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Gender-Affirming Surgery

Patient-reported and Clinical Outcomes following Gender-affirming Chest Surgery: A Comparison of Binary and Nonbinary Transmasculine Individuals

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Background: Nonbinary individuals assigned female at birth are increasingly presenting for gender-affirming chest surgery (GCS). However, little is known about psychosocial outcomes in this group. We compare patient-reported and clinical outcomes after GCS between nonbinary and binary transmasculine individuals who underwent GCS.

Methods: We performed an institutional retrospective chart review. Demographic information, medical comorbidities, history of gender-affirming medical care, operative details, and complications were collected and compared between nonbinary and binary patients. Two validated patient-reported outcomes measures, the Gender Congruence and Life Satisfaction (GCLS) scale and the chest dysphoria measure were administered postoperatively.

Results: A total of 281 patients were included, of which 40.6% (114) identified as nonbinary and 59.4% (167) identified as binary transgender men. Fewer nonbinary patients used testosterone ($P < 0.001$). Nonbinary patients underwent a wider variety of masculinizing chest operations than binary patients, with fewer nonbinary patients electing for free nipple-areolar complex grafts ($P < 0.001$) and more nonbinary patients undergoing breast reduction ($P = 0.001$). A total of 137 (48.7%) patients responded to postoperative surveys. Nonbinary and binary respondents had comparable scores on the overall GCLS ($P = 0.86$), GCLS chest subscale ($P = 0.38$), and chest dysphoria measure ($P = 0.40$). The absence of nipple-areolar complex grafts was associated with higher GCLS chest scores ($P = 0.004$).

Conclusions: Nonbinary individuals have similarly positive outcomes following GCS compared with binary individuals. Surgeons should be aware of greater medical and surgical heterogeneity in this population and seek to understand individual patients' goals and priorities. *(Plast Reconstr Surg Glob Open 2024; 12:e6297; doi: 10.1097/GOX.0000000000006297; Published online 11 November 2024.)*

INTRODUCTION

Nonbinary individuals are thought to make up ~32% of the transgender and gender-diverse (TGD) population.[1] The term "nonbinary" is used to describe individuals whose gender identity is not entirely male or female.[2–4] As some individuals may simultaneously identify as nonbinary and another gender, we will use the term "binary" to describe individuals who identify solely as male or female. Compared with binary transmasculine individuals, nonbinary individuals face specific healthcare disparities[5,6] and have unique transition-related goals.[7–9] For example, nonbinary individuals are less likely to desire gender-affirming hormone therapy.[10,11] TGD community members have identified surgical outcomes for nonbinary patients to be a key priority for future research.[12]

According to the 2015 US Transgender Survey, gender-affirming chest surgery (GCS), or "top surgery" is the most common gender-affirming procedure among nonbinary individuals.[7] A growing number of studies have shown differences in transition trajectories and surgical requests between nonbinary and binary transmasculine individuals undergoing GCS.[9,13–15] For instance, nonbinary individuals

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are less likely to request nipple-areolar complex (NAC) grafts or be on gender-affirming hormone therapy such as testosterone before surgery.[9,13] Although GCS has been shown to improve psychosocial outcomes among TGD individuals,[16,17] few studies have looked at psychosocial outcomes specifically in the nonbinary population. One previous study found similar rates of aesthetic satisfaction after GCS between binary and nonbinary patients using the BODY-Q; however, this was limited by a small sample size of nonbinary individuals.[18] Another study drew similar conclusions from a larger group; however, this study used an ad hoc questionnaire which has not been validated.[9] As such, further investigation is needed to understand the impact of nonbinary identity on the psychosocial outcomes of GCS.

In this single-center study, we compare postoperative patient-reported outcomes of nonbinary and patients with binary TGD, to explore the psychosocial impact of GCS in the nonbinary patient population. We compare the demographic and clinical characteristics of nonbinary and binary patients as a secondary outcome. We hypothesized that nonbinary patients have similar postoperative patient-reported outcomes compared with binary patients and that nonbinary patients at our institution will demonstrate similar patterns of hormone use and surgical preferences compared with previous literature in this space.

Takeaways

Question: What is the impact of nonbinary identity on psychosocial outcomes of gender-affirming chest surgery (GCS)?

