)	0 (0.0)	0.999
Sepsis	0 (0.0)	0 (0.0)	0.999
Septic shock	0 (0.0)	0 (0.0)	0.999
Readmission	21 (0.5)	2 (1.4)	0.260
Reoperation	49 (1.2)	3 (2.1)	0.324

long-term outcomes such as implant revision rates, capsular contracture, breast asymmetry, or breast pain. It primarily addresses short term perioperative outcomes when applying less restrictive surgical indications in the transgender population. Limitations of this study include the heterogeneous cohorts. Identification of transgender patients was based on ICD9/ICD10 codes associated with gender dysphoria. Details regarding anatomic plane of implant placement and type of implant unavailable. This analysis remains the first comparison in the surgical literature of comorbidities and outcomes of breast augmentation stratified by cis and transgender communities.

Conclusions

Previously reported national sample data has demonstrated an increasing number of transgender patients seeking gender-affirming therapy (5). Top surgery has the potential to significantly improve and maintain quality of life (25). Despite increased preoperative comorbidities, transgender women undergoing chest reconstruction have similar perioperative safety profiles to cisgender women undergoing cosmetic breast augmentation.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the Guest Editors (Dr. Oscar J. Manrique, Dr. John A. Persing, and Dr. Xiaona Lu) for the series "Transgender Surgery" published in *Annals of Translational Medicine*. The article was sent for external peer review organized by the Guest Editors and the editorial office.

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at http://dx.doi.org/10.21037/atm-20-3355

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at http://dx.doi.org/10.21037/atm-20-3355). The series "Transgender Surgery" was commissioned by the editorial office without any funding or sponsorship. JP served as the unpaid Guest Editor of the series. The authors have no other conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was conducted in approval of Yale Ethical guidelines; consent was waived as this is a de-identified public database. All available data can be obtained by contacting the corresponding author or the American College of Surgeons, NSQIP committee.

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Cite this article as: Gabrick KS, Chouiari F, Park KE, Allam O, Mozaffari MA, Persing JA, Alperovich M. A comparison of perioperative safety for breast augmentation in cis- *vs*. trans patients. Ann Transl Med 2021;9(7):601. doi: 10.21037/atm-20-3355

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