International Journal of Otorhinolaryngology and Head and Neck Surgery
Kim CM et al. Int J Otorhinolaryngol Head Neck Surg. 2019 Jan;5(1):187-190
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937

DOI: http://dx.doi.org/10.18203/issn.2454-5929.ijohns20185311

Case Report

Management of radiation-related supraglottic stenosis with serial in-office steroid injections

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Received: 18 July 2018
Revised: 13 September 2018
Accepted: 14 September 2018

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ABSTRACT

Management of supraglottic stenosis in patients with history of head and neck radiation presents a clinical challenge for otolaryngologists. The cornerstone of treatment has historically been surgical intervention, both endoscopic and open. However, recently described techniques related to outpatient management of subglottic and tracheal stenosis with routine in-office steroid injections may provide a translatable model for supraglottic stenosis management. We describe a clinical protocol for in-office steroid injections to the laryngopharynx for patients with supraglottic stenosis secondary to radiation fibrosis. Two patient cases are reported, including endoscopic examinations over a follow-up period of 12 to 16 months. Both patients experienced significant improvement in their supraglottic airways. In-office steroid injections may be beneficial to prevent or slow stenosis recurrence in patients treated with radiation for head and neck cancer. With continued refinement of this technique, a paradigm shift may occur in the management of supraglottic stenosis.

Keywords: Supraglottic stenosis, Radiation, Head and neck cancer, Steroid injection, Dysphagia

INTRODUCTION

Management of stenosis of the supraglottic laryngopharynx presents a challenge for oto-laryngologists. The process of stenosis tends to be progressive, chronic and refractory, and can result in life-threatening airway compromise or debilitating dysphagia if unchecked. Etiologies for supraglottic stenosis include inflammatory, autoimmune, post-surgical scarring, radiation fibrosis, trauma, prolonged intubation, and caustic ingestion.[1] Symptoms range from dysphagia and dysphonia to potentially life-threatening airway compromise.

There are increasing numbers of patients treated with radiation therapy for head and neck cancer, some of whom develop supraglottic stenosis. The management of supraglottic stenosis has historically entailed surgical interventions ranging from open supraglottic laryngectomy to endoscopic interventions to release scar, combined with dilation and application of anti-cicatricial agents.[2] These surgical techniques may involve significant morbidity, including risks associated with perioperative management of inherently difficult airways. Recently, less invasive treatment techniques involving serial awake, in-office steroid injections have shown efficacy, predominantly in the treatment of subglottic and tracheal stenosis.[3,4] Based on these data, we adapted an outpatient protocol for the management of supraglottic stenosis to allow long-term airway patency. Such a technique has not been previously demonstrated in this patient population. Here, we report two cases of successful office-based management of radiation-related supraglottic laryngopharyngeal stenosis.

CASE REPORT

Patient selection

The Medical Institutional Review Board of the University of California at Los Angeles approved the study. All cases of supraglottic laryngopharyngeal stenosis treated with serial in-office steroid injections during a 16-month period at a tertiary care academic medical center by the senior surgeon (D.K.C.) were reviewed. Patients with concurrent glottic, subglottic, tracheal, or multi-level stenosis were excluded.

Clinical technique

The patient was fully awake and positioned upright on an examination chair. The patient's nasal cavity was decongested and anesthetized. A transnasal flexible videoendoscopy was performed to visualize the supraglottic stenosis.

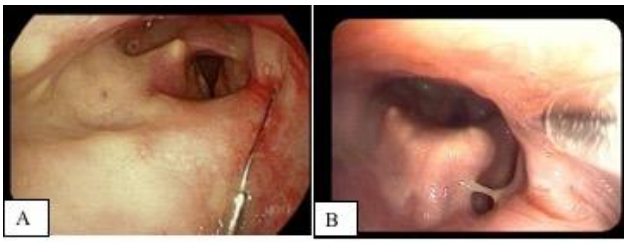

Figure 1: Endoscopic depictions of transoral in-office injection of steroid to lateral supraglottic scar band using (A) Peroral technique and (B) Endoscopy-assisted working channel technique.