Findings: Nonbinary individuals had comparable scores on the overall Gender Congruence and Life Satisfaction (GCLS), the GCLS chest subscale, and the chest dysphoria measure compared with binary individuals, but opted for a wider variety of procedure types.

Meaning: GCS is effective in nonbinary individuals. Differences in patient goals underscore the need for individualized preoperative counseling for nonbinary individuals seeking GCS.

METHODS

This study received institutional review board approval by Northwestern University and is compliant with the Declaration of Helsinki. Strengthening the Reporting of Observational Studies in Epidemiology reporting guidelines were followed.

Population

Adult patients with TGD assigned female at birth (AFAB) who underwent top surgery with 1 of the senior authors (S.W.J and M.E.) between January 2018 and February 2023 were included for review. All patients were treated according to the World Professional Association of Transgender Health Standards of Care available at the time treatment was initiated.[4,19] Exclusion criteria included minors (age < 18 years), chest surgery for reasons other than treatment of gender dysphoria (ie, breast cancer), revision GCS, and identity other than TGD AFAB.

Data Collection

Clinical and demographic data were collected by retrospective chart review and entered into a Research Electronic Data Capture (REDCap) database at our institution. REDCap is supported by Northwestern University's Clinical and Translational Sciences Institution, which is funded in part by a Clinical and Translational Science Award grant from the National Institutes of Health UL1TR001422. Demographic information and medical history including gender identity, age, race, ethnicity, body mass index (BMI), and medical and psychiatric comorbidities. Surgical details such as history of chest surgery, operative details, postoperative complications, and need for revision procedures were also collected. Postoperative complications included hematoma, seroma, infection, deep vein thrombosis, pulmonary embolism, delayed wound healing, and NAC loss or necrosis.

Patient-reported outcome measures were administered by email through the REDCap database at least 6 weeks after their index surgery. Patients received 2 patient-reported outcome measures: the Gender Congruence and Life Satisfaction (GCLS) scale[20] and the chest dysphoria measure (CDM).[21] The GCLS is a 38-item measure that assesses gender congruence related to specific primary and secondary sex characteristics, including a chest-specific scale, and broadly assesses gender-related well-being.[20] The GCLS has been validated in both nonbinary and binary transmasculine individuals.[20] Item 13 was excluded according to the recommendations from the Northwestern University institutional review board.[22] The GCLS and its subscales are scored on a scale of 0–5, with higher values reflecting improved well-being. The CDM is a 17-item measure that has been used to assess the impact of gender-affirming mastectomy on psychosocial functioning.[17,21] It is scored on a scale from 0 to 51, with higher values representing increased chest-related distress and poorer psychosocial function.[21]

Surgical Approaches

Operative techniques included double incision mastectomy with or without free NAC grafting, periareolar mastectomy, nipple-sparing gender mastectomy, and breast reduction. Double-incision mastectomy (Fig. 1A) was performed using accepted approaches.[23] All patients with GCS who underwent double-incision mastectomy were presented with the option to undergo free NAC grafting during their initial consultation (Fig. 1A). At our center, periareolar mastectomy was performed in patients with minimal breast tissue and skin excess by making a full-thickness semicircular incision around the inferior areolar border (Fig. 1B). In some patients, areola size was reduced by de-epithelializing around the superior areolar border. Nipple-sparing gender mastectomy was performed in patients with borderline eligibility for a periareolar procedure, based on the amount of breast tissue and/or skin excess. In this approach, an incision is made along the inferolateral border of the

