Superomedial Submucosal Partial Arytenoidectomy for Improved Posterior Glottic Closure

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Introduction

- Endoscopic arytenoidectomy was first described by Ossoff et al in 1983 for improvement in glottal airway without the need for an external approach.
- Modifications of this technique to a partial arytenoidectomy have since been proposed with the goal still focused on airway improvement, but allowing for better preservation of vocal function.
- We propose that a superomedial arytenoidectomy may be performed in some cases to improve voice as a primary goal, and specifically to close a posterior glottic gap seen in some patients with unilateral vocal fold paralysis.
- Patients with a unilateral vocal fold paralysis often present with an anteromedially prolapsed arytenoid on the paralyzed side. It has been shown that adding arytenoid repositioning to traditional type 1 thyroplasty can provide an additional vocal improvement by providing better posterior glottic closure. Thus we hypothesized that removing the cuneiform, corniculate, and superomedial portion of the arytenoid could achieve the same goal during endoscopic anterior vocal fold injection.
- In 2001, Hans Mehieu presented this concept at the 5th Annual Laryngeal Framework Surgery Course in Amsterdam, Netherlands. The senior author (NEM) was present at the course and began implementing and refining the technique for improvement in voice. He presented his experience in 2008 at the 37th Annual Voice Foundation Symposium, but it has yet to be reported in the literature.
- We present our modified submucosal technique and a case example illustrating its usefulness in posterior glottic closure.

SURGICAL TECHNIQUE

Under general anesthesia, an Abrams modified Dodo laryngoscope was used to expose the larynx (Figure 2a). Subglottic jet ventilation was used throughout the case with the jet needle placed via a side port on the laryngoscope. With the CO2 laser set at 2 watts, continuous superpulse, an “S” incision was created over the superior right arytenoid (Figure 2c). A medially based mucosal flap was then raised off the arytenoid cartilage (Figure 2d), and the cuneiform and corniculate cartilages were removed (Figure 2d). The superior and medial portions of the arytenoid cartilage were excised, taking care to preserve its lateral, anterior, and inferior portions to protect the muscular and vocal processes and their attachments (Figure 2e). The mucosal flap was repositioned intermittently to evaluate the new arytenoid complex and confirm that enough cartilage had been removed. Finally, the flap was replaced and secured in place with fibrin sealant (Figure 2f). Next, a total of 0.5 cc of Cymetra® was injected just anterior and lateral to the right vocal process. The patient awakened without difficulty, and there were no complications.

Table 1: CAPE-V, Cinnabar Auditory-Perceptual Evaluation of Voice

<table>
<thead>
<tr>
<th>CAPE-V Score</th>
<th>Pre-Operative</th>
<th>1 Month Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Severity</td>
<td>95/100 – Severe</td>
<td>60/100 – Mild</td>
</tr>
<tr>
<td>Roughness</td>
<td>20/100 – Moderate</td>
<td>6/100 – Mild</td>
</tr>
<tr>
<td>Breathiness</td>
<td>100/100 – Severe (connected speech)</td>
<td>80/100 – Normal</td>
</tr>
<tr>
<td>Strain</td>
<td>15/100 – Mild</td>
<td>30/100 – Mild to Mod (Intermittent)</td>
</tr>
<tr>
<td>Pitch</td>
<td>62/100 – Mild (sustained phonation)</td>
<td>Normal</td>
</tr>
<tr>
<td>Loudness</td>
<td>70/100 soft – Severe</td>
<td>Normal</td>
</tr>
</tbody>
</table>

Table 2: Patient VRQOL and VHI-10

- Voice-related quality of life (VRQOL) and voice handicap index (VHI-10) was obtained for preoperative and postoperative comparison.

Conclusions

- Partial arytenoidectomy has been used to decrease airway obstruction in patients with bilateral true vocal fold paralysis.
- Our case suggests that a SSPA can improve posterior glottic closure and voice as well as airway.
- Paired with anterior vocal fold medialization, this procedure can contribute to the reduction of overall dysphonia in select patients with unilateral vocal fold paralysis and malpositioned arytenoid cartilages.

References