The Laryngoscope

How I Do It

Endoscopic-Assisted Radiofrequency Lingual Tonsillectomy

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INTRODUCTION

Lingual tonsil hypertrophy can have a significant negative impact on quality of life, with symptoms of upper airway obstruction, dysphagia, and sleep apnea.[1] Medical management is typically unrewarding. Traditional techniques of lingual tonsillectomy (including monopolar cautery or laser) are associated with high morbidity, including significant pain, bleeding, and potential temporary worsening of airway obstruction due to postoperative edema.[2–4] Surgical visualization of the hypertrophic lymphatic tissue is generally performed via suspension laryngoscopy, but most authors agree that the views are suboptimal, and working down the long shaft of the laryngoscope can hamper instrument mobility.[5] As such, lingual tonsillectomy continues to be a procedure hampered with difficulties. Herein we describe our approach to lingual tonsillectomy, that being endoscopic-assisted with the use of controlled radiofrequency ablation (also known as Coblation). We will also review the currently available techniques for lingual tonsillectomy in comparison to our technique.

SURGICAL METHOD

Patients scheduled for lingual tonsillectomy must meet certain symptomatic inclusion criteria (such as sleep apnea or dysphagia) as well as undergo flexible nasopharyngoscopy to ensure that hypertrophic lingual tonsils are the sole source of their health concerns before proceeding to surgery. Once the diagnosis is established and consent obtained, patients are brought to the operating room for treatment. A preoperative anesthetic consultation is obtained in each case to formulate a plan for management of the shared airway. Preoperative medications (metronidzole [500 mg intravenously] and dexamethasone [4–8 mg, weight adjusted]) are administered. Patients are nasally intubated, positioned supine with neck moderately extended, and a bite block is placed to open the mouth. A small gauze square is placed to protect the submandibular ducts, after which the tongue is retracted out of the mouth using a stay suture (Fig. 1A). The tongue surface and pharynx are painted with chlorhexidine 0.13%. A 70-degree endoscope is placed transorally and used to both elevate the soft palate and simultaneously visualize the hypertrophic lingual tonsils (Fig. 2A). Then, 1% lidocaine with epinephrine is infiltrated into the submucosal tissue of the tongue. Under endoscopic guidance, radiofrequency energy is applied via a Coblation EVac-70 Xtra Plasma wand at setting 9 (Arthro-Care ENT, Sunnyvale, CA) (Fig. 2B) to cause molecular dissociation of the tissue and completely vaporize it. Tissue is ablated superficially laterally but deeper as the instrument approaches the midline until the vallecula are seen to be unobstructed, at which point the procedure is stopped. Bleeding is stopped with the plasma wand using the cautery setting. After extubation and transfer to a monitored setting for 24 hours, they are discharged home. Follow-up takes place in 2 to 3 weeks after the procedure, at which time the ablated area is visualized to confirm effective healing (Fig. 1B).

DISCUSSION

There has been an evolution of surgical access and techniques for lingual tonsillectomy. Safety and success rely on conscientious efforts to ensure good preparation, airway security, optimal exposure for visualization, and resection techniques.[1] The history of lingual tonsil resection techniques have progressed from the use of sharp dissection, suction diathermy, laser, microdebrider, cryotherapy, and ultrasonic coagulating dissector to most recently, radiofrequency ablation.[1–4] Cold techniques can be associated with significant intraoperative bleeding often resulting in an unclear operative field and early termination of the surgery.[2,4] Hot techniques such as suction cautery or lasers may have benefits of controlled hemostasis, but they also have disadvantages of charring of tissue, stimulation of tongue musculature when used on a monopolar, higher rates of thermal injury to neurovascular structures, and potential for secondary hemorrhage postoperatively when blood dries and scabs off.[3] Soft tissue shavers similar to the powered instrumentation used in functional endoscopic sinus surgery have also been described.[1] The advantages include improved safety, precision, and efficiency, as well as a power suction to keep operative field clear. The limitations are the rigidity of the power instrument and difficulty manipulating in tough-to-reach areas such as the base of the tongue.[1]

Various visualization methods have been used that are center- and surgeon-specific, including suspension video laryngoscopy and microscope or rigid endoscopy.[2–4] Suspension microlaryngoscopy is the most commonly used method of

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Editor's Note: This Manuscript was accepted for publication December 20, 2010.

The authors have no funding, financial relationships, or conflicts of interest to disclose.