Peroral or transnasal endoscopic injection techniques were used depending upon patient tolerance. Peroral injection was performed using a long spinal needle and a 1 cc Luer lock syringe. The needle was bent to conform to the shape of the oral cavity/oropharynx and was passed through the mouth to the supraglottis. Injection was performed at two to four sites of the scar under visualization with the videoendoscope. In subjects that did not tolerate peroral injection due to gagging, the injection was performed using an Interject sclerotherapy needle (Boston Scientific, Marlborough, Massachusetts) passed through the working channel of a flexible laryngoscope. One to two cubic centimeters of Kenalog-40 Injection (triamcinolone acetonide injectable suspension, 40 mg/mL, Bristol-Myers Squibb, Princeton, New Jersey) were injected submucosally to the targeted areas in the supraglottic stenosis (Figure 1). If resistance to injection was encountered due to dense scar, then the needle was repositioned slightly deep to the scar or to a different area of the scar.

Case 1

A 62-year-old male presented five months after completing chemoradiation therapy for locoregionally advanced hypopharyngeal/supraglottic squamous cell carcinoma. His disease remained in remission, however, he suffered from severe dysphagia and gastrostomy tube dependence. He initially presented with significant narrowing of the supraglottic airway and required an awake tracheostomy during his first endoscopic airway surgery. The supraglottic stenosis was treated with carbon dioxide (CO2) laser radial incisions of laryngopharyngeal stenosis with balloon dilation, application of mitomycin C (0.4mg/mL), and Kenalog-40 Injection to the scar. He was subsequently decannulated but continued to develop recurrent stenosis and required a total of eleven such endoscopic procedures over two years, approximately every two months.

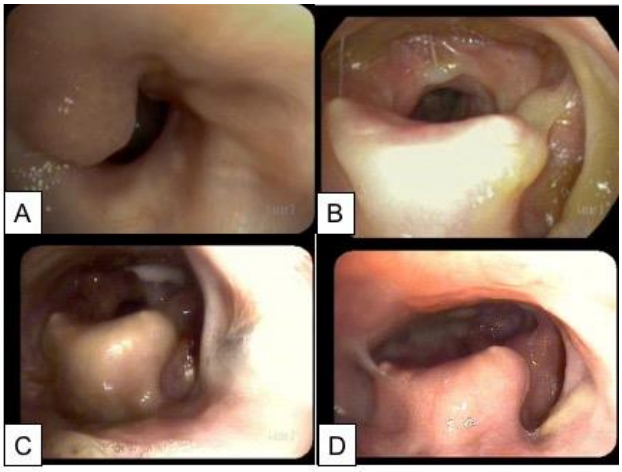

Figure 2: Serial supraglottic endoscopic examinations at baseline prior to last operative intervention and following initiation of steroid injection after surgery per protocol for Case 1. (A) Baseline; (B) two months; (C) four months; (D) twelve months.

The patient then commenced management with serial, in-office steroid injections to the supraglottic scar. He underwent three monthly injections for three months, bimonthly injections for four months, and has since continued injections every three months. Despite having required eleven endoscopic surgeries during the first two years of his disease, he has not needed operative intervention since he commenced the in-office steroid injections. At his 12-month follow-up, he maintained stable supraglottic scarring and patent airway (Figure 2). He does have concurrent dysphagia and gastrostomy tube dependence secondary to severe pharyngeal weakness

Case 2

A 59-year-old female underwent primary chemoradiation therapy for oropharyngeal squamous cell carcinoma. Her disease remained in remission, however, she suffered from laryngopharyngeal stenosis, severe dysphagia, and gastrostomy tube dependence. Her airway remained patent without need for tracheostomy. She underwent endoscopic procedures with CO2 laser radial incisions of laryngopharyngeal stenosis with balloon dilation,

application of mitomycin C (0.4mg/mL), and Kenalog-40 Injection to the scar. She required nine of these procedures in the operating room over a period of three years, approximately once every three to four months.

