INTRODUCTION

• Pathologic vocal fold asymmetry has been well-established and strongly associated with various vocal fold pathologies.
• Physiologic asymmetries are also significantly prevalent in asymptomatic, normophonic subject groups.
• The specific features that transition patients from asymptomatic to symptomatic are not well understood.
• Individual components of vocal fold asymmetry have been characterized in either dysphonic or normophonic subject groups.
• Simultaneous examination of multiple features in a mixed patient population has not yet been performed.

STUDY AIMS

• Investigate the association between number of vocal fold asymmetries and vocal function
• Investigate the association between specific asymmetry profiles (motion, configuration, vibration) and vocal function

METHODS AND MATERIALS

• 136 new patients undergoing videostroboscopic examination
• October 2013 to June 2014, Cleveland Clinic
• Regardless of chief complaint or vocal function

Measurements:
• Retrospective chart review
  - Patient demographics
  - Vocal function (perceptual assessment by the clinician)
• Videostroboscopic exam review (Figures 1 - 3)
  1. Vocal fold motion (symmetric* vs. asymmetric**)
  2. Vocal fold configuration (symmetric or asymmetric)
  3. Vocal fold vibration
• Inter-rater reliability was calculated for 20 subjects in each asymmetry parameter assessed. Kappa values for vocal fold motion, configuration, and vibration were determined to be 0.55, 0.88, and 0.83, respectively.

RESULTS

Table 1: Patient Population (N = 136)

<table>
<thead>
<tr>
<th>Age, mean ± sd</th>
<th>56 ± 17 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>female</td>
<td>81 (60%)</td>
</tr>
<tr>
<td>male</td>
<td>55 (40%)</td>
</tr>
<tr>
<td>Smoking status</td>
<td></td>
</tr>
<tr>
<td>never</td>
<td>77 (57%)</td>
</tr>
<tr>
<td>former</td>
<td>45 (33%)</td>
</tr>
<tr>
<td>current</td>
<td>14 (10%)</td>
</tr>
<tr>
<td>Patient reports dysphonia</td>
<td>116 (85%)</td>
</tr>
</tbody>
</table>

Primary diagnosis
- dysphonia 42 (31%)
- vocal fold lesion 15 (11%)
- vocal cord paralysis 14 (10%)
- dyspahgia 12 (9%)
- chronic cough 8 (6%)
- laryngopharyngeal reflux disease 7 (5%)
- other 38 (< 5%) each

Vocal fold lesions
- normophonic 28 (21%)

Voice Handicap Index score
- normophonic, mean ± sd 35.0 ± 26.0
- dysphonic, mean ± sd 54.1 ± 19.7

* Vocal fold lesions include nodules, polyps, and cysts. Vocal cord paralysis may be unilateral or bilateral
** Other diagnoses include globus sensation, laryngitis, throat pain, adductor spasmodic dysphonia, dyspnea, subglottic stenosis, vocal cord leukoplakia, burning mouth syndrome, cancer of the larynx, exophthalmic goiter, hoarseness, headache, hearing loss, laryngeal spasm, nasal obstruction, post nasal drainage, presbylarynges, protruded U, rhiinus, vocal cord dysfunction, vocal cord granuloma, vocal cord paresis, vocal tremor, and Zenker’s diverticulum

Table 2: Number of Asymmetries in Dysphonic and Normophonic Patients

<table>
<thead>
<tr>
<th>Number of Asymmetries</th>
<th>Dysphonic (n=85)</th>
<th>Normophonic (n=51)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>16 (19%)</td>
<td>14 (27%)</td>
</tr>
<tr>
<td>1</td>
<td>23 (27%)</td>
<td>15 (30%)</td>
</tr>
<tr>
<td>2</td>
<td>23 (27%)</td>
<td>15 (30%)</td>
</tr>
<tr>
<td>3</td>
<td>23 (27%)</td>
<td>7 (14%)</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>51</td>
</tr>
</tbody>
</table>

• The number of asymmetries does not follow a dose-dependent relationship with vocal function (Table 2).
• The number of parameter asymmetries was not significantly associated with vocal function (Chi-square test, p = 0.29).
• The effect of each individual parameter or combination of parameters was not significantly associated with vocal function (whole model test, p = 0.33) (Figure 4).
• As expected, the most common profile among the dysphonic patients was all asymmetry and among the normophonic patients was no asymmetry.
• However, all vocal fold asymmetry profiles were represented within each patient cohort indicating no clear delineation of vocal function based on profile.

KEY POINTS

• The accumulation of parameter asymmetries would logically seem to predict voice dysfunction, but this relationship was not observed.
• Although no statistically significant associations were found between different asymmetry profiles and vocal function, clinically important differences may be present.
• This highlights the importance of avoiding over-diagnosis or over-emphasis of vocal fold asymmetry as the major contributory factor of voice dysfunction.
• It is important to note that our findings apply most directly to a perceptual, in-office assessment of voice dysfunction. Higher resolution methods of vocal fold asymmetry and function may conclude different associations for the same parameters.
• Certain asymmetry profiles were rarely observed and may not have been sufficiently represented to detect differences.
• Future directions include a larger sample size, further stratification based on known vocal fold paralysis or lesions, and refinement in the assessment of vocal fold motion.

REFERENCES