

Endoscopic Management of Supraglottic Laryngopharyngeal Stenosis

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Stenosis of the supraglottic larynx and pharynx is an uncommon and difficult condition to treat. The most common etiologies include iatrogenic injury from oropharyngeal and supraglottic surgery, radiation therapy, prolonged intubation, trauma, caustic ingestion, and inflammatory diseases.¹ Presenting symptoms are a function of stenosis severity and can range from dysphagia and dysphonia to potentially life-threatening airway obstruction.

The optimal treatment of supraglottic laryngopharyngeal stenosis remains unclear. Historically, supraglottic stenosis was treated with open supraglottic laryngectomy. However, this was accompanied by high morbidity related to chronic aspiration and poor wound healing.² More conservative techniques with reduced morbidity have recently gained favor, especially for subglottic and tracheal stenosis.^{3,4} We have adapted these endoscopic techniques to manage supraglottic laryngopharyngeal stenosis to provide long-term airway patency. In this report, we present our management of a series of patients using scar-releasing CO₂ laser incisions of the lateral supraglottic laryngopharynx, combined with controlled radial balloon dilation and mitomycin C application as adjunctive treatment.

Materials and Methods

Patients

This study was approved by the Medical Institutional Review Board of the University of California at Los Angeles and is Health Insurance Portability and Accountability Act compliant. All cases of supraglottic laryngopharyngeal stenosis treated during a 4-year period at a tertiary academic medical center by the senior surgeon (D.K.C.) were reviewed. Cases with concurrent glottic, subglottic, or interarytenoid involvement were excluded. Clinical outcomes and endoscopic findings of the airway were reviewed.

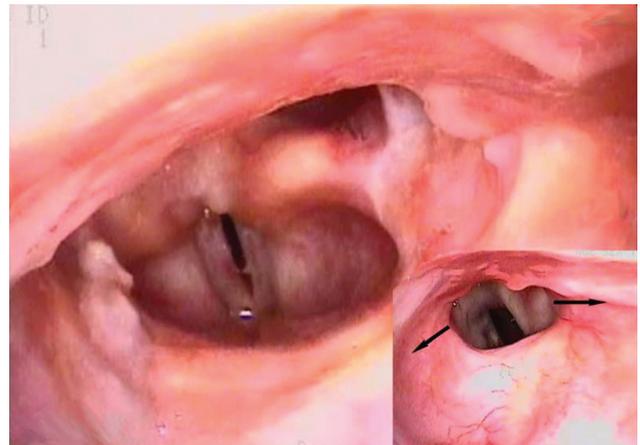


Figure 1. Case 1. Supraglottic laryngopharyngeal stenosis before (inset) and after CO₂ laser incisions of the lateral laryngopharynx, balloon dilation, and topical mitomycin C application. Arrows point to the direction of scar-releasing laser incisions.

Surgical Technique

The patient is intubated fiber-optically using a flexible bronchoscope, or an endotracheal tube is placed through a preexisting tracheostoma. Suspension laryngoscopy using a Lindholm or Dedo laryngoscope is performed, and the lateral supraglottic pharyngeal scar bands are placed under tension. Deep incisions of the lateral laryngopharyngeal scar bands are made bilaterally using the CO₂ laser (**Figures 1 and 2**). Repeated dilations using a controlled radial expansion (CRE) balloon dilator (Boston Scientific Corporation, Natick, Massachusetts) and deepening of the laser incisions serially enlarge the airway. Typically, 2 to 3 dilations

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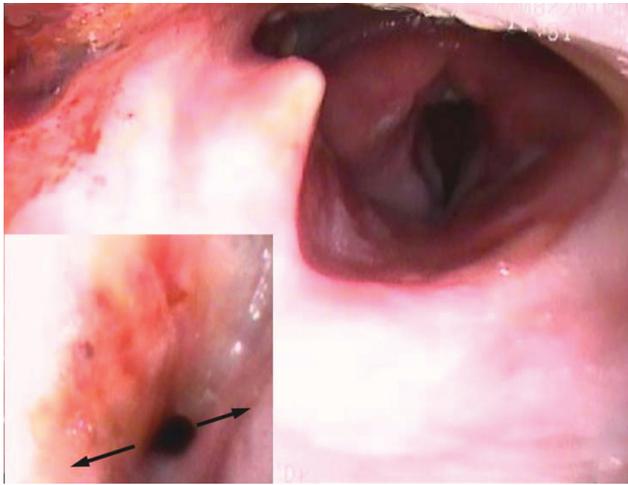


