The Laryngoscope

How I Do It

Overcoming Nasal Discomfort—A Novel Method for Office-Based Laser Surgery

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Objectives: The passage of a flexible channeled laryngoscope for office-based laser laryngeal surgery can be limited by narrow nasal passages, nasal discomfort, or both. We describe a novel method for delivering the laser fiber transorally with simultaneous laryngeal visualization to avoid these limitations. This technique can be employed with instruments available in most otolaryngologists' offices.

Methods: A retrospective chart review was performed and procedural details were recorded.

Results: Technical description: A laser fiber was threaded through the shaft of an Abraham cannula. A patient was seated in an otolaryngology examination chair and instructed to hold and stabilize his own tongue. Using his nondominant hand, the surgeon placed a rigid angled telescope into the patient's oral cavity for laryngeal visualization. Using his dominant hand, the surgeon simultaneously introduced the laser fiber threaded through the Abraham cannula into the patients oral cavity and guided it towards the patients larynx. Energy from the PDL, KTP, or CO_2 flexible laser fibers was then delivered for management of glottic papillomatosis and leukoplakia. Treatment of glottic lesions was achieved successfully in all cases with titration endpoints identical to the transnasal approach.

Conclusions: For patients who cannot tolerate transnasal passage of a flexible channeled laryngoscope during office-based laser laryngeal surgery, an attractive alternative to surgery under general anesthesia is the transoral technique. This approach does not rely on distal chip endoscopes and can be performed with existing equipment in an office setting.

Key Words: Laryngology, laryngeal surgery, office-based, procedures, surgery, laser laryngeal surgery, transoral laser.

***Laryngoscope,* 121:2396–2398, 2011**

INTRODUCTION

Office-based laryngeal surgery was initially performed through a transoral approach with a mirror used to visualize the larynx.[1] Over the last decade, however, channeled flexible laryngoscopes have permitted a transnasal approach for biopsies, vocal fold augmentation, and most recently, unsedated laser laryngeal surgery.[2,3] Unfortunately, some patients with nasal anatomic restrictions experience significant nasal discomfort and cannot tolerate these procedures. Additionally, many surgeons do not own flexible channeled endoscopes, which are necessary to perform such procedures. These limitations may lead physicians to perform laser laryngeal surgery in the operating room, thereby increasing costs, patient morbidity risks, and necessitating time off from work for patients and those transporting them to and from surgery. An attractive alternative in this setting is the transoral delivery of a flexible laser fiber as it bypasses the nasal cavities, is generally well tolerated, and allows for identical laser energy titration endpoints. Furthermore, it can be used with equipment that is available in many otolaryngologists' offices. This approach has been employed for use with numerous lasers and is a standard part of our office-based armamentarium.

TECHNIQUE

Unsedated transoral laser laryngeal surgery was performed for patients with either laryngeal keratosis with dysplasia or papillomatosis. All patients were male and aged between 45 and 60 years old. Procedures were performed in the otolaryngology clinic examination suite containing a powered examination chair, video tower with photodocumentation capability, and an appropriate laser. The patient was seated and instructed to inhale 3 cc of nebulized 4% lidocaine. An atomizer was then used to spray the patient's oral cavity and oropharynx with additional 4% lidocaine. The patient was asked to

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Editor's Note: This Manuscript was accepted for publication May 3, 2011.

Accepted for presentation at the 132nd Annual Meeting of the American Laryngological Association, Chicago, Illinois, April, 2011.

The authors have no financial disclosures for this article.

The authors have no conflicts of interest to disclose.

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DOI: 10.1002/lary.21911

Fig. 1. PDL fiber threaded through an Abraham cannula. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

lean his torso forward, hold his tongue with gauze, and assume a "sniffing" position. The surgeon held a rigid 70-degree angled telescope (Rigid endoscope 9106, Kay-Pentax, Lincoln Park, NJ) in his nondominant hand and placed it along the patient's lingual sulcus to visualize the larynx. Under visualization, three 1-cc aliquots of 4% lidocaine were applied to the patient's endolarynx through an Abraham cannula while the patient held a long /e/. At the end of the phonatory gesture, patients were instructed to breathe in deeply to inspire the lidocaine to complete laryngotracheal anesthesia.

All persons present were distributed protective laser eyewear. A fiber from a carbon dioxide (ENT-L-1, Omni Guide, Cambridge, MA), 532-nm KTP (Endo Stat, 10–0612, San Jose, CA), or 585-nm pulsed dye laser (Cynosure, Westford, MA) was threaded through an Abraham cannula attached to the shaft of a 5-cc syringe (Fig. 1). The Abraham cannula was placed along the patient's left lingual sulcus and the rigid endoscope was

Fig. 2. Placement of the rigid endoscope and laser fiber transorally in the unsedated patient. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

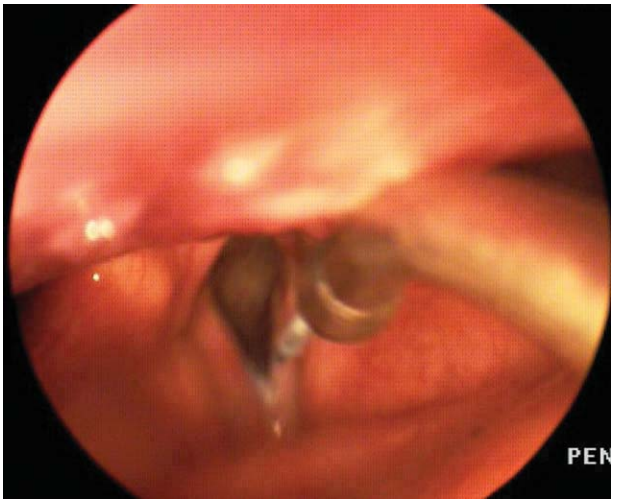

Fig. 3. Laser fiber threaded through an Abraham cannula being used transorally to treat glottic disease. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

used to visualize laser energy applied to the larynx (Figs. 2 and 3). All procedures were able to be completed to the desired endpoint.

