

Impact of Perioperative Voice Therapy on Outcomes in the Surgical Management of Vocal Fold Cysts

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Summary: Introduction. Vocal fold cysts are benign mid-membranous lesions of the true vocal fold, classified as mucus retention or epidermal inclusion cysts. Treatment is surgical excision with or without postoperative voice therapy.

Methods. A retrospective review was performed of the demographics, treatment approach, and outcomes of patients treated for vocal fold cysts between 2009 and 2014. Voice Handicap Index (VHI)-10 scores before and after treatment were compared using the Wilcoxon Rank-Sum test and the two-tailed Student's *t* test. Videostroboscopy examinations were reviewed for posttreatment changes in vibratory characteristics of the vocal folds.

Results. Twenty-five patients were identified, and one was excluded for incomplete records. Mean age was 41.9 years (66.7% female), and mean follow-up time was 5.58 months. Microflap excision was pursued by 21/24 (87.5%) patients, with 14 patients (58.3%) undergoing perioperative voice therapy. One cyst recurred. Two patients elected for observation, and their cysts persisted. VHI-10 decreased from 23.8 to 6.6 ($P < 0.001$) overall. There was a statistically significant reduction in VHI-10 in patients undergoing surgery with and without postoperative voice therapy ($P < 0.004$ and 0.001), but there was no significant difference between these two groups. Mucosal wave was classified as normal or improved in the majority. Cysts were characterized as mucus retention cysts in 19/21 (90%) and as epidermal inclusion cysts in 2/21 (10%).

Conclusions. Vocal fold cysts impact mucosal wave and glottic closure. Surgical excision resulted in low rates of recurrence, and in improvement in the mucosal wave and VHI-10. Perioperative voice therapy did not offer a significant benefit. Mucus retention cysts were the majority, in contrast to other published studies.

Key Words: Vocal fold cyst—Benign vocal fold lesion—Dysphonia—Voice therapy—Videostroboscopy.

INTRODUCTION

A vocal fold cyst is a benign mid-membranous lesion that typically presents as a sac-like structure with well-defined borders within the superficial lamina propria of the true vocal fold. They are estimated to account for 6–13% of benign laryngeal lesions and are typically classified as either epidermal inclusion or mucus retention cysts.^{1,2} Epidermal inclusion cysts are composed of caseous material encased in stratified squamous and keratinizing epithelium.³ They are thought to form as a result of phonotrauma leading to trapping of epithelium within the lamina propria.² Mucus retention cysts are lined with ciliated epithelium⁴ and form as a result of obstructed glandular ducts. The obstruction of these ducts and subsequent cyst formation may result from phonotrauma, chronic laryngitis, or infection.² Vocal fold cysts are typically unilateral and result in a significant reduction in the vibratory properties of the true vocal fold mucosa on videostroboscopy.⁵ Due to their mid-membranous location and tendency to distort the free edge of the vocal fold, an hourglass closure pattern is often noted on videostroboscopy as well. Vocal fold cysts may result in significant dysphonia due to their effect on vocal fold vibration and glottic closure. Figure 1 displays typical appearances of epidermal inclusion and mucus retention cysts.

Surgical excision with the microflap technique is the mainstay of treatment of vocal fold cysts. These lesions typically do not

resolve with voice therapy, and observation of cysts could potentially risk rupture, which may result in scarring or sulcus formation. Surgical excision, however, also risks scarring of the vocal fold, leading to a poor vocal outcome.⁶ Additionally, some patients are either unwilling or unable to undergo surgery for these benign lesions. In this study, we review our outcomes in the surgical and nonsurgical treatment of vocal cysts in order to determine the most effective management strategy. We hypothesized that surgical excision is a safe and effective treatment for vocal fold cysts. In addition, we hypothesized that patients undergoing postoperative voice therapy would have better outcomes compared with surgery alone.

MATERIALS AND METHODS

Patient cohort

Under an Institutional Review Board-approved protocol, the medical records of adult patients treated at our institution for vocal fold cysts between 2009 and 2014 were reviewed. Patients were identified via a search of existing records for the International Classification of Diseases (ICD)-9 codes for benign laryngeal lesions (478.4-6). The records were then reviewed to identify patients who were diagnosed with vocal fold cysts. Patients included in the study had complete medical records, including Voice Handicap Index (VHI)-10 questionnaire scores and recorded videostroboscopy examinations before and after treatment. Patients with incomplete medical records were excluded from the analysis.

Voice evaluations and therapy sessions for all study patients were performed by the same speech language pathologist. Surgical treatment was performed under general anesthesia and consisted of suspension laryngoscopy with microflap excision (MFE) of the cyst.