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DOI: 10.1002/lary.21730

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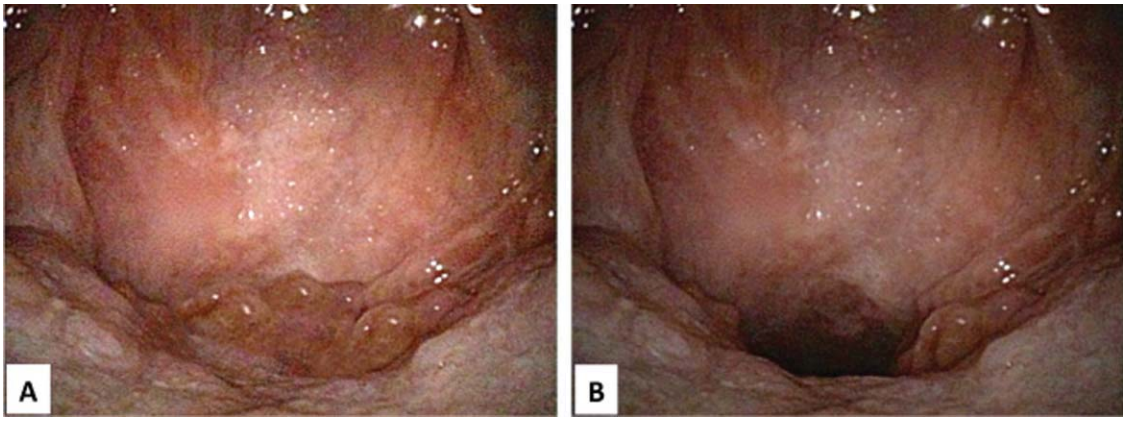

Fig. 1. (A) Pre-operative view of hypertrophic lingual tonsillar tissue. (B) Post-operative view showing extent of resection. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

exposure, as described in two out of three papers presenting radiofrequency lingual tonsillectomy.[2,4] However, working down the long shaft of the laryngoscope limits instrument mobility.[2] Maturo's experience with using suspension laryngoscopy for lingual tonsillectomy found it to be bulky, distorting to the lingual anatomy, and requiring constant readjustment and resuspension.[5] Additionally, it added the increased risk of damaging the teeth, temporary dysgeusia, and altered tongue mobility. In contrast, in our technique the senior author (B.W.R.) uses rigid endoscopy to provide panoramic views of the lingual tonsils, with the option of differing degrees of visualization (0, 30, 45, 70 degrees) and easy access in any direction with no material risk to the tongue, palate, or teeth.

Radiofrequency surgery for controlled ablation was first introduced in 2001 for various dermatologic disorders such as facial rhytides and orthopedic procedures including closed joint surgeries.[6] This technology utilizes radiofrequency energy to excite electrolytes in a conductive medium, most commonly saline solution. The energized sodium ions have sufficient energy to break molecular bonds within tissues, causing tissue to dissolve at a relatively low temperature (typically 40°–70°C), with minimal injury to surrounding tissue.[6] This results in effective dissection with less postoperative pain than from thermal injury. Radiofrequency ablation technology has gained acceptance in tonsillectomy and adenoidectomy.[7–9] Multiple studies suggest that there is decreased pain and recovery time with Coblation than with electrocautery and the ultrasonic scalpel, and there is not a higher incidence of postoperative hemorrhage with this technique. The Coblator consists of a malleable hand-

