
Computed Phonetograms in Adult Patients with Benign Voice Disorders before and after Treatment with a Nonsedating Antihistamine (Loratadine)

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Introduction

Phonetography has been recommended for adequate medical voice care combined with stroboscopy [1]. In earlier studies of chronic hoarseness in children based on phonetograms, usually a combined infectious allergic history and significant reduction of the voice area was found compared with normal children [2].

The diagnosis of chronic laryngitis has been discussed. Damsté and Lernoa’s definition [3] includes objective findings of red laryngeal mucosa and irregular thickening of the vocal folds, which is in principle reversible. Bielski [4] found infection, allergy, smoking, climate, toxic factors, and vocal abuse as causes of laryngitis, but had no comments on prevalence or any suggestions on causal systematic treatment. Brewer and McCall [5] agree that no unanimous opinion on causes is normally found by medical doctors, speech therapists, and physiologists. In the therapeutic situation cortisone has been used, probably too much. Van Leden [6] suggests that steroids should be reserved for emergencies.

In studies of pharyngeal wall and nasal mucosa in vitro and in vivo the effect of beclomethasone spray and oral antihistamines as well as cromoglycate spray have been examined by Okuda [7]. The basophil cells decreased in the steroid group, although the sensitivity to histamine persisted in the remaining cells. The histamine sensitivity decreased in the nose and pharyngeal wall in the antihistamine group, although the number of basophils was unchanged. The effect of cromoglycate was related to the blocking of release of histamine. No studies on the effect of antihistamines on the vocal cord epithelium have been found, but an effect of nonsedating oral antihistamines on chronic laryngitis could be expected.

Based on previous clinical studies of benign voice disorders [2, 8, 9] the aim of the present study was to investigate a possible effect of the new nonsedating antihistamine Loratadine also on chronic laryngitis [10]. The causes of the disease seem difficult to differentiate by history of illness, symptoms, or stroboscopic findings [11]. The phonetographic principle was described by many authors [12, 13]. A suggestion for standardization of measurement [13] has not yet been rectified. In this study the stroboscopy was supplemented with phonetography by the computerized method previously described [14, 15].
Study Population and Method

After evaluation by the Ethical Committee of Copenhagen a consecutive double-blind study was carried out on 30 adults with chronic laryngitis and a history of hoarseness for more than 1 month. Informed consent was obtained from patients successively referred from general practitioners to the ENT clinic with a history of hoarseness; information was obtained on use of voice, training of voice, allergy, smoking, and possible toxic factors in the surroundings. Patients with a nasal septum deviation, patients without capability to reproduce tones, and patients with other disorders (arthritis, heart disease) were excluded from the study. Malignancy, pregnancy, allergy to antihistamines, cortisone and antihistamine treatment during the last 24 h, immunotherapy for the last 6 months and other diseases that could interfere with treatment or that need treatment were also reasons for exclusion.

If the history indicated infections, erythromycin in standard doses was given during the 1st week. Vitamin A and local anesthetic lozenges were allowed. The patients were randomized, and coded capsules with active ingredients or placebo were given for 2 weeks. The diary filled in by the patients included information on time of capsule intake, side effects, but also scores of effect from 0 (= no symptoms) to 3 (= severe hoarseness disturbing daily activities). Computed phonotigrams were stored after the 1st and 2nd week for statistical analysis based on a previously developed statistical program for comparison of phonotograms [15].

Results

Table 1 shows the diagnoses of patients in group A (active ingredients) and B (placebo). An equal distribution was found in groups A and B for diagnoses, verified allergy, smoking, other medical treatment, side effects, voice training and use of voice.

Figure 1 shows a phonotigrams of a patient before and after treatment with Loratadine. Figure 2 shows the average phonotograms and standard deviations in group A for females (active ingredients) at the beginning of the treatment period, in the middle, and at the end.

Figure 3 shows the average phonotograms in group B (placebo) at the beginning, in the middle, and at the end of the treatment period. The phonotigrams in the two groups vary with regard to the lowest tone, the highest tone, and the maximal dynamic distance; in both

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Patients</th>
<th>Mean age (range)</th>
<th>Patients with known allergy</th>
<th>Smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic laryngitis</td>
<td>8 F</td>
<td>60.6 (25–78)</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4 M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recurrent chronic laryngitis</td>
<td>6 F</td>
<td>45.7 (26–68)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic laryngitis and Reinke edema</td>
<td>4 F</td>
<td>36.0 (23–51)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Chronic laryngitis and hyperkeratosis of vocal cords</td>
<td>3 F</td>
<td>47.5 (28–59)</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1 M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic laryngitis and vocal nodules</td>
<td>1 F</td>
<td>18.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Age and diagnosis of 30 patients and data for positive allergic history and smoking (2 patients did not return for the last examination)
groups A and B only 1 male had high notes. In none of the two groups of average phonetograms a clear register difference is present.

In figure 4 the results of the statistical calculations, based on computed data of the SAS statistical program, are presented. The data in groups A and B were found to be comparable. The areas changed from day 0 to day 14; in females 44 dB × semitones were found in group A and 46 dB × semitones in group B, in males 14 and 19 db × semitones. The result showed a significant effect from day 0 to day 14 due to other medicine (p < 0.01).

Subjective effect scores made by the patients at the beginning, in the middle, and at the end of the treatment period showed a nonsignificant change by one positive score in group A. Stroboscopy showed no significant differences in the two groups.

Discussion

Phonetograms were computed in a group of hoarse patients treated with either Loratadine or placebo in a prospective, double-blind, randomized study. In both groups an
Fig. 2. Average phonetograms in group A (active ingredients) in female patients. (n = 14).
Fig. 3. Average phonograms in group B (placebo) in female patients (n = 14).
Fig. 4. Computed comparison of results of area and maximal dynamic range measurements in the phonetograms (28 patients with all information).

effect was shown during the observation time on the phonetogram areas corresponding to better subjective scores, but without significant difference between the two groups.

No significant change in fundamental frequency in patients with benign voice disorders, except for Reinke edema, was found by Baken [12]. Our observation time may be too short, but in studies on antihistamine effect in asthma a 10-week duration of treatment was used, which, however, gave no significant effect on the pulmonary function.

Peak flow and phonation time and a semiquantitative evaluation of glottography and stroboscopy were carried out in another study with measurements before and after microsurgery on the vocal cord, but no significant changes were found [8]. In earlier studies with hoarse children a comparison was made with the normal population and not to the same patient before and after treatment and a significant difference for the highest tone and intensity range at 262 Hz was found in the phonetogram.

Future designs for studies should probably focus on polyinstrumentation and even poly-medication [16] for possible cumulation of results. Instrumentation for combined airflow and synchronous stroboscopy/electroglottography [18] is under development in our laboratory. At least in trained singers the difference between the closing phases will prob-
ably be measurable [19]. In the earlier material from 1980 [9] a follow-up study was carried out which also refines the evaluation.

As for polymedication [21], Loratadine has been combined with ephedrine in recent studies [16]. Maybe the effect of H1 receptor blocking agents should be optimized by adding H2 receptor blockers also in the larynx [20]. Of course platelet-activating factors and other activators in tissue are not limited by antihistamines. But still it seems reasonable to focus on the basophils also in chronic laryngitis, which serve the complex function of the upper airway with cylindrical and platelet epithelium.

The effect in groups A and B was significantly related to other medication (p < 0.01). The antibiotic treatment could be the reason, and the effect equal to the effect on exacerbations of chronic bronchitis [22].

Positive allergic histories are difficult to objectify for voice results. Our new instrumentation for computed phonetography combined with stroboscopy makes research on allergic phenomena much easier, and our study underlines the need suggested by IFOS for voice area measurement as a basic equipment for voice diagnosis [1]. In the future, studies on the changes of phonograms in patients with hoarseness combined with allergic rhinitis might result in further basic understanding of histamine factors related to voice disorders.

Phonetogramme von erwachsenen Patienten mit gutartigen Stimmerkrankungen vor und nach Behandlung mit einem nicht sedierenden Antihistaminikum (Loratadin)


Phonetogrammes informatisés, enregistrés avant et après traitement par un antihistaminique non sédatif (Loratadin) chez des patients adultes atteints de troubles bénins de la voix

La Fédération internationale des Sociétés d’oto-rhinolaryngologie recommande d’associer la phonéto-graphie à la stroboscopie. La présente étude, menée à la suite d’études cliniques, a porté sur 30 patients affligés d’un enrroulement bénin persistant (plus d’un mois); elle est centrée sur l’exploitation de phonogrammes informatisés, enregistrés avant et après traitement par un nouvel antihistaminique, Loratadin. Il s’agit d’une étude clinique randomisée en double aveugle (Loratadin/placebo). Les deux groupes ont reçu conjointement de la vitamine A, une anesthésique topique et de l’erythromycine. Aucune différence significative n’a été constatée entre les deux groupes, mais le traitement médical associé a significativement amélioré la surface du phonogramme, ce qui confirme l’effet bien connu des antibiotiques sur les exacerbations de la bronchite chronique.

Acknowledgement

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References


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