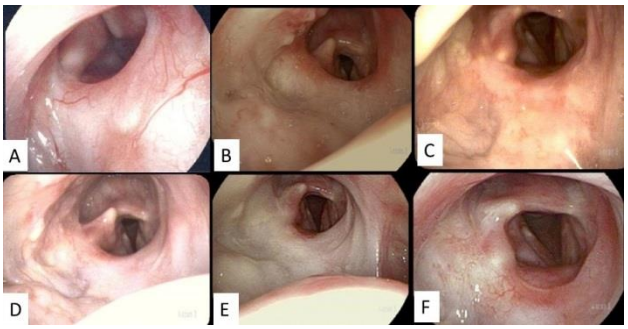

Figure 3. Serial supraglottic endoscopic examinations at baseline prior to last operative intervention and following initiation of steroid injection after surgery per protocol for Case 2. (A) Baseline; (B) two months; (C) six months; (D) eight months; (E) nine months; (F) twelve months.

The patient then commenced management with serial, in-office Kenalog-40 Injection to the supraglottic scar. Per protocol, she underwent three monthly injections for three months, bimonthly injections for four months, and has since continued maintenance injections every three months over a total period of 16 months. Of note, during her outpatient treatment course, she required one interval endoscopic surgical intervention for progressive shortness of breath. This operation occurred following her third injection, four months after initiating outpatient injections. Following surgery, she resumed the outpatient injection protocol where she had left off. At 12 months follow-up since her last operation, she has maintained excellent control of supraglottic scarring, patent airway, and stable dysphagia with gastrostomy tube dependence (Figure 3).

DISCUSSION

In this case report, we present the feasibility of managing supraglottic laryngopharyngeal stenosis secondary to radiation fibrosis with serial in-office steroid injections. In our practice, select patients are now beginning to be routinely managed with this protocol. By utilizing data from in-office steroid injections in the treatment of subglottic and tracheal stenosis, we were able to establish a similar protocol for management of supraglottic stenosis to allow long-term airway patency.[3,4] Although promising outcomes with a similar protocol have been previously reported for a single patient with idiopathic supraglottic stenosis, our publication is the first to report on its efficacy in patients with radiation-induced supraglottic stenosis, who tend to have more mature fibrotic scars.[5]

The protocol consists of injecting patients monthly for the first three months, bimonthly for the next four months, and then once every three months thereafter. In Case 1, the serial injections have seemed to obviate the need for any further operative interventions 12 months after starting the injection protocol; previously, this same patient underwent 11 dilation surgeries over a two-year period. In Case 2, a patient who previously required dilation surgeries every three to four months required operating room intervention only once over a 16-month period since commencement of the injections, the last 12 months of which she has not needed any operative intervention. It remains unclear which patients best respond to steroid injections, but our initial data show promise in at least significantly reducing or obviating the need for frequent visits to the operating room.

Our sample size of two cases is small but radiation-related supraglottic stenosis is overall a very rare condition and the treatment effects of serial steroid injections were clinically dramatic in both patients and thus not by chance. Larger cohort studies and randomized controlled studies comparing surgical versus in-office treatment would be helpful to further delineate the benefits of this management strategy. Although the described technique is far from curative for supraglottic laryngopharyngeal stenosis, it does seem to offer promising initial results. Routine follow-up will be critical, given that restenosis is expected to occur in this patient population. However, with serial in-office steroid treatments for maintenance, it appears that surgical intervention can be delayed for longer intervals or avoided altogether.

Management of supraglottic laryngopharyngeal stenosis is challenging and there is associated morbidity with each endoscopic procedure. Given the increasing numbers of patients treated with radiation therapy for head and neck cancer- which now comprise a significant portion of the population treated by otolaryngologists — the preliminary data clearly demonstrate that in-office steroid injections have a beneficial effect to prevent or slow stenosis recurrence. With continued investigation, refinement, and demonstration of this technique in larger and broader patient cohorts, a paradigm shift may occur in the management of supraglottic stenosis.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Kim CM, Patel PB, Feinstein AJ, Chhetri DK. Management of radiation-related supraglottic stenosis with serial in-office steroid injections. Int J Otorhinolaryngol Head Neck Surg 2019;5:187-90.