Type I Thyroplasty After Arytenoidectomy and Posterior Cordectomy

William Valentino, MD1, Hassan Paknezhad, MD1, and Robert T. Sataloff, MD, DMA, FACS1

Bilateral vocal fold immobility (BVFI) can be caused by bilateral recurrent laryngeal nerve damage, cricoarytenoid joint fixation, or posterior glottic stenosis, and other less common etiologies. Patients normally present with airway obstruction symptoms including stridor, dyspnea, dysphagia, and/or voice changes. It is often treated surgically. Arytenoidectomy has been performed most commonly for BVFI and is often combined with posterior cordotomy.1,2 The procedure requires compromise between airway patency and voice quality. When excellent airway patency is admired, patients may experience breathy and soft voice. To our knowledge, no studies have been published on attempts to improve dysphonia following arytenoidectomy/cordectomy (Ar/C). Two patients illustrate our experience with thyroplasty after these airway procedures.

Case 1

A 60-year-old male had undergone right arytenoidectomy and posterior cordectomy 4 years prior to his current presentation secondary to bilateral arytenoid fixation. He was decannulated and breathing well, but he was bothered by persistent difficulty projecting his voice in noisy places since Ar/C. Voice Handicap Index (VHI) was scored as 23. Strobovideolaryngoscopy revealed absence of right arytenoid, incomplete glottic closure with a posterior gap and soft musculomembranous vocal fold closure, and stable airway (Figure 1A). Voice therapy for 3 months had helped (VHI reduced to 17), but he still wanted a stronger voice. A computed tomography scan of the larynx showed no airway obstruction. Right type I thyroplasty was performed under local anesthesia with light sedation. Both voice and rapid breathing were tested in the operating room. At the 3-month postoperative visit, the patient was happy with his voice, and the VHI had decreased to 13. He denied dyspnea. Strobovideolaryngoscopy revealed improved glottic closure without any airway obstruction (Figure 1B).

Case 2

A 60-year-old female had undergone left partial arytenoidectomy and posterior cordectomy secondary to bilateral arytenoid fixation. She had difficulty with low voice volume without dyspnea and VHI was 25. She had undergone left type 1 thyroplasty 2 years after the arytenoidectomy. During her 3-month postoperative visit, patient reported voice improvement, but her VHI was 29. Stroboscopy revealed improved glottic closure with post gap.

Figure 1. A, Premedialization thyroplasty strobovideolaryngoscopy revealed absence of right arytenoid, incomplete glottic closure with post gap and soft anterior closure, vocal fold height mismatch, and anterior commissure web. B, Postmedialization thyroplasty strobovideolaryngoscopy revealed preoperative findings and improved glottic closure with post gap.

Received: April 18, 2019; accepted: April 23, 2019

Corresponding Author:
Robert T. Sataloff, MD, DMA, FACS, Department of Otolaryngology - Head and Neck Surgery, Drexel University College of Medicine, 219N. Broad Street, 10th Floor, Philadelphia, PA 19107, USA.
Email: rtsataloff@phillyent.com
glottic closure. After 1 year, she again reported a decrease in voice volume, VHI was scored at 30. Stroboscopy revealed incomplete glottic closure (Figure 2A). Therefore, revision left type I thyroplasty procedure was performed. During the 3-month postoperative visit, her voice was stronger and VHI was scored at 25, and stroboscopy revealed improved glottic closure with a minimal posterior gap (Figure 2B). At her most recent office visit, 48 months following the surgery, the patient believed that her voice projection was stable and improved compared to her status prior to her first thyroplasty.

External arytenoidectomy was introduced initially by Woodman in 1946 and Thornell described an endoscopic technique in 1949. Arytenoidectomy continues to be the most reliable technique for reestablishing adequate airway patency in patients with BVFI. This procedure may be partial or total, and it is often combined with posterior cordectomy in order to increase the size of the posterior glottis. The increased improvement of airway patency may be at the expense of voice quality and associated with increased risk of aspiration! However, objective analysis performed by Yilmaz et al in 2013, demonstrated no significant change in pre- versus postmedial arytenoidectomy and posterior cordectomy VHI or acoustic and aerodynamic measures.

Both patients in our study had difficulty projecting their voice and denied dyspnea, dysphagia, and aspiration. The patients had undergone arytenoidectomy and posterior cordectomy more than 2 years prior to reevaluation for their voice problems. Strobosvideolaryngoscopy revealed a sufficient airway posteriorly and soft glottic closure anteriorly. The risks, benefits, and complications of type I thyroplasty procedures were discussed, and the patients understood that because they had minimal airway reserve, medialization of vocal fold should be performed conservatively. The procedures were performed under local anesthesia, and Gore-Tex was implanted on the same side as the past Ar/C; therefore, we were able to evaluate voice and breathing simultaneously and adjust medialization. At the 3 month postoperative visits, the patients believed their voice to be improved which was mirrored by a 5-point reduction in their VHI, improved glottic closure and improved vibratory function. Conservative type I thyroplasty is a safe treatment option for patients who have undergone arytenoidectomy with or without posterior cordectomy and seek stronger voice.

**Declaration of Conflicting Interests**
The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Funding**
The author(s) received no financial support for the research, authorship, and/or publication of this article.

**ORCID iD**
William Valentino https://orcid.org/0000-0002-9540-626X

**References**
1. Sataloff RT. Voice surgery. In: Sataloff, ed. *Professional Voice: The Science and Art of Clinical Care*. 4th ed. San Diego, CA: Plural Publishing; 2017:1461-1462.
2. Hillal AD, Benninger M, Blitzer A., et al. Evaluation and management of bilateral vocal cord immobility. *Otolaryngol Head Neck Surg*. 1999;121(6):760-765.
3. Woodman DG. A modification of the extralaryngeal approach to arytenoidectomy for bilateral abductor paralysis. *Arch Otolaryngol*. 1946;43(1):63-65.
4. Thornell WC. A new intralaryngeal approach in arytenoidectomy in bilateral abductor paralysis of the vocal cords: report of three cases. *Arch Otolaryngol*. 1949;50(5):634-639.
5. Yilmaz T, Süslü N, Atay G, Özser S, Günaydın RÖ, Bajin MD. Comparison of voice and swallowing parameters after endoscopic total and partial arytenoidectomy for bilateral abductor vocal fold paralysis. *JAMA Otolaryngol Head Neck Surg*. 2013;139(7):712.