Figure 2. Case 2. Supraglottic laryngopharyngeal stenosis before (inset) and after CO₂ laser incisions of the lateral laryngopharynx, balloon dilation, and topical mitomycin C application. Arrows point to the direction of scar-releasing laser incisions.

using the 20-mm balloon are needed, and the laryngoscope can also be used to exert anterior force and stretch the scar at the laser incision sites. Topical mitomycin C is applied (0.4 mg/mL) using cotton pledgets for at least 4 minutes.

Results

Four patients meeting the aforementioned criteria were identified upon retrospective review.

Case 1

A 50-year-old woman presented 2 years after chemoradiation therapy for base-of-tongue cancer. She was G-tube and tracheostomy dependent. She initially underwent office-based CRE balloon dilations, but recurrent stenosis required dilation every 6 to 8 weeks. She then underwent lateral pharyngeal CO₂ laser releasing incisions, balloon dilation, and mitomycin C application (**Figure 1**). She was subsequently decannulated. She did require repeat endoscopic intervention 12 months later for recurrent stenosis. However, this was performed without a tracheostomy. Currently, the airway remains stable at 12-month follow-up after her second endoscopic intervention.

Case 2

A 58-year-old man developed supraglottic stenosis after radiation therapy and was G-tube and tracheostomy dependent. Initial management included CO₂ laser releasing incisions, balloon dilation, and mitomycin C application (**Figure 2**). He was subsequently decannulated but developed moderate restenosis after 1 year. Repeat procedure was performed without a tracheostomy. At his 22-month follow-up visit, his airway remains stable.

Case 3

A 60-year-old woman with sarcoidosis developed supraglottic laryngopharyngeal stenosis requiring tracheostomy. She

underwent the aforementioned endoscopic surgical intervention allowing for decannulation. At 12 months postoperatively, she developed mild restenosis and underwent repeat procedure without a tracheostomy. Her airway is stable at 18 months after the last intervention.

Case 4

A 66-year-old tracheostomy-dependent woman with idiopathic supraglottic laryngopharyngeal stenosis underwent the aforementioned endoscopic intervention. She was decannulated postoperatively but was lost to follow-up for 2 years when she re-presented from having just undergone a tracheostomy for recurrent stenosis. She subsequently underwent endoscopic reoperation and was decannulated. At her last follow-up visit 10 months after decannulation, her airway remains patent.

Discussion

The combination of CO₂ laser radial incisions and dilation is a well-established technique for treatment of subglottic and tracheal stenosis.^{3,4} In this report, we describe the successful adaptation of this technique to supraglottic laryngopharyngeal stenosis. As illustrated by our first case, balloon dilations alone offered only a short-term benefit, and repeat dilations were required every 6 to 8 weeks. The addition of releasing incisions of the lateral laryngopharyngeal scar bands greatly increased the efficacy of our balloon dilations. Although recurrences do occur, the frequency between procedures is significantly reduced using the combination procedure to 12 months or greater. In addition, application of mitomycin C to the dilated region likely also extends the time to restenosis by inhibiting scar formation.⁵ Regular follow-up is essential because restenosis is expected over the long term, but repeat endoscopic intervention can be readily performed as an outpatient procedure without a tracheostomy.

Author Contributions

Darshni Vira, acquisition of data, drafting the article, final approval of the version to be published; **Adam DeConde**, drafting the article, final approval of the version to be published; **Dinesh K. Chhetri**, conception and design, revising the article, final approval of the version to be published.

Disclosures

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