Efficacy of Adductor Spasmodic Dysphonia Botulinum Toxin Injections Delivered During a Valsalva

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Introduction

Botulinum toxin is recommended as a primary therapy for spasmodic dysphonia (American Academy of Otolaryngology-Head and Neck Surgery, 2014). A commonly employed method for injection of botulinum toxin was first described by Blitzer and colleagues and involves transcutaneous injection of the material into the vocal cords with the assistance of electromyography (EMG) for localization of the vocalis muscle (Blitzer & Brin, 1992; Blitzer, Brin, Fahn, & Lovelace, 1988). Despite use of topical/local anesthetic with this method, coughing, swallowing, and other laryngeal movements can interfere with the accuracy and resultant effectiveness of botulinum toxin injections for adductor spasmodic dysphonia. We have found that breath hold (Valsalva) during delivery of Botox therapy in patients with highly sensitive larynges can prevent coughing, swallowing, and other laryngeal motions. The goal of this study was to describe this method and compare outcomes with those patients instructed to phonate after needle insertion (the conventional technique).

Methodology

Design

- Retrospective chart review
- August 2013 – September 2014
- Voice-Related Quality of Life (V-RQOL) survey scores just prior to treatment and at peak effectiveness (approximately 1-month post treatment)

Participants

- Adductor spasmodic dysphonia only
- Valsalva technique: N = 17 patients
- Conventional technique: N = 19 patients

Botulinum Toxin Injections

- All injections performed transcutaneously by a single laryngologist (S.H.) and with the assistance of EMG localization by the same neurologist
- Valsalva group was asked to perform Valsalva maneuver by holding their breath to prevent glottic motion (e.g. swallowing and coughing) during localization of the muscle and during injection

Table 1. Patient demographic information.

<table>
<thead>
<tr>
<th></th>
<th>Valsalva group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>Age (SD; Range)</td>
<td>62.3 years (11.6; 41.7-83.6)</td>
<td>63.1 years (9.4; 45.4-80.3)</td>
</tr>
<tr>
<td>Gender</td>
<td>13 female, 4 male</td>
<td>12 female, 7 male</td>
</tr>
<tr>
<td>Essential Tremor</td>
<td>3 patients</td>
<td>2 patients</td>
</tr>
</tbody>
</table>

Methodology Continued

Voice Related Quality of Life (V-RQOL)

1. I have trouble speaking loudly and being heard in noisy situations
2. I run out of air and take frequent breaths when talking
3. I didn’t know what would come out when I began speaking
4. I am anxious and frustrated
5. I get depressed
6. I have trouble using the telephone
7. I have trouble doing my job or practicing my profession
8. I avoid going out socially
9. I have to repeat myself to be understood
10. I have become less outgoing

Average Rating

(none/not a problem) 1 . . . 2 . . . 3 . . . 4 . . . 5 (most severe)

Table 2. Average V-RQOL ratings at the current state and at peak effectiveness. Note: Question 7 has been omitted due to several respondents indicating that this question was not applicable.

<table>
<thead>
<tr>
<th>Question</th>
<th>Valsalva group (current)</th>
<th>Control group (current)</th>
<th>Valsalva group (peak)</th>
<th>Control group (peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.62</td>
<td>3.74</td>
<td>2.54</td>
<td>2.16</td>
</tr>
<tr>
<td>2</td>
<td>2.31</td>
<td>2.42</td>
<td>1.85</td>
<td>1.68</td>
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<tr>
<td>3</td>
<td>2.85</td>
<td>2.68</td>
<td>2.00</td>
<td>1.84</td>
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<tr>
<td>4</td>
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<td>2.68</td>
<td>1.69</td>
<td>1.84</td>
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<td>5</td>
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<td>1.95</td>
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<td>6</td>
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<td>3.47</td>
<td>1.92</td>
<td>1.95</td>
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<td>8</td>
<td>2.39</td>
<td>2.37</td>
<td>1.62</td>
<td>1.63</td>
</tr>
<tr>
<td>9</td>
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<td>3.37</td>
<td>2.08</td>
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<tr>
<td>10</td>
<td>2.46</td>
<td>2.79</td>
<td>1.62</td>
<td>1.79</td>
</tr>
</tbody>
</table>

Results

- All patients reported significant improvement in V-RQOL at peak effectiveness (approximately 1 month post-treatment) regardless of technique (p = 0.000).
- Overall, there were no significant effects of technique, age, gender, or history of essential tremor on voice outcomes for patients receiving Botox therapy.

Table 2. Average V-RQOL ratings at the current state and at peak effectiveness. Note: Question 7 has been omitted due to several respondents indicating that this question was not applicable.

Discussion

• The results suggest that, in general, Botox injections significantly improve the voice-related quality of life for patients with spasmodic dysphonia at peak effectiveness. However, there was no significant difference in voice-related quality of life when using the modified technique with gentle Valsalva maneuver versus the conventional technique.
• Our findings are consistent with other studies indicating that botulinum toxin injection is effective in temporarily improving voice quality in patients with adductor spasmodic dysphonia.
• Study limitations include having a small sample size, a short period of evaluation, and a limited evaluation of factors that might influence voice-related quality of life (age, gender, and diagnosis of essential tremor).
• Futures studies involving a larger sample size, a longer period of evaluation, a more comprehensive evaluation of factors that might influence voice outcomes (e.g. duration of disease, Botox dose administered), and additional assessments of voice quality and ease of use of this modified technique are needed to strengthen the results of this study.

Conclusion

As the Valsalva technique helps stabilize the larynx and provides outcomes comparable to that of the conventional technique, the Valsalva approach should be considered for patients prone to laryngeal motion (swallowing/coughing) during botulinum toxin injections for adductor spasmodic dysphonia.

References