

Research Article

Inclusive Healthcare Settings: Promoting Post-operative Follow-up in Transgender Voice Care through Awareness and Education

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- Gender-affirming; Transgender; Wendler glottoplasty; Post-operative follow-up

Abstract

Objectives: Gender-affirming laryngeal surgeries are becoming more common. Surgical outcomes for benign laryngeal disease are often affected by post-operative care. Documented barriers to medical care faced by transgender persons may affect their ability to participate in post-operative care visits and may affect their overall outcome. This study was initiated to compare the post-operative follow-up rates between patients who underwent gender-affirming laryngeal surgery and those who underwent voice surgery for non-neoplastic vocal fold lesions.

Methods: We conducted a retrospective chart review of patients who underwent laryngeal surgery for either gender-affirmation or non-neoplastic vocal fold lesions between January 2017 and June 2022. All post-operative visits were scheduled pre-operatively for both groups. The percentage of actual visits attended out of total visits scheduled was calculated. Standard statistical tests were performed to compare the groups.

Results: The study included 228 patients; 30 underwent surgery for non-neoplastic vocal fold lesions, and 198 underwent gender-affirming laryngeal surgeries. The follow-up rate for patients who underwent gender-affirming laryngeal surgeries was 69.9%, and 58.1% for those who underwent non-neoplastic vocal fold lesion surgeries ($p = .026$). This significance was observed only when polypectomies were included in the analysis, whereas the follow-up rates for cyst and granuloma removal were similar to transgender individuals who underwent gender-affirming surgery.

Conclusion: Despite known disparities and potential barriers to care, this study found that post-operative follow-up rates for transgender women were similar or slightly higher than those of cisgender patients who underwent removal of benign laryngeal disease. Future multi-centric studies are needed to evaluate the follow-up rates for other gender-affirming surgeries to identify potential disparities.

INTRODUCTION

Gender-affirming surgery, also referred to as gender reassignment surgery, includes any surgical procedure designed to alleviate gender dysphoria, a condition where a person experiences distress and discomfort due to their gender identity being incongruent with their physical appearance [1]. For many individuals who identify as transgender, their voice can be a significant source of dysphoria, causing distress and discomfort when speaking or being addressed [2]. Gender-affirming voice surgery in combination with voice therapy can alleviate this distress by modifying pitch, resonance, articulatory patterns, and inflection patterns (among other things) within words and phrases to better align voice and speech with the individual's gender identity [3]. In addition to being transgender, many of these individuals belong to other minority communities and are subjected to significant healthcare disparities. There are several systemic and individual factors that contribute to health inequities within minority communities, including access to healthcare, socioeconomic factors, culture and language

barriers, and discrimination. Transgender individuals also have limited access to gender-affirming care, stigma from healthcare providers, and higher rates of mental health issues [4,5]. These factors can hinder a patient's ability to follow-up with providers.

Post-operative follow-up care is essential for optimal surgical outcomes and patient satisfaction [6]. During follow-up visits after voice surgery, clinicians typically address healing and voice rehabilitation. Research has shown that post-operative physical rehabilitation is beneficial for patients undergoing orthopedic procedures [7]. Similarly, in outpatient laryngeal surgery for benign disease, although not statistically proven, it is commonly thought that pre-operative and post-operative voice therapy can improve result [8,9]. Modifying the voice before surgery may enhance outcomes for transgender patients, with post-operative rehabilitation necessary for optimal results [9]. If transgender patients experience barriers to care, this may affect their ability to attend post-operative visits, and ultimately their overall outcome.

Therefore, we sought to compare the follow-up rates of

transgender patients undergoing gender-affirming procedures with a control group of cisgender patients who also underwent laryngeal surgery. All patients had their three-month series of post-operative visits scheduled at the time their surgical procedure was scheduled. The purpose of these visits is to monitor healing and adjust the patients vocal use patterns which have been demonstrated to affect overall outcome. The primary outcome measure was the percentage of pre-scheduled post-operative follow-up visits attended within a three-month period. The secondary outcome measure was the comparison of the number of pre-operative visits, race, patient satisfaction, and age and follow-up rates in the transgender cohort.