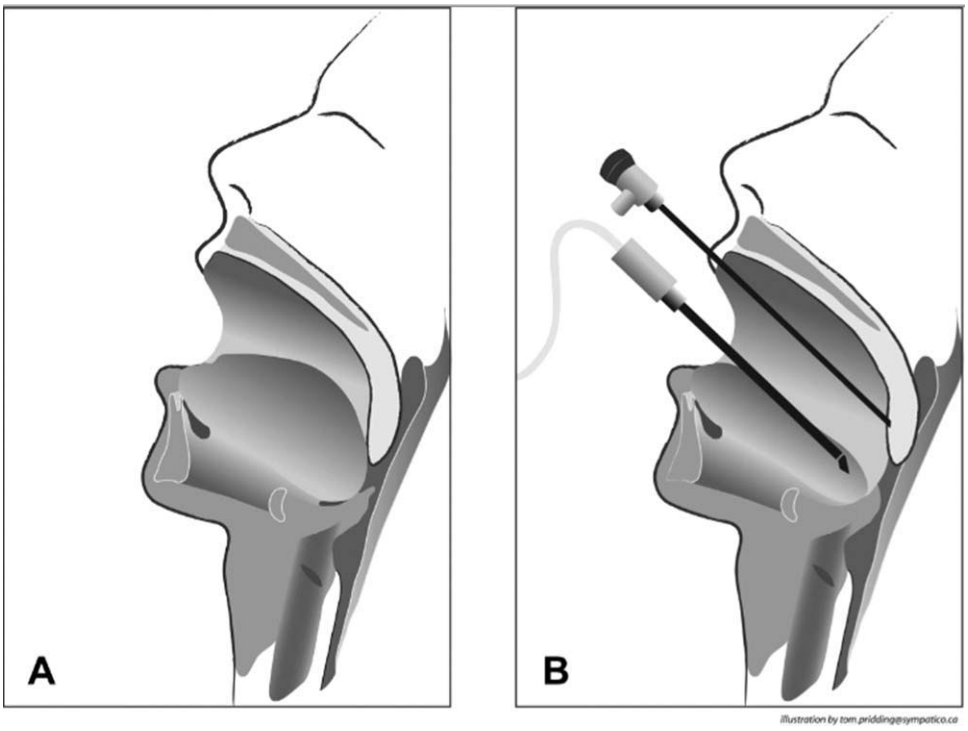

Fig. 2. (A) Pre-operative saggital schematic diagram of lingual tonsillar hypertrophy. (B) Intraoperative instrument positioning for maximal ease of lingual tonsil resection.

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piece with a suction irrigation tip and cautery capability for hemostasis. These are ideal for lingual tonsils, which are particularly amenable to liquefaction and aspiration technique.

A literature review reveals sparse data describing the use of Coblation for lingual tonsillectomy. Its feasibility as an instrument for performing lingual tonsillectomy was first recognized by Robinson et al. in 2006.[2] They performed radiofrequency lingual via suspension laryngoscopy using an operating microscope. In their series of 18 patients, indication was mainly for obstructive sleep apnea patients presenting with modest or massive lingual tonsil hypertrophy. Postoperative outcome included an average pain score of 3 (0–7), no bleeding, no tracheostomy, and two requiring revision lingual tonsillectomies. The main advantages reported were faster dissection, improved hemostasis, less airway edema, and less postoperative pain. However, he noted that visualization with suspension laryngoscopy was very challenging and led to suboptimal resection in some cases. Mowry et al. also documented a case report of a 17-year-old boy with dysphagia and subsequent weight loss as a result of lingual tonsil hypertrophy and who was treated successfully with Coblation, with access via suspension laryngoscopy.[4] Mention was also made here of the challenging access via laryngoscopy.

Only one case report exists describing use of an endoscope to assist in lingual tonsillectomy. Bock et al. reported a case of a 41-year-old woman with tongue base hypertrophy causing dysphagia.[3] Lingual tonsillectomy was performed with a McKesson mouth prop and silk suture for retraction of tongue and visualization, and use of a 70-degree 4-mm endoscope. Symptoms of dysphagia and globus sensation improved markedly after surgical reduction of lingual tonsillar tissue as confirmed on postoperative clinical imaging and patient's clinical function.

A recent report on the use of robotic surgery for sleep apnea described the use of the DaVinci system for operating on the tongue base.[10] Although lingual tonsils were not specifically mentioned in this report, one could potentially consider adaptation of this robotic system for use in lingual tonsillectomy. Certain barriers such as surgical inexperience and cost containment would need to be overcome to make this a practical method.

Several potential limitations exist when considering endoscopic-assisted radiofrequency ablation lingual tonsillectomy. There is an initial learning curve to overcome in terms of transoral manipulation of the various surgical instruments and angulated views. Additionally, the ablation system carries a cost that may be more expensive than other surgical possibilities; patients are typically required to pay for the plasma wand out of pocket.

CONCLUSION

Lingual tonsillectomy continues to be a challenging procedure in otolaryngology. Advantages of Coblation lingual tonsillectomy lie in various surgical and clinical improvements including faster dissection, improved hemostasis, reduced surgical time, less airway edema, and tolerable postoperative pain. Using the endoscope to simultaneously enable clear visualization abrogates the numerous technical difficulties found with suspension laryngoscopy. The combination of the two tools together leads to a powerful, reliable, and safe technique for lingual tonsillectomy. Further studies comