Conservative Management for Vocal Fold Polyps

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Vocal fold (VF) polyps are one of the most commonly encountered benign lesions of the larynx. Although VF polyps are benign and nonneoplastic in nature; they may cause significant voice disturbances, often requiring surgical removal under general anesthesia. Considering the benign nature of the disease, conservative management could be considered. Classically, surgery has been the mainstay of management for vocal fold (VF) polyps. However, a significant portion of patients experience spontaneous regression and may not require surgery.

OBJECTIVES
To report the results of conservative management for VF polyps, identify patients with polyps that are more likely to resolve, and describe the time course of resolution.

DESIGN, SETTING, AND PARTICIPANTS
In this case series of 248 patients with VF polyps conducted presenting to a tertiary referral center, 94 patients were treated conservatively with at least 3 months of follow-up. All laryngoscopy photodocumentation and medical records were reviewed retrospectively.

INTERVENTIONS
Conservative management with close follow-up.

MAIN OUTCOMES AND MEASURES
Time course and resolution of VF polyps.

RESULTS
Of 94 VF polyps, 43 (46%) showed a clinically significant reduction in size, and 36 (38%) resolved completely without requiring surgery. Multivariate analysis showed that VF polyps were most likely to resolve in female patients and those with small, recent-onset polyps. The majority of polyps that resolve do so within 8 months, which can assist clinical decision making and counseling.

CONCLUSIONS AND RELEVANCE
Selected patients with VF polyp may benefit from conservative management, especially female patients and those with small, recent-onset polyps. The majority of polyps that resolve do so within 8 months, which can assist clinical decision making and counseling.

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In the present study, we aimed to demonstrate the feasibility of conservative management of VF polyps by observing their natural course. We also analyzed factors influencing spontaneous resolution of VF polyps and the time course for resolution. In doing so, we sought to practically implement our findings in clinical decision making.

Methods
The study was approved by the institutional review board of Seoul National University Bundang Hospital, which also approved the waiver of patient informed consent.

Our study group consisted of a consecutive case series of patients presenting to a tertiary care center catering to both referred patients and patients from the community. Between May 2003 and June 2012, 248 patients were diagnosed as having VF polyp. Included in this category were...
mid-membranous benign exophytic VF lesions, which would generally be accepted as a polyp. Any lesions in doubt of this typical finding were excluded from the analysis. Laryngoscopy results were documented in all clinical sessions and archived in the PACS (Picture Archiving and Communication System).

Follow-up intervals were usually 2 to 3 months apart but varied depending on patient preference and distance of the patient’s residence from the hospital. Patients who were followed up for at least 3 months with conservative management were included in the analysis. Laryngoscopy images were retrieved, and medical records were retrospectively analyzed. Reinke edema, other benign VF lesions (eg, cysts, nodules, contact granulomas), and paralyzed or immobile VFs were excluded from the study.

The size of the polyp was determined as follows (Figure 1): large (category 3), larger than one-third of the overall VF length; medium (category 2), smaller than one-third of the overall VF length; small (category 1), pinpoint size; and resolved (category 0). According to the size criteria, changes in polyp size were defined as follows: complete remission, no remnant polyp at the last follow-up (end point category 0); partial remission, decreased size but remaining lesion (category 3→2, category 3→1, category 2→1); and stable disease, no change or increased size category (partial remission and stable disease were grouped together in the persistent group).

The polyp morphology and color were also considered. Polyps were categorized as hemorrhagic, organized, and translucent (Figure 2). The reflux finding score (RFS) was evaluated with the initial laryngoscopy finding according to Belafsky et al. An RFS of 7 or higher was regarded as indicating a high possibility of laryngopharyngeal reflux.

Statistical analysis was performed using the PASW Statistics 18 program (IBM). A logistic regression model (Enter method) was used for multivariate analysis. A Kaplan-Meier plot was used to analyze the natural course and time-dependent outcome for VF polyps. P < .05 was considered statistically significant.

Results

Among 248 patients with VF polyp, 94 were observed or managed conservatively for at least 3 months and 154 underwent surgery. The mean (SD) age was 56.62 (12.26) years and 50.83 (13.13) years for conservatively managed patients and patients undergoing surgery, respectively (P = .001). The male to female ratio was 1.29:1 and 1.83:1 for conservatively managed patients and patients undergoing surgery, respectively (P = .19).

The median follow-up period was 7.2 months (range, 3-60 months), and the mean follow-up interval was 3.01 months for conservatively managed patients. Conservative measures included vocal hygiene, dietary and lifestyle modifications for laryngopharyngeal reflux, and proton pump inhibitors.

The initial size of the polyp was large in 21% of the cases, medium in 57%, and small in 22%. Hemorrhagic, organized, and translucent polyps accounted for 47%, 28%, and 25% of lesions, respectively. The RFS was 7 or higher in 78% of the cases. The polyp completely disappeared (complete remission) in 36 patients (38%), shrank (partial remission) in 7 patients (7%), and was persistent (stable disease) in 51 patients (54%). The improvement rate and resolution rate of polyps followed for more than 3 months was 46% and 38%, respectively.

Factors attributable to polyp resolution were analyzed using univariate analysis (Table 1). Female patients, patients with initial small polyp size, and patients with shorter symptom duration were more likely to have complete resolution of the polyp. These 3 attributes were valid by multivariate analysis (Table 2).

We also investigated the time-dependent course of VF polyps. Figure 3 represents the temporal distribution of spontaneous resolution of polyps. Of the 36 patients in whom the polyp had eventually disappeared, the polyp had resolved completely by the 3-month follow-up examination in 16 patients (44%) and by the 8-month follow-up examination in 29 patients (81%).

Discussion

In our study, we were able to confirm that a considerable number of patients (46%) with VF polyps improved over time. Our results showed that female patients, patients with recent onset, and patients with small polyps were most likely to experience resolution of the lesion. Our findings are in concordance with the results of several other studies. Furthermore, our series demonstrated that the majority of polyps that resolve do so within 8 months from presentation.

Most of the literature regarding management of VF polyps focuses on surgical removal of the disease. Considering that general anesthesia and surgery itself is not without complications and that the cost and socioeconomic impact of surgery cannot be neglected, patients may benefit from avoid-
ing unnecessary operations. However, only a small number of studies has addressed this issue to date.7

Several studies raised the possibility that immediate surgery may not be appropriate for all patients. Cohen and colleagues8 presented one of the first studies reporting the utility of voice therapy as the first line treatment for VF polyps. However, their report comprised both cysts and polyps and reported only the improvement of symptoms.

More-recent large case series focused on the utility of voice therapy as the main treatment strategy.6,9 Their primary endpoint was improvement in voice quality. In our series, we chose complete resolution of the polyp as the significant endpoint because we considered the decision for surgery a more important clinical issue than improvement of voice quality. Voice therapy was not prescribed in our series because of the limited capacity of our institution’s voice laboratory. Consequently, the possible confounding effect of voice therapy on the outcomes in the current case series could be eliminated, further validating our results. A recent review article by Garrett and Francis7 showed that voice therapy may or may not be important in the conservative approach for VF polyps. However, the role of voice therapy and vocal hygiene in any voice-related condition should not be overlooked. Hence, the role of voice therapy in the conservative management of VF polyps remains to be investigated.

Two recent reports call for detailed attention.3,4 Nakagawa and colleagues4 reported similar findings to those from our study. They conservatively treated 132 patients with VF polyp. After a mean duration of 5.1 months, 55 patients achieved complete resolution, while 29 patients experienced a reduction of their lesion after a mean duration of 4.1 months. The rate of resolution (41.7%) is comparable to our result (38.3%). They also found that female patients and patients with small-sized polyps and shorter duration of symptoms had a better chance of improvement with conservative management, which is in concordance with our findings. In addition, they reported that

Table 1. Univariate Analysis of Factors Affecting Resolution of Vocal Fold Polyps*

<table>
<thead>
<tr>
<th>Factors</th>
<th>Complete Remission (n = 36)</th>
<th>Persistent (n = 58)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD), y</td>
<td>58.3 (11.2)</td>
<td>55.6 (12.9)</td>
<td>.43b</td>
</tr>
<tr>
<td>Sex, No.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>13</td>
<td>40</td>
<td>.002c</td>
</tr>
<tr>
<td>Female</td>
<td>23</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Initial size, No.</td>
<td></td>
<td></td>
<td>.001c</td>
</tr>
<tr>
<td>Small</td>
<td>15</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>18</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>3</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Polyp morphology, No.</td>
<td></td>
<td></td>
<td>.37c</td>
</tr>
<tr>
<td>Hemorrhagic</td>
<td>19</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Organized</td>
<td>7</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Translucent</td>
<td>10</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Symptom duration, mean (SD), mo</td>
<td>3.4 (2.2)</td>
<td>24.6 (62.4)</td>
<td>.001h</td>
</tr>
<tr>
<td>Reflux finding score, mean (SD)</td>
<td>11.1 (4.0)</td>
<td>10.9 (4.7)</td>
<td>.89b</td>
</tr>
</tbody>
</table>

* Findings show that female sex, small initial size, and short symptom duration are statistically significantly associated (P < .05) with complete remission. Age, polyp morphology, and reflux finding score are not statistically significant.

b t Test.
c Pearson χ² test.

Table 2. Multivariate Analysis Using a Logistic Regression Model*

<table>
<thead>
<tr>
<th>Parameters</th>
<th>β Coefficient</th>
<th>P Value</th>
<th>Exp(β)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>−0.120</td>
<td>.73</td>
<td>0.988</td>
</tr>
<tr>
<td>Female sex</td>
<td>−2.065</td>
<td>.03</td>
<td>0.127</td>
</tr>
<tr>
<td>Initial polyp size: small</td>
<td>−4.334</td>
<td>.03</td>
<td>0.011</td>
</tr>
<tr>
<td>Polyp morphology: hemorrhagic</td>
<td>−0.120</td>
<td>.68</td>
<td>0.887</td>
</tr>
<tr>
<td>Short symptom duration</td>
<td>1.210</td>
<td>.001</td>
<td>0.358</td>
</tr>
</tbody>
</table>

Abbreviation: Exp(β), exponentiation of the β coefficient.

* Findings show that female sex, small initial size, and short symptom duration are statistically significant (P < .05) in resolution of vocal fold polyps.
they did not detect an influence of voice therapy on patients in their case series. They concluded that VF polyps may be treated conservatively in selected patients.

Our study revealed an additional dimension of VF polyp resolution, the time course. In the clinic, 2 factors are important when counseling patients regarding their options. The first is identifying patients who would benefit by postponing surgery. The second requires determining, for patients who opt to postpone surgery, how long they should wait before reconsidering the operation. In our study, nearly half of all patients who eventually achieved complete remission had the polyp resolve within 3 months and 80% of them had the polyp resolve within 8 months. This is a significant finding that can be applied to patient counseling in the clinical setting. In a report by Klein and colleagues, although the numbers were small, polyps that eventually resolved did so within 9 months, which is in concordance with our data.

How some polyps regress is not clearly known, most probably because the phenomenon itself has not been well described. A possible explanation is that the interstitial material underlying the polyp undergoes resorption, which fits well with the finding that small polyps of recent onset have a better chance of resolving. Laryngopharyngeal reflux was prevalent in our case series; however, the laryngopharyngeal reflux itself or the use of proton pump inhibitors did not affect the natural course of the polyp. We have had patients with a pedunculated polyp who reported sudden improvement of voice following an episode of severe coughing. This may be due to mechanical removal of the polyp. However, it does not explain regression in most of the patients included in this series. The mechanism underlying spontaneous regression needs further investigation.

The major limitation of our study is the innate retrospective nature of the design. Patients undergoing conservative management may have been subject to selection bias. Moreover, patients were assigned to various conservative management schemes based on physical examination findings and concomitant conditions such as laryngopharyngeal reflux. Another limitation of this study is that voice evaluation results were not available. Vocal traits associated with polyp resolution could not be analyzed in this series. Despite the shortcomings, several significant factors were identified in the multivariate analysis, by which we could deduce a projected time frame for resolution of VF polyps. We believe that these data may serve as a basis for further prospective randomized studies.

In summary, 38% of the VF polyps resolved completely without surgery. Female patients and patients with recent onset and small polyps had a statistically significant tendency for spontaneous resolution. Hemorrhagic polyps were not associated with spontaneous regression. Of the polyps that spontaneously resolved, 44% and 81% did so at 3 and 8 months, respectively.

Conclusions

Watchful waiting for a limited course of time could be considered for selected patients with VF polyps. Our results show that the majority of polyps that spontaneously resolve do so within 8 months, which can assist in clinical decision making.
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Statistical analysis: Jeong, S. J. Lee.
Administrative, technical, or material support: W. Y. Lee, Ahn.
Study supervision: Chang, Ahn.
Conflict of Interest Disclosures: None reported.

REFERENCES