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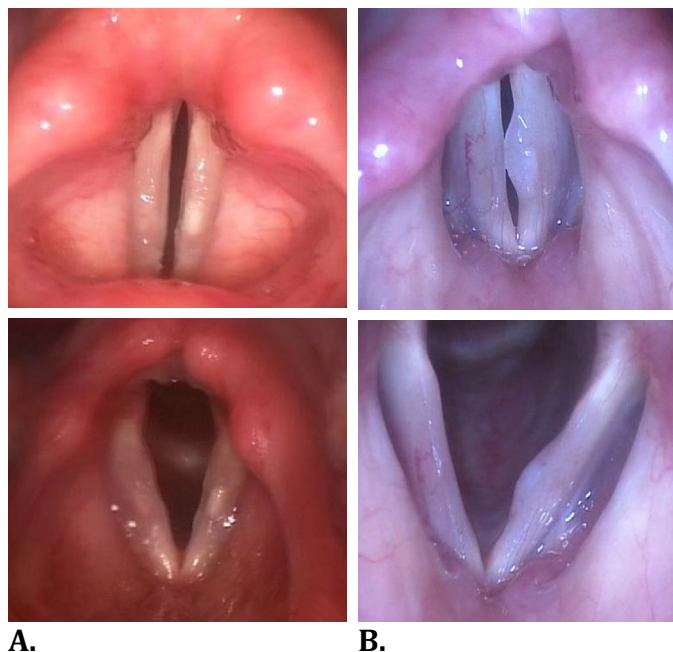


FIGURE 1. A. Epidermal inclusion cyst involving the superior surface of the left true vocal fold. B. Mucus retention cyst involving the free edge of the left true vocal fold.

Data collected and outcomes measured

Existing electronic medical records were reviewed, and data pertaining to patient demographics, treatment modalities, and VHI-10 scores before and after treatment were recorded. Operative and pathology reports were reviewed to determine cyst type (epidermal inclusion versus mucus retention). Videostroboscopy examinations before and after treatment were reviewed and scored by a blinded laryngologist and speech language pathologist. All videostroboscopy examinations were performed with either a 70° rigid endoscope (KayPENTAX, Montvale, New Jersey) or via a flexible laryngoscope with a distal chip (Olympus ENF-VQ, Olympus Surgical, Center Valley, Pennsylvania). Pretreatment and posttreatment examinations were performed with the same style of laryngoscope (either rigid or flexible for both examinations) for consistency. The reviewers rated the mucosal wave as either improved or not improved compared with the pretreatment examination. Additionally, the reviewers compared the mucosal wave of the involved vocal fold to that of the uninvolved

vocal fold, scoring it as either normal, present but decreased, or absent.

Statistical analysis

VHI-10 scores before and after treatment were compared using the Wilcoxon rank-sum test. Changes in the VHI-10 between the different treatment modalities were compared using a two-tailed Student's *t* test. Interrater reliability between the two clinicians who reviewed the videostroboscopy examinations was calculated to determine percent agreement and Krippendorff's alpha.

RESULTS

Twenty-five patients who underwent treatment for a vocal fold cyst between 2009 and 2014 were identified, and one patient was excluded for incomplete medical records. Mean age at diagnosis was 41.9 years (range 22–69 years), and 16 patients were female (66.7%). Mean follow-up time after initial diagnosis was 5.58 months (range 0.17–54 months, median 3 months). Twenty-one patients (21/24, 87.5%) underwent MFE of their cyst, with 14/21 (66.7% of surgical patients, 58.3% overall) pursuing perioperative voice therapy. One patient (4.2%) opted for voice therapy alone, and two patients (8.3%) deferred any treatment but did follow up for repeat videostroboscopy to monitor the lesion. Patients who pursued voice therapy attended a mean of 4.25 (range 1–10) sessions. The type of cyst was documented in either the operative or pathology report, with 19/21 (90%) characterized as mucus retention cysts and 2/21 (10%) characterized as an epidermal inclusion cyst. Four surgical patients underwent either subepithelial steroid injection concurrently or noncontact potassium titanyl phosphate (KTP) laser treatment after MFE to reduce the risk of scar formation postoperatively. One patient's vocal fold cyst recurred after initial MFE with no recurrence after re-excision (1/21, recurrence rate 4.8%).

A comparison of VHI-10 scores before and after treatment is displayed in Table 1. Statistically significant improvements in VHI-10 scores were observed in patients who underwent MFE with or without perioperative voice therapy and in the patient cohort overall. The patients who opted for no treatment did not have a statistically significant improvement in VHI-10 at follow-up, although there was a mean improvement of 5.5 in their VHI-10 scores. As only one patient underwent voice therapy alone, statistical significance cannot be determined; however, the patient's VHI-10 did improve 19 points (30–11) after a course

TABLE 1. Comparison of Mean VHI-10 Scores Before and After Treatment Overall and for Each Treatment Group. The Wilcoxon Rank-Sum Test was Applied to Determine If the Change in VHI-10 Within Each Group Was Statistically Significant

	All Patients (n = 24)	MFE (n = 7)	MFE + Voice Therapy (n = 14)	Voice Therapy (n = 1)	No Treatment (n = 2)
Pretreatment VHI-10	23.83	28.29	20.42	30	29
Posttreatment VHI-10	6.5	8	3	11	23.5
Change in VHI-10	17.33	20.29	17.43	19	5.5
<i>P</i>	<0.001	0.004	<0.001	N/A	0.57

Abbreviations: MFE, microflap excision; VHI, Voice Handicap Index.

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