DISCUSSION

Transnasal office-based laser laryngeal surgery was first described in 2003 using a 585-nm pulsed dye laser.[3] Since then, it has been more widely adopted using numerous other lasers.[4–7] Office-based laser laryngeal surgery offers patients benefits including avoiding morbidity of general anesthesia, allowing for decreased recovery time, preventing missed time from work, and ease of driving to and from the office without the reliance on others. Performance of laser laryngeal surgery in office saves over $5,000 per case compared to performance in the operating room.[8]

A limitation of the transnasal approach is some patient's intolerance of the channeled esophagoscope or laryngoscope. Another limitation is access to the equipment—most otolaryngologists do not have channeled endoscopes due to cost and maintenance issues, preventing them from performing laser surgeries in office. The described adaptation of an Abraham cannula overcomes both of these limitations.

The transnasal esophagoscope (TNE) is commonly used to perform office-based laser laryngeal surgery, but its large size limits its use. The outer diameter of a standard TNE (EE-1580K, Pentax) is 5.1 mm, and in a large series 17 of 611 attempted esophagoscopies were aborted because of an inability to pass the TNE through a tight nasal vault.[9] A distal-chip channeled laryngoscope (VNL-1570STK, Pentax) is slightly smaller (O.D. = 4.9 mm) but we have found some individuals intolerant of its passage as well. It was these patients' complaints that inspired the development of this approach.

Another limitation of office based laryngeal surgery is equipment. A distal chip flexible channeled endoscope, video processor, and computer are relatively expensive. Cleaning a channeled endoscope is time and labor intensive, which also limits its use. That being said, many

TABLE I.
Laser Fiber Diameters.

Laser	Fiber	Fiber Width
Carbon dioxide	ENT-L-1, Omni Guide, Cambridge, MA	1.2 mm
532-nm KTP	Endo Stat, 10–0612, San Jose, CA	0.6 mm
585-nm PDL	Cynosure, Westford, MA	0.6 mm
Thulium	Rigifib, ALLMED systems, Pleasanton, CA	0.55 mm

otolaryngologists have access to less expensive rigid angled telescopes which may be used for laser surgery. Additionally, almost every otolaryngologist owns a flexible fiberoptic laryngoscope with video capabilities. Similar to the common vocal fold injection technique of a transoral injection guided by a transnasal laryngoscope,[10] a surgeon can use a fiberoptic laryngoscope to guide transoral application of laser energy via an Abraham cannula.

The transoral approach for laryngeal procedures is not new; in fact, laryngeal surgery draws its origins from unsedated transoral intervention.[11] Ford and colleagues[12,13] described the use of lidocaine to permit mirror based transoral procedures and then modified this to use a rigid angled telescope to monitor vocal fold augmentation and botox application. Others[14] have described use of a rigid angled telescope to monitor transoral steroid injections of the larynx. We adapted this approach to perform unsedated laser laryngeal surgery in patients intolerant of channeled endoscopes.

This approach is facilitated by use of an Abraham cannula, which has a diameter of 2.0 mm. The laser fiber diameters that have been employed in this manner are listed in Table I. Patients easily tolerated this approach, and all patients are offered either the transnasal or transoral approach for office-based laser laryngeal surgery. Although laryngeal papilloma and dysplasia were treated in this manner, other diseases normally managed with in office laser, such as Reinke's edema, granulomas, and polyps are also amenable to be treated through this approach.

Fig. 4. Angling of laser fiber and endoscope for optimal delivery of laser energy to the glottis. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

Use of a channeled flexible laryngoscope does offer some theoretical advantages over this approach. It may be positioned just millimeters superior to the glottis allowing for close examination of laser energy on laryngeal tissue. The distance between a rigid telescope and glottis can be limited by the patient's oral cavity anatomy. To overcome this obstacle, one may magnify the view of the vocal fold by angling the telescope inferiorly (Fig. 4).

A channeled esophagoscope or laryngoscope also can be angled to alter the location in which laser energy is directed. A TNE has a 330 degree range of motion and a channeled laryngoscope 260 degree range of motion. Additionally, flexible endoscopes can be rotated and angled to access difficult to reach areas such as the anterior commissure and the medial edge of the vocal fold. An Abraham cannula does not have an end that articulates. That being said, neither of these limitations impeded our ability to perform procedures to the desired completion point.

CONCLUSION

The transoral approach of applying laser energy via Abraham cannula is an effective alternative for office-based laser laryngeal surgery. It is an excellent approach for patients with constricted nasal vaults, and does not require the presence of channeled endoscopes that may be expensive and difficult to clean.

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