Clinical Significance of Contralateral Reactive Lesion in Vocal Fold Polyp and Cyst

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Summary: Objective. We investigated the clinical significance of contralateral reactive lesions in patients undergoing laryngeal microsurgery for benign vocal fold lesions such as vocal polyps and cysts.

Study Design. This was a retrospective, single institution cohort study.

Methods. Patient medical records were reviewed for demographic characteristics; acoustic, aerodynamic, and perceptual analyses; and Voice Handicap Index score before and after laryngeal microsurgery. Definitive diagnoses were made via intraoperative microlaryngoscopic evaluations. Clinical parameters were assessed to identify risk factors for contralateral reactive lesions. We evaluated surgical outcome using voice analysis.

Results. We enrolled 268 patients (109 men and 159 women) with benign vocal fold lesions. A total of 195 (72.8%) had a contralateral reactive vocal fold lesion. A multivariable analysis revealed that being a never smoker and having a hoarseness duration ≥6 months, vocal polyps, and small primary lesions were independent risk factors for contralateral reactive lesions (P < 0.05). The preoperative perceptual evaluation and maximum phonation time were significantly worse in patients with a contralateral reactive lesion than in those without one (P = 0.014, P = 0.004, respectively). The voice parameters in patients who underwent excision of the contralateral reactive lesion were generally better than those who received conservative treatment, particularly the noise-to-harmonic ratio (P = 0.004).

Conclusions. Contralateral reactive vocal fold lesions are frequently detected in patients with vocal polyp and cyst. The reactive lesions had an adverse effect on voice quality. Simultaneous excision of primary and contralateral reactive lesions may be an alternative treatment for better voice outcome.

Key Words: Vocal polyp–Vocal cyst–Reactive vocal fold lesion–Phonomicrosurgery–Microlaryngoscopy.

INTRODUCTION

Benign vocal fold lesions (BVFLs) including vocal fold nodules, polyps, and cysts, are a common cause of voice disorders. BVFLs can be differentiated by the physical features of the lesions found at phonomicrosurgery. Microlaryngoscopy with general anesthesia allows superior imaging of the glottis through stereoscopic magnification to precisely assess the characteristics of the mucosa. BVFLs can be treated using surgery or conservative therapy. Surgery can be highly successful when performed using precise phonomicrosurgical techniques and is recommended for vocal fold cysts that do not respond to voice rest or therapy. Most vocal polyps do not resolve and only decrease in size with voice rest or therapy. Meanwhile, conservative therapy has been widely used to treat vocal nodules.

Vocal polyps and cysts are generally unilateral, whereas reactive lesions are often found on the contralateral vocal fold directly opposite the primary lesion. A reactive vocal fold lesion must be paired with a contralateral vocal fold lesion. It may have a cup-and-saucer appearance, with the contralateral lesion indenting the reactive vocal fold lesion at the point of maximum contact. Reactive lesions may be more responsive to nonsurgical therapy because some clinical and videostroboscopic findings have indicated that the lesion is anatomically superficial. However, there is little support for this hypothesis.

Treatment options and outcomes for primary vocal polyps, cysts, and contralateral reactive lesions (CRLs) have not been assessed using objective measurements. We investigated the risk factors associated with CRLs and the clinical significance of detecting these lesions during phonomicrosurgery. Furthermore, we propose alternative treatment for the management of CRLs regarding the benefit of simultaneous surgical resection for optimal postoperative voice results.

MATERIALS AND METHODS

Our study was approved by the Institutional Review Board of the Catholic University of Korea, Seoul, Korea. We reviewed the medical records of consecutive patients who underwent laryngeal microsurgery for BVFLs between January 2011 and December 2014. Among patients with BVFLs, only patients with vocal fold polyps or cysts were included. Exclusion criteria included (1) vocal nodules caused by symmetrical bilateral lesions; (2) previous history of phonomicrosurgery for vocal fold lesions; (3) accompanying structural and functional vocal fold abnormalities such as Reinke edema, vocal atrophy, sulcus vocalis, vocal fold scarring, and vocal fold paralysis; and (4) prior history and present diagnosis of another pathology such as laryngeal tuberculosis, cancer, and precancerous lesions. The study included 268 patients who completed the pre- and 3-months postoperative voice assessments. All patients had undergone a routine laryngological examination followed by videostroboscopy using a 70° rigid laryngoscope connected to a stroboscope (Karl Storz Endoscopy–America, Culver City, CA).
All participants provided a detailed medical history, which included their age and profession, details about the onset of their symptoms, smoking practices, and vocal behavior including voice overuse or misuse. The clinical parameters were older age (>60 years), tobacco use (never, former [quit >3 months before diagnosis], and current [within 3 months of diagnosis] smoker), and duration of voice change (<3 months, 3–6 months, and ≥6 months). Clinical parameters including age, gender, smoking, duration of voice change, type and size of the primary lesion, polyp pattern, lesion location, involved side of the vocal fold (left and right), and voice abuse were explanatory variables for the presence of a CRL.

Patients were divided into two groups according to the presence of a CRL (Figure 1). Group A (n = 73) included patients diagnosed with vocal polyps or cysts alone, and Group B (n = 195) included patients diagnosed with vocal fold polyps or cysts with a CRL. Group B was subsequently divided into subgroups according to whether the reactive lesion was surgically excised or not.

**Morphologic evaluation of vocal fold lesions and clinical correlations**

Both vocal folds were carefully examined during suspension microlaryngoscopy to identify polyps and cysts with and without a CRL. Our lesion definitions were broadly consistent with those of previous studies. To standardize the diagnostic criteria, a polyp was defined as a red or translucent focal mass lesion with or without hemorrhage, and a cyst was defined as an encapsulated subepithelial mass. The morphologic features were classified according to size (small, less than one-fourth the length of the vocal fold—from anterior commissure to vocal process; medium, one-fourth to one-third; large, more than one-third), location (anterior one-third and middle one-third of vocal fold), color (hemorrhagic polyp with vascular changes or nonhemorrhagic polyp), and polyp type (having a pedunculated or broad-based shape). The status of the contralateral vocal fold was classified as the presence of reactive vocal fold lesion or not (Figures 1 and 2).

A reactive vocal fold lesion was defined as epithelial hyperplasia of membranous vocal fold. A pseudocyst was defined as translucent, blister-like in appearance, and composed of a semi-solid fluid underneath thinned epithelium without encapsulation.

All surgeries were performed by a single surgeon (JHC) with expertise in phonosurgery. Cold microsurgery was used to remove vocal fold lesions (Figure 1). Vocal polyps and cysts were removed using the microflap technique, and the mucosa was preserved as much as possible. We also preserved the layer of Reinke space during dissection and prevented the remaining mucosa from adhering to vocal ligament. After removal of primary lesion, a CRL was either excised or not. After reviewing medical records, we found that a CRL was mainly removed at the beginning of this study, whereas a CRL was not routinely removed from the second half of study period. Thus, in Group B with CRL, two subgroups appeared according to the treatment modality: resection of CRL or nonresection of CRL.

**Voice analysis**

Voice quality was assessed before and 3 months after phonosurgery in all patients. The acoustic analysis included fundamental frequency, jitter, shimmer, and noise-to-harmonic ratio (NHR). Acoustic variables were measured by assessing a few seconds of sustained phonation of the vowel /a/ using the Multi-Dimensional Voice Program from the Computerized Speech Lab system (Model 4500, KayPENTAX, Lincoln Park, NJ). A well-trained phonetician performed a subjective assessment of voice quality using the grade-roughness-breathiness-asthenia-strain (GRBAS) scale. All patients completed a Voice Handicap Index (VHI) questionnaire with a five-point scale from 0 (never) to 4 (always) for each question. The instrument had a minimum total score of 0 and a maximum total score of 120, with higher scores indicating greater perceived disability due to the patient’s voice problem.
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