Pseudomonas Aeruginosa Chondritis of Laryngeal Cartilage with Recurrent Airway Obstruction

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INTRODUCTION

Laryngeal granulomas are commonly seen with laryngopharyngeal reflux and vocal abuse. These are often localized to the vocal process and treated with speech therapy and antireflux therapies resulting in good response.[1] Surgical intervention is reserved when conventional therapy fails or rarely airway obstruction results.[2]

While reflux-related laryngeal granulomas are most common, laryngeal inflammation with granulomatous changes can also be associated with a variety of autoimmune systemic diseases. For example, Wegner’s granulomatosis characteristically causes infraglottic and subglottic inflammatory change that evolves into subglottic stenosis and airway obstruction. [3] Relapsing polychondritis (RP) can also be a rare cause of episodic inflammation of the larynx, with some patients developing subglottic and tracheobronchial airway involvement. [4,5] Sarcoïdosis, a chronic granulomatous disease, rarely affects the larynx, but can cause thickening and induration of the subglottic trachea from noncaseating granulomas. [6,7] Pemphigus is an autoimmune condition causing loosening of the epidermal-dermal junction. This causes sloughing of the epidermis and the resulting inflammatory response can lead to supraglottic narrowing. [8]

In addition to reflux and autoimmune diseases, there are multiple infectious diseases that can cause laryngeal inflammation with airway obstruction. Acute bacterial infections, by varying strains of *Haemophilus influenzae* B, or sometimes *Klebsiella rhinoscleromatis* can cause life threatening obstructive supraglottitis, requiring emergent intervention. [9,10] Chronic infectious etiologies include tuberculosis which can cause a nodular exophytic, and sometimes ulcerative lesion, most commonly on the posterior glottis. It is rare to see true obstruction from this, but often laryngeal tuberculosis can be mistaken for squamous cell carcinoma. [10,11] Fungal infections including blastomycosis, histoplasmosis, cryptococcosis, coccidioidomycosis, and candidiasis, can affect the larynx and on rare occasions cause airway obstruction.

To our knowledge, there are no reports in the literature on spontaneous-onset Pseudomonas aeruginosa laryngitis leading to recurrent laryngeal granulomas resulting in airway obstruction. We herein present a rare condition where chronic chondritis is caused by this bacterium.

Case Report

An otherwise healthy 51 year old woman presented to laryngology clinic with history of progressive, recurring dysphonia and airway obstruction to the point that she required tracheotomy at an outside institution. The obstruction was reportedly due to recurring granulomas within her anterior subglottis, which had been resected endoscopically on three separate occasions over a five month period. Removal of the granulomas was followed by virtually an immediate recurrence causing dysphonia and airway obstruction. Upon presentation she was found to have a pedicled anterior subglottic mass lesion in conjunction with right hemilaryngeal fullness, which was concerning for a deeper mass lesion. (Figure 1) A CT scan and follow-up MRI imaging (Figure 2,3,4) demonstrated a mass with its epicenter at the right laryngeal cartilage with some extension into the strap muscles. Fine-needle aspiration was unsuccessful in obtaining tissue from this lesion and she underwent microscopic direct laryngoscopy with biopsy. Operative findings showed extremely thick and calcified right laryngeal cartilage concerning for cartilaginous tumor with extensive reactive tissue surrounding the cartilaginous mass lesion extending to her right hemilaryngeal cartilage. The biopsy and culture results were consistent with a chronic pseudomonas infection of the right hemilarynx with pathology suggesting osteochondritis with areas of necrosis.

Figure 1. (Right) Initial presentation Stroboscopy

Figure 2. Initial stroboscopy showing right obstructing glottic mass.

Figure 3. Initial MRI T1 image showing right sided mass.

Figure 4. Initial MRI T2 image of right laryngeal mass.

Figure 5. Post-operative CT scan showing removed mass and postoperative right larynx.

Figure 6. Post-operative stroboscopy showing abduction/adduction

Ciprofloxacin treatment was initiated for three months which kept her from developing airway obstruction. However, the abnormal fullness of the infected right hemilaryngeal cartilage did not resolve. After consultation with her infectious disease physician, it was decided that the problem should be approached like an osteomyelitis involving a limb; adequate debridement of the poorly vascularized tissues was needed before antibiotics could completely resolve the infection. [12] A modified right hemilaryngectomy was performed, resecting infected right hemilaryngeal cartilage and lateral cricopharyngeal muscle, but sparing most of the thyroarytenoid muscle and membranous vocal fold. She was continued on prolonged oral ciprofloxacin for 12 weeks and now has been disease free for over one year, with no significant dysphonia. (Figure 5,6)

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OBJECTIVE:
Chronic inflammatory pathology such as laryngopharyngeal reflux, autoimmune disease, vocal abuse, or post-traumatic cartilage exposure has been associated with recurrent laryngeal granuloma formation. The objective of this study is to present a case of recurrent, obstructive granulomatous lesions of the larynx due to chronic Pseudomonas aeruginosa chondritis, which has not been previously described in the literature.

METHODS/RESULTS:
Case report with review of the literature.

RESULTS:
This is a case of a previously healthy 51 year old woman with no history of laryngeal trauma who presented with recurrent airway obstruction from glottic and infraglottic granulomatous lesions. At an outside institution, she had undergone tracheotomy and multiple endoscopic removal procedures, with the lesions rapidly recurring after each removal. At our institution, cultures demonstrated Pseudomonas aeruginosa and CT demonstrated a fullness of the laryngeal cartilage. She subsequently underwent resection of the infected cartilage via an external approach, and treatment with a prolonged (12 week) course of oral ciprofloxacin. She has now been decannulated and disease free for over one year.

CONCLUSION:
Pseudomonas aeruginosa chondritis is a rare but potentially treatable cause of recurrent laryngeal granuloma formation.

REFERENCES