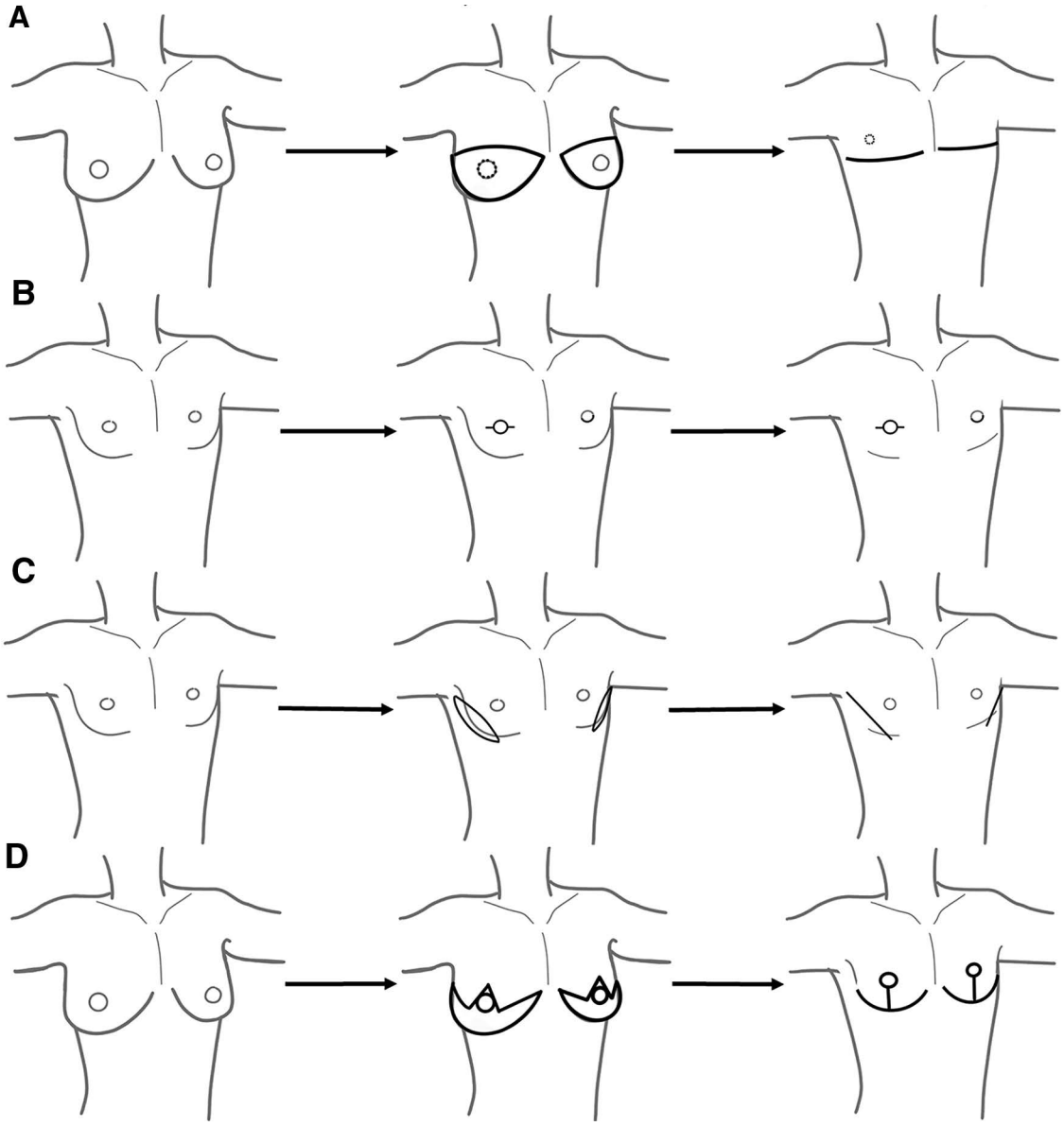

Fig. 1. Surgical techniques. A, Double incision with or without free nipple grafts. B, Periareolar mastectomy. The extent of skin resection around the areola depends on preoperative chest size. C, Nipple-sparing gender mastectomy. D, Wise-pattern breast reduction. FNG.

pectoralis major, allowing for the removal of excess skin and repositioning of the NAC inferolaterally (Fig. 1C). Breast reductions were performed using an inferior pedicle coupled with either a Wise-pattern skin incision (Fig. 1D) or a no vertical scar incision. All operative decisions were made through a shared decision-making model between the surgeon and each patient based on aesthetic preferences, functional concerns, body habitus, and other unique factors.

Statistical Analysis

Descriptive statistics were calculated for the complete group and separately for the nonbinary and binary transmasculine cohorts. Nonbinary and binary patients were compared using bivariate analysis. Due to nonnormal distribution, numerical data are presented as the median and interquartile range (IQR) and compared using Wilcoxon rank-sum testing. Categorical variables are presented as frequencies and percentages and compared using the Fisher exact test due to sample size.

Patient-reported outcome measures were scored using their respective scoring algorithms outlined above.[20,21] Missing items were imputed using mean imputation, as the total percentage of missing items was less than 5%.[24] Median and IQR were calculated and compared using nonparametric test. Multivariate linear regression was performed for the GCLS, GCLS subscales, and the CDM using the following predictor variables: gender identity,

Table 1. Demographic Characteristics of the Study Population

Variable	Total Population, N (%)	Transgender Man, N (%)	Nonbinary, N (%)	*P*
Total patients	281	167	114	
Age, y, median (IQR)	27.4 (24.3–30.8)	26.7 (22.6–30.5)	28.1 (25.2–31.8)	0.009*
Ethnicity				
Hispanic/Latinx	26 (9.3)	18 (10.8)	8 (7.0)	0.60
Not Hispanic/Latinx	248 (88.3)	145 (86.8)	103 (90.4)	
Declined to state	7 (2.5)	4 (2.4)	3 (2.6	
Race				
White	198 (70.5)	109 (65.3)	89 (78.1)	0.01*
African American	46 (16.4)	37 (22.2)	9 (7.9)	
Asian	5 (1.8)	4 (2.4)	1 (0.9)	
Other	21 (7.5)	12 (7.2)	9 (7.9)	
Declined to state	11 (3.9)	5 (3.0)	6 (5.3)	
BMI, kg/m^2, median (IQR)	28.6 (24.0–35.2)	29.0 (23.4–35.9)	28.3 (24.3–34.0)	0.95
Smoking				
Current or former	93 (33.1)	62 (37.1)	31 (27.2)	0.18
Never	188 (66.9)	105 (62.9)	83 (72.8)	
Diabetes	11 (3.9)	8 (4.8)	3 (2.6)	
Bipolar disorder	18 (6.4)	9 (5.4)	9 (7.9)	0.46
Depression	139 (49.5)	73 (43.7)	66 (57.9)	0.02*
Anxiety	152 (54.1)	88 (52.7)	64 (56.1)	0.63
PTSD	16 (5.7)	9 (5.4)	7 (6.1)	0.80
Autism spectrum disorder	7 (2.5)	2 (1.2)	5 (4.4)	0.12
ADHD	47 (16.7)	27 (16.2)	20 (17.5)	0.87
Substance use disorder	5 (1.8)	4 (2.4)	1 (0.9)	0.65
Using testosterone	218 (77.6)	160 (95.8)	58 (50.9)	<0.001*
Testosterone use, mo, median (IQR)†	23.9 (13.8–42.3)	24.2 (14.4–43.1)	21.2 (10.3–38.2)	0.18

The Fisher exact test was used for categorical variables.
Wilcoxon rank-sum test was used for continuous variables due to nonparametric distribution.
†Among patients taking testosterone.
**P* value statistically significant.
ADHD, attention-deficit hyperactivity disorder; PTSD, posttraumatic stress disorder.

BMI, testosterone use, surgical technique, revisions, and resection weight. A *P* value of less than 0.05 was considered significant. All analyses were performed using R (version 4.3.2) and RStudio (version 2023.09.1).

RESULTS

Patient Characteristics

A total of 281 patients met the inclusion criteria. Of those, 40.6% (n = 114) identified as nonbinary (Table 1). The median age at the time of surgery for nonbinary and binary patients was 28.1 years (IQR: 25.2–31.8) and 26.7 years (IQR: 22.6–30.5) ($P = 0.009$). Although most nonbinary (78.1%) and binary (65.3%) patients self-identified as White, the racial makeup of both groups significantly differed ($P = 0.01$). Notably, 22.2% (37) of binary patients identified as Black/African American, compared with only 7.9% (9) of nonbinary patients.

There was no significant difference in ethnicity, BMI, and smoking status between nonbinary and binary patients. Significantly more nonbinary patients had a diagnosis of depression at the time of surgery (57.9%) compared with binary patients (43.7%) ($P = 0.02$). There was no significant difference in the prevalence of other comorbidities. The proportion of patients using testosterone differed significantly, with 95.8% (160) of binary and 50.9% (58) of nonbinary patients using testosterone at the time of surgery ($P < 0.001$). Among those using testosterone, the median length of time on testosterone therapy before surgery did not significantly differ between groups ($P = 0.18$).

Surgical Characteristics

Surgical characteristics and outcomes between the cohorts were similar with the exceptions of the presence of NAC grafts and incision style (Table 2). Nonbinary and binary patients differed significantly in both incisions ($P = 0.001$) and whether they opted for NAC grafts ($P < 0.001$). Double incision mastectomy was the most common surgery performed in both cohorts. However, more nonbinary patients received other procedure types [nonbinary: 18 (15.8%), binary: 15 (9.0%)] and nonbinary patients were less likely to have free NAC grafts [nonbinary: 89 (78.1%), binary: 161 (96.4%)] (Table 2). Decisions about the use of drains and/or liposuction were based on surgeon preference and otherwise not specifically studied; however, these did not differ significantly between nonbinary and binary patients. Complication rates (hematoma, seroma, infection, wound dehiscence, and NAC loss) did not significantly differ between groups (Table 2).

Patient-reported Outcomes

A total of 137 individuals (48.7%) responded to the patient-reported outcome survey. Responses were completed at a median of 11.0 months (IQR: 6.9–15.2) after surgery, with no significant differences between

Table 2. Surgical Characteristics of the Study Population

Variable	Total Population, N (%)	Transgender Man, N (%)	Nonbinary, N (%)	*P*
Total patients	281	167	114	
Prior surgery to chest	11 (3.9)	5 (3.0)	6 (5.4)	0.36
Concomitant hysterectomy	9 (3.2)	8 (4.8)	1 (0.9)	0.09
Nipple grafts	250 (89.0)	161 (96.4)	89 (78.1)	<0.001*
Surgical technique				
Double-incision mastectomy	248 (88.3)	152 (91.0)	96 (84.2)	0.001*
Periareolar excision	9 (3.2)	7 (4.2)	2 (1.8)	
Nipple-sparing gender mastectomy	15 (5.3)	8 (4.8)	7 (6.1)	
Breast reduction	9 (3.2)	0 (0.0)	9 (7.9)	
Liposuction performed	116 (41.6)	67 (40.1)	49 (43.8)	0.62
Drain placed	270 (96.8)	163 (98.2)	107 (94.7)	0.16
Resection weight in g, median (IQR)†	561.0 (326.6–943.4)	512.9 (286.1–906.8)	659.6 (388.9–986.2)	0.06
Unplanned reoperation	13 (4.6)	7 (4.2)	6 (5.3)	0.78
Hematoma	15 (5.3)	8 (4.8)	7 (6.1)	0.79
Seroma	4 (1.4)	3 (1.8)	1 (0.9)	0.65
Infection	5 (1.8)	5 (3.0)	0 (0.0)	0.08
Wound dehiscence	3 (1.1)	2 (1.2)	1 (0.9)	1.00
NAC loss	3 (1.2)	3 (1.9)	0 (0.0)	0.55
Planned reoperation	46 (16.4)	30 (18.0)	16 (14.0)	0.42
Planned reoperation reason				
Scar revision	32 (69.6)	23 (76.7)	9 (56.2)	0.17
Contour revision	3 (6.5)	2 (6.7)	1 (6.2)	
Nipple reduction	4 (8.7)	3 (10.0)	1 (6.2)	
Other	7 (15.2)	2 (6.7)	5 (31.2)	

*Statistically significant *P* value.
†Mean resection weight of right and left.

nonbinary and binary respondents. As shown in Table 3, the demographic characteristics of responders versus nonresponders were similar. Of the demographic variables collected, only age differed significantly ($P = 0.03$) between responders and nonresponders, with responders having a higher median age [28.5 y (IQR: 24.7–31.9)] compared with nonresponders [26.5 y (IQR: 23.9–29.9)].

Median patient-reported outcome scores for nonbinary and binary respondents are shown in Table 4. There were no significant differences in the CDM ($P = 0.40$), overall GCLS score ($P = 0.86$), or 4 of the 5 GCLS subscale scores (Table 4). There was a significant difference in the social gender recognition GCLS subscale ($P < 0.001$), with nonbinary respondents having a median score of 2.8 (IQR: 2.8–4.2) and binary respondents having a median score of 3.8 (IQR: 3.2–4.2).

Results of a multiple regression analysis of patient-reported outcome scores for the nonbinary, binary, and combined cohorts are reported in Table 5. After controlling for gender identity, BMI, testosterone use, incision style, revision rate, and resection weight, there was a statistically significant positive association between undergoing a double-incision mastectomy without free NAC grafting and the chest subscale of the GCLS (coefficient = 0.75, $P = 0.004$). There was also a negative association between nonbinary identity and the social gender recognition subscale of the GCLS (coefficient = –0.72, $P < 0.001$). No other statistically significant associations were observed.

DISCUSSION

In this single-center study comparing nonbinary and binary transmasculine patients seeking GCS, we found equally high quality of life, high chest-specific satisfaction, and low levels of chest dysphoria. Operative technique and previous testosterone use differed significantly between binary and nonbinary patients, with nonbinary patients more frequently forgoing free NAC grafts. Comparable postoperative patient-reported outcome scores between cohorts support the effectiveness of GCS in nonbinary individuals, although differences in patient goals underscore the need for individualized preoperative counseling for nonbinary individuals seeking GCS.

Our findings extend those of previous studies looking at patient-reported outcomes among nonbinary individuals after GCS, using validated scales within a larger cohort.[9,18] Nonbinary patients in our study reported comparable psychosocial outcomes to binary transmasculine patients. The use of established patient-reported outcome measures allows for outcome comparisons with individuals who have not undergone gender-affirming medical interventions. The GCLS validation study previously found significantly higher mean GCLS scores in transgender men who had undergone GCS compared with those who had not.[20] Our postoperative overall and chest subscale GCLS scores were favorable in both our nonbinary and binary cohorts and were comparable to those of postoperative transgender men in the GCLS validation study.[20] This supports the theory that GCS contributes to high chest satisfaction and overall quality of life in nonbinary individuals. Nonbinary respondents scored lower on the social gender recognition GCLS subscale than their binary peers. This subscale measures how frequently an individual's gender is correctly recognized in social settings and lower scores within the nonbinary cohort are likely a reflection of

Table 3. Characters of Responders versus Nonresponders

Variable	Total Population, N (%)	Nonresponders, N (%)	Responders, N (%)	*P*
Total patients	281	144 (51.3)	137 (48.7)	
Age, median (IQR)	27.4 (24.3–30.8)	26.5 (23.9–29.9)	28.5 (24.7–31.9)	0.03*
Gender identity				0.21
Transgender man				
Nonbinary				
Ethnicity				0.11
Hispanic/Latinx	26 (9.3)	14 (9.7)	12 (8.8)	
Not Hispanic/Latinx	248 (88.3)	124 (86.1)	124 (90.5)	
Declined to state	7 (2.5)	6 (4.2)	1 (0.7)	
Race				0.55
White	198 (70.5)	100 (69.4)	98 (71.5)	
African American	46 (16.4)	26 (18.1)	20 (14.6)	
Asian	5 (1.8)	2 (1.4)	3 (2.2)	
Other	21 (7.5)	8 (5.6)	13 (9.5)	
Declined to state	11 (3.9)	8 (5.6)	3 (2.2)	
BMI, kg/m^2, median (IQR)	28.6 (24.0–35.2)	28.0 (23.8–34.4)	29.1 (24.0–36.1)	0.29
Smoking				0.43
Current or former	93 (33.1)	54 (37.5)	39 (28.5)	
Never	188 (66.9)	90 (62.5)	98 (71.5)	
Diabetes	11 (3.9)	5 (3.5)	6 (4.4)	0.56
Bipolar disorder	18 (6.4)	9 (6.2)	9 (6.6)	0.81
Depression	139 (49.5)	73 (50.7)	66 (48.2)	0.91
Anxiety	152 (54.1)	77 (53.5)	75 (54.7)	0.81
PTSD	16 (5.7)	10 (6.9)	6 (4.4)	0.62
Autism spectrum disorder	7 (2.5)	2 (1.4)	5 (3.6)	0.27
ADHD	47 (16.7)	21 (14.6)	26 (19.0)	0.34
Substance use disorder	5 (1.8)	4 (2.8)	1 (0.7)	0.37
Using testosterone	218 (77.6)	116 (80.6)	102 (74.5)	0.25
Testosterone use, mo, median (IQR)†	23.9 (13.8–42.3)	24.2 (13.4–41.5)	22.5 (14.2–42.3)	0.91

The Fisher exact test was used for categorical variables.
Wilcoxon rank-sum test was used for continuous variables due to nonparametric distribution.
*Statistically significant *P* value.
†Among patients taking testosterone.
ADHD, attention-deficit hyperactivity disorder; PTSD, posttraumatic stress disorder.

Table 4. Patient-reported Outcomes among the Study Population

Variable	Total Population	Transgender Man	Nonbinary	*P*
Total patients (N)	137	76	61	
CDM, median (IQR)	5.0 (1.0–8.8)	4.0 (1.0–7.8)	6.0 (1.0–10.5)	0.40
GCLS, median (IQR)	3.8 (3.3–4.1)	3.8 (3.4–4.0)	3.8 (3.2–4.1)	0.86
Chest	4.6 (4.0–5.0)	4.5 (4.0–5.0)	4.8 (4.2–5.0)	0.38
Life satisfaction	3.6 (3.0–4.0)	3.6 (3.1–4.1)	3.4 (3.0–3.9)	0.18
Social gender recognition	3.5 (2.5–3.8)	3.8 (3.2–4.2)	2.8 (2.2–3.2)	<0.001*
Intimacy	3.5 (2.8–4.0)	3.5 (2.8–4.0)	3.8 (2.8–4.2)	0.47
Psychological function	4.1 (3.4–4.4)	4.1 (3.4–4.3)	4.1 (3.7–4.6)	0.45

Wilcoxon rank-sum test was used due to nonparametric distribution.

differing social acceptance of nonbinary gender identities overall.[3,4]

Although the CDM is not validated, it has been used in previous studies to assess outcomes after GCS and has been shown to improve postoperatively.[17,21] Like the GCLS scores, CDM scores in both the nonbinary and binary cohorts did not differ significantly and were comparable to postoperative scores in previous studies.[17] This suggests that nonbinary individuals derive similarly positive psychosocial benefits from GCS as do binary individuals. Top surgery for gender affirmation in nonbinary individuals can provide a measurable therapeutic impact for this population.

As in previous studies, we observed that nonbinary patients were less likely to follow the steps of traditional binary gender transition.[9,13] For instance, they were less likely to have taken testosterone before GCS. According to the eighth edition of the World Professional Association of Transgender Health Standards of Care, hormone use is no longer considered a necessary step of gender transition for nonbinary individuals.[4] Our analysis found no association between preoperative testosterone use and patient-reported outcomes in the nonbinary cohort. This supports the move away from testosterone use as a prerequisite for GCS, as satisfaction is equally favorable with or without preoperative

Table 5. Multivariate Linear Regression Models for Patient-reported Outcomes

	GCLS			
	Overall	Chest	Social Recognition	CDM
Gender identity: binary				
Nonbinary	−0.07 ($P = 0.57$)	−0.10 ($P = 0.63$)	−0.72 ($P < 0.001$)	2.09 ($P = 0.32$)
BMI	0.0005 ($P = 0.96$)	−0.02 ($P = 0.20$)	−0.003 ($P = 0.84$)	0.21 ($P = 0.18$)
Testosterone use: yes				
No	0.03 ($P = 0.81$)	−0.18 ($P = 0.43$)	−0.21 ($P = 0.30$)	−2.21 ($P = 0.35$)
NAC grafts: yes				
No	0.27 ($P = 0.11$)	0.75 ($P = 0.004$)	0.24 ($P = 0.29$)	−1.37 ($P = 0.60$)
Surgical technique: double-incision				
Nipple-sparing gender mastectomy	−0.13 ($P = 0.57$)	0.15 ($P = 0.64$)	0.04 ($P = 0.89$)	−0.67 ($P = 0.85$)
Periareolar	−0.22 ($P = 0.62$)	−0.02 ($P = 0.98$)	−0.31 ($P = 0.59$)	−3.92 ($P = 0.56$)
Breast reduction	0.27 ($P = 0.42$)	0.09 ($P = 0.86$)	0.12 ($P = 0.78$)	−3.68 ($P = 0.47$)
Revision: no				
Yes	0.23 ($P = 0.12$)	0.23 ($P = 0.30$)	−0.03 ($P = 0.87$)	−2.74 ($P = 0.23$)
Resection weight	−0.0001 ($P = 0.39$)	0.0002 ($P = 0.31$)	−0.0001 ($P = 0.62$)	−0.003 ($P = 0.19$)

Coefficients and *P* values are reported.

hormone therapy in the nonbinary population. Nonbinary patients were also more likely to forgo free NAC grafts. Based on the senior author's experience in preoperative counseling, when these decisions are made, nonbinary individuals may prefer not to have NAC grafts for many reasons. Some patients report that they prefer the aesthetics of a smooth chest, although others find nipples increase their chest dysphoria or are not able to tolerate the uncertainty of nipple healing due to concern for NAC necrosis or pigment changes. Our findings further support the practice of offering GCS without free NAC grafts and underscore the importance of individualized patient counseling and shared decision-making in this patient population.[4,25,26] Furthermore, a qualitative study of specific themes around decisions for or against NAC reconstruction is needed to best characterize this in the voices of those directly impacted.

The percentage of nonbinary patients in our cohort was greater than those reported in early studies of this population.[9,13,27] This may represent an increasing proportion and/or visibility of nonbinary individuals overall, a trend recently reported by Skorochod et al.[15] Alternatively, this may be attributed to selection bias as nonbinary individuals may disproportionately present to institutions known in the TGD community to provide care tailored to their goals.

We also found that our nonbinary cohort was older at the time of surgery compared with those in our binary cohort. This is in contrast to Skorochod et al,[15] who reported a younger nonbinary group. Reasons for this are likely multifactorial such as the differing health systems and national policies between Israel and the United States, and differences in center-specific experience and prerequisites. Importantly, our observation of age refutes the concern that increasing numbers of nonbinary people are accessing surgery prematurely.[28] Finally, fewer nonbinary patients identified as Black or African American compared with binary transmasculine patients. Previous studies of the nonbinary population have either included predominantly White race[9] or have not reported the racial makeup of the cohort.[13,15,27] The etiology of less racial diversity among nonbinary individuals has not been studied. Through an intersectional lens, it is likely that systemic oppression, interpersonal discrimination, implicit bias, medical mistrust, and underrepresentation of Black healthcare providers contribute to this disparity.[29–31] A devoted future study is urgently needed to explore the impact of race on gender identity, visibility, and access to gender-affirming care.

Limitations

This study was limited by its retrospective approach, which reduced variables available for analysis and prevented the collection of preoperative patient reported outcome measures (PROMs). Additionally, gender identity was abstracted from the medical record via discreet selections within the documented demographics section and/or review of preoperative surgical consultation notes. This reduced the ability to confirm patient self-identification with respect to gender identity and may contribute to uncharacterized selection bias. Although we were unable to directly compare differences between preoperative GCLS and CDM scores, our use of validated measures and comparison with a binary cohort allows for meaningful conclusions about the effectiveness of GCS in nonbinary individuals. Although we observed a statistically significant association between chest satisfaction and free NAC grafting, our study was underpowered to detect a difference in this variable; therefore, this may represent a false-positive finding and should be interpreted with caution. There was also significant variability in the interval between surgery and PROM administration. The median interval between surgery and the follow-up survey did not differ between the nonbinary and binary cohorts, minimizing the impact that this variability has on our overall conclusions. Little is known about the optimal time for PROM administration postoperatively; however, previous studies have shown a significant impact of GCS as early as 3 months.[17] Despite these limitations, we feel this study extends the current understanding of GCS outcomes among nonbinary patients.

CONCLUSIONS

Nonbinary individuals who are AFAB have similarly positive psychosocial outcomes after GCS compared with binary

transmasculine individuals. Despite lower use of preoperative testosterone among the nonbinary population, this did not affect postoperative psychosocial outcomes. Nonbinary patients underwent a greater variety of operative techniques to tailor breast volume, shape, and nipple embodiment goals, including more frequently opting to forgo free NAC grafts. Surgeons must recognize the variability among nonbinary individuals seeking GCS and emphasize the provision of both access and individualized care for this group of patients.

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DISCLOSURES

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