METHODS

This retrospective chart review study was conducted at a single center between January 2017 and June 2022. The patients were divided into two groups: cisgender patients who underwent laryngeal surgery for non-neoplastic vocal fold lesions, and transgender patients who underwent laryngeal surgery for gender-affirmation. The study was approved by the Mount Sinai Hospital System Institutional Review Board, and a waiver of informed consent was granted since patient data were de-identified. All procedures were performed by the senior author (MSC). Patient demographic data, surgical details, pre-operative and post-operative patient-reported outcome measures (PROMs), and follow-up visit information were extracted from medical charts for analysis. PROMs included the Transwomen Voice Questionnaire (TWVQ) for the gender affirming population, and the Voice Handicap Index (VHI-10) for the cisgender lesion population. Lower scores on the TWVQ and VHI-10 signify higher patient satisfaction.

After a gender-affirming endoscopic vocal fold shortening or non-neoplastic vocal fold lesion removal, the recommended follow-up periods are one week, four weeks, two months, and three months. For those who received only thyroid cartilage reduction or cyst removal, follow-up visits were scheduled at one week, six weeks, and three months post-operatively. The follow-up period examined in this study was three months after surgery.

In post-hoc analysis, the cisgender patients who underwent surgery for non-neoplastic disease were subdivided into three groups: cysts, polyps, and granuloma.

The Shapiro-Wilk test was used to determine the distribution of the data. The non-parametric data was analyzed using the Mann-Whitney U Test and the Spearman. The Student's T-test was used for parametric data. Analysis of variance (ANOVA) was used to assess differences in follow-up rates between ethnicities and locations. The significance level was set at $p < 0.05$.

RESULTS

A total of 228 patients who underwent outpatient laryngeal surgery between 2017 and 2022 were identified. Among them, 30 patients underwent surgery for non-neoplastic vocal fold lesions, including polyp (12), cyst (11), granuloma (6), or nodule (1) removal. The remaining 198 patients underwent gender-affirming laryngeal surgeries such as endoscopic vocal fold shortening and/or thyroid cartilage reduction. Patient demographic data are presented in Table 1 (Table 1a:

Transgender cohort demographics, Table 1b: Cisgender cohort demographics). Only one case of nodule removal was identified, which was included in the general analysis but not in individual analysis by surgical type.

The follow-up rate for all patients who underwent any gender-affirming surgery was 69.9%, which was statistically higher than the follow-up rate of 58.1% for all patients who underwent non-neoplastic vocal fold lesion surgeries ($p < .05$).

The follow-up rate among transgender patients was not statistically different between those who received endoscopic vocal fold shortening, TCR, or both surgeries simultaneously.

Cisgender patients who underwent polyp removal had a statistically significant worse follow-up rate than other cisgender patients who underwent either cyst or granuloma removal (45.8% vs 69.7% and 66.7%, $p < .05$). The follow-up rate of cisgender patients after polypectomy was also worse than transgender individuals who underwent endoscopic vocal fold shortening (45.8% vs 71.1%, $p < .05$). Follow-up data is reported in Table 2 (Table 2a: Follow-up data in the Transgender cohort, Table 2b: Follow-up data in the Cisgender cohort).

Univariate analysis of patient demographics showed that race/ethnicity did not significantly affect the follow-up rates across both transgender and cisgender cohorts. The evaluation of follow-up rates of men and women in the cisgender cohort was comparable and not statistically significant. Analysis of follow-up trends over time showed that although there was a decrease in follow-up rates immediately after the COVID-19 pandemic in 2020 (across all surgeries), it was not statistically significant within both transgender and cisgender cohorts. Table 3 shows the univariate analysis, and Figure 1 shows the trend of follow-up rates over the years.

The study found that the average number of pre-surgical voice therapy visits before an endoscopic vocal fold shortening procedure was 3.4 (± 2.5). There was a weak positive correlation ($r = .24$) between the number of pre-surgical speech therapy visits and the follow-up rate in the transgender community.

Patient-reported outcomes were evaluated using the TWVQ questionnaire in the transgender population, and the VHI-10 questionnaire in the cisgender population. Both questionnaires showed improvements in scores from pre-operative to post-operative assessments, but there was no significant correlation between the questionnaire scores and follow-up rates.

Additionally, a correlation analysis was performed between the TWVQ scores and the number of pre-surgical speech therapy visits, but only a weak negative correlation was found in the post-operative TWVQ scores ($r = .22$). Table 2 provides more information on the patient-reported outcomes and the number of voice therapy visits.

