Phonation and Electric Activity in Adductor Dystonia

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Resumo

The latency between the initiation of thyroarytenoid (TA) electrical activity and the onset of phonation generally is increased in patients with adductor laryngeal dystonia. Objective: to compare the severity of dysphonia with the latency between electrophysiological activation of the thyroarytenoid muscle (TA) and the onset of phonation in patients with adductor laryngeal dystonia. Method: 21 patients with adductor dystonia and 15 control patients underwent laryngeal electromyography of the left TA muscle. Three speech-pathologists arrived at a consensus to rate the perceptual evaluation of voice quality. Results: Patients with dystonia presented a significantly higher latency time (569.57 ms) in comparison with controls (202.93 ms). The average latency measured for patients with mild dysphonia was 332 ms, for moderate dysphonia was 426 ms and for the severe dysphonia was 792 ms. Conclusion: latency was significantly and directly related to the degree of severity of dysphonia.

Introduction

Patients with laryngeal dystonia have usually normal electromyography (EMG). Poor coordination between agonist and antagonist muscles or inappropriate activation may be found. One EMG parameter of evaluation is the measurement of the time interval between the registered electrical activity and phonation which normally is around 200 ms. Dysphonia has higher than normal values, usually above 500ms, and may reach even 1 second. In our clinical evaluations and electromyography we observed that the more severe the laryngeal dystonia the bigger the interval between electrical activation and phonation.

Purpose: to compare the degree of severity of dysphonia in patients with adductor laryngeal dystonia with the latency between the electrophysiological activation of the TA muscle and the onset of phonation.

Method

Thirty six participants were submitted to laryngeal electromyography (LEMG). 21 of the participants were diagnosed with adductor laryngeal dystonia and 15 were normal adults, who comprised the control group. The left Thyroarytenoid muscle was studied. The LEMG was done percutaneously using a concentric needle, and the sound was captured by a microphone located 5cm from the mouth (fig 1). The needle was introduced by the cricothyroid membrane, 0.5cm from sagittal median line in a superior and lateral angle of approximated 30 to 45 degree until electrical activity was reached (fig 2). The next step was to put off the EMG volume to prevent the capture of any sound of electrical activation from the microphone located next to patient’s mouth. The waves generated by the emission of vowel /i/ were saved in the computer hard disk. The latency time was measured from the rise of amplitude of electrical potentials to the beginning of phonation (fig 3). Dysphonia severity was evaluated by perceptual analysis consensus of three speech-language-pathologists/voice specialists. They evaluated the production of five tasks: 1) sustained vowel /e/ at a normal pitch and loudness; 2) sustained vowel /i/ in ascending and descending glissando; 3) sustained vowel /i/ at high pitch; 4) phrases containing voiced and voiceless phonemes spoken in usual loudness; 5) phrases spoken in whispered and loud speech. They classified the degree of dysphonia severity in the following scale: 0 – no alteration perceived; 1 – mild degree; 2 – moderate degree; 3 – severe degree. The Mann-Whitney test was used to compare the latency between groups and the Spearman’s Analysis to verify the correlation between the degree of dysphonia severity and the latency time set (p<0.05).

Results

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<tr>
<th>Dysphonia severity degree and latency time (ms) between TA electrical activation and phononon onset.</th>
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<tbody>
<tr>
<td>Degree of dysphonia</td>
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<tr>
<td>---------------------</td>
</tr>
<tr>
<td>No alteration</td>
</tr>
<tr>
<td>Mild</td>
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<td>Moderate</td>
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<td>Severe</td>
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Spearman’s correlation p < 0.01 *

Conclusions

Latency time is significantly correlated to dysphonia severity. The biggest the latency time, the highest the dysphonia severity.

Bibliography


Watson BC; Schaefer SD; Freeman FJ; Dembowski J; Kondraske G; Roark R. Laryngeal electromyographic activity in adductor and abductor spasmodic dysphonia. Ann Otol Rhinol Laryngol 2001; 110:461-466.