DISCUSSION

Post-operative care is considered an essential component of patient outcome by many surgeons and most laryngologists. Specifically, during the post-operative visits after laryngeal surgery, the patients' behavioral methods of voice production are assessed and modified as possible to influence healing and

Table 1: Patient Demographics						
A) Transgender cohort						
		All Transgender	Endoscopic Vocal Fold Shortening	TCR	Endoscopic Vocal Fold Shortening and TCR	
Sample Size	N	198	90	47	61	
Gender	% Female	100%	100%	100%	100%	
Age	Mean (SD)	34.7	38.1	28.8	34.3	
Ethnicity	White, N (%)	83 (42%)	32 (36%)	27 (57%)	24 (39%)	
	African American, N (%)	50 (25%)	28 (31%)	5 (11%)	17 (28%)	
	Hispanic, N (%)	48 (24%)	23 (25%)	9 (19%)	16 (26%)	
	Other, N (%)	17 (9%)	7 (8%)	6 (13%)	4 (7%)	
Location	NYC, N (%)	147 (74%)	67 (74%)	33 (70%)	47 (77%)	
	NY State, N (%)	22 (11%)	11 (12%)	7 (15%)	4 (7%)	
	Neighboring States (NJ and CT), N (%)	14 (7%)	5 (6%)	4 (8%)	5 (8%)	
	Out of State, N (%)	15 (8%)	7 (8%)	3 (7%)	5 (8%)	
B) Cisgender cohort						
		All Cisgender	Polyp	Cyst	Granuloma	Nodule
Sample Size	N	30	12	11	6	1
Gender	% Female	46.70%	33.30%	54.50%	50%	100%
Age	Mean (SD)	58.7	54.6	64.8	54.3	67
Ethnicity	White, N (%)	17 (57%)	6 (50%)	7 (64%)	3 (50%)	1 (100%)
	African American, N (%)	6 (20%)	4 (33%)	2 (18%)	0	0
	Hispanic, N (%)	4 (13%)	2 (17%)	1 (9%)	1 (17%)	0
	Other, N (%)	3 (10%)	0	1 (9%)	2 (33%)	0
Location	NYC, N (%)	21 (70%)	10 (84%)	7 (64%)	3 (50%)	1 (100%)
	NY State, N (%)	4 (13%)	1 (8%)	2 (18%)	1 (17%)	0
	Neighboring States (NJ and CT), N (%)	5 (17%)	1 (8%)	2 (18%)	2 (33%)	0
	Out of State, N (%)	0	0	0	0	0
Abbreviations: TCR- Thyroid Cartilage Reduction, NYC- New York City; NJ- New Jersey; CT- Connecticut						



Figure 1 Follow-up rates over time in the Transgender and Cisgender cohorts.

Table 2: Follow-up visits					
A) Follow-up visits and rates in the Transgender population					
	All Transgender	Endoscopic Vocal Fold Shortening	TCR	Endoscopic Vocal Fold Shortening and TCR	
Preoperative TWVQ	95.4/120	96.9/120	N/A	93.2/120	
Postoperative TWVQ	50.1/120	50.2/120	N/A	50.0/120	
# Pre-op Visits	3.4	3.5	N/A	3.3	
# Post-op Visits	N/A	2.8	1.9	2.9	
Follow-up Rate	69.90%	71.10%	63.80%	72.90%	
B) Follow-up visits and rates in the Cisgender population					
	All Cisgender	Polyp	Cyst	Granuloma	Nodule
Preoperative VHI-10	17.2	21.1	10.3	22.7	18
Postoperative VHI-10	6.3	7.4	2.2	7	28
# Pre-op Visits	N/A	N/A	N/A	N/A	N/A
# Post-op Visits	N/A	1.8	2	2.7	1
Follow-up Rate	58.10%	45.80%	69.70%	66.70%	25.00%
Abbreviations: TWVQ - Transwomen voice questionnaire; VHI-10 – Voice handicap index					

Table 3: Univariate Follow-up Rate Analysis			
		All Transgender	All Cisgender
Gender	Female	69.90%	53.00%
	Male	N/A	62.50%
Ethnicity	White, (%)	71.80%	57%
	African American, (%)	63.70%	20%
	Hispanic, (%)	70.50%	13%
	Other, (%)	77.90%	10%
Location	NYC, (%)	69.70%	70%
	NY State, (%)	11%	13%
	Neighboring States (NJ and CT), (%)	7%	17%
	Out of State, (%)	8%	0%

outcome. Therefore, if barriers to this care exist, efforts need to be developed to reduce these barriers. This study found that as a group, despite perceived barriers, transgender patients that underwent endoscopic vocal fold shortening and/or thyroid cartilage reduction had significantly higher follow-up rates than cisgender patients as a whole who underwent surgery for benign laryngeal disease. When cisgender patients were divided into groups based on their conditions, the polyp cohort had significantly lower follow-up rates than the cyst and granuloma groups, and follow-up rates for the remainder of the cisgender cohort equalized with that of the transgender cohort. Cisgender patients undergoing surgery for cysts or granulomas are presumed to have more diverse etiologies than those undergoing surgery for phono-traumatically induced polyps [10-12]. Cysts tend to be located deeper in the vocal fold tissue, which may require more extensive surgical work and resulted in stronger encouragement for patients to attend post-operative visits for

rehabilitation. As a result, this condition is now being perceived as “more complex” and treated more similarly to patients undergoing gender-affirming surgery.

In contrast to a previous study showing that African-American patients had a higher likelihood of being lost to follow-up, this study found no significant differences in short-term follow-up rates by race for laryngeal surgery.¹³ The accessibility of gender-affirming surgery is influenced by insurance reimbursement rates, which can impact the care patients receive and their follow-up [14]. Transgender patients in our clinic had better follow-up rates, which might have been due to established insurance coverage or self-payment arrangements before their scheduled procedure.

In a study by Pattanasin et al. which looked at factors affecting loss to follow-up in men who have sex with men, they uncovered factors such as young age, education level, and distance to

the provider being correlated with less follow-up [15]. This relationship was weakly expressed in the transgender cohort of this study. The cisgender patient cohort was significantly older, yet they had worse follow-up rates.

Previous work by Brown et al. showed that the combination of voice therapy and endoscopic vocal fold shortening produced the best voice outcomes, seen with a higher score on patient-reported outcome measures [16]. Therefore, it was important to evaluate whether voice therapy visits prior to surgery could predict follow-up rates. This study revealed weak correlations between the number of pre-surgical voice therapy sessions and follow-up rates ($r = .24$). This could not be assessed in the cisgender cohort since many patients were not recommended to partake in voice therapy sessions pre-operatively, due to patient and/or provider preferences.

Research has demonstrated that post-operative rehabilitation for patients undergoing all types of surgery significantly impacts patient-reported outcomes [7,8,17]. Patients who participate in rehabilitation programs tend to have better PROMs than those who do not. For example, studies have shown that patients who participate in rehabilitation after total knee replacement surgery have better pain control, functional outcomes, and quality of life compared to those who do not [9]. Similarly, patients who participate in post-operative pulmonary rehabilitation after lung surgery have improved lung function, exercise capacity, and quality of life [17]. Our study showed that pre-operative voice rehabilitation was weakly correlated with improvements in patient-reported outcomes ($r = -.22$), while post-operative voice rehabilitation was not. This suggests that increased pre-operative voice therapy visits were mildly associated with higher patient satisfaction, as indicated by lower TWVQ scores.

One limitation of this study was sample size variability. The transgender cohort had significantly more surgical patients compared with the cisgender cohort, which was likely due to previous correlations found between need for surgery and type of lesion [18]. Additionally, the cisgender population had different post-operative follow-up and pre-surgical voice therapy visit suggestions, making it challenging to compare these factors between the two populations.

CONCLUSION

Our clinic observed that despite potential barriers to care, post-operative follow-up rates for transgender women were higher than those for cisgender patients undergoing surgical removal of benign laryngeal disease. However, when the cisgender group was divided into different disease categories, this difference was only persistent for those patients' undergoing removal of laryngeal polyps. The reason for this difference is not known but presumed to be perceived insignificance of the "polyp" diagnosis. In our setting, follow-up visit rate were not significantly influenced by factors such as race/ethnicity, age, or number of pre-operative visits. Future multi-centric studies are necessary to assess the follow-up rates for other gender-affirming surgeries to identify potential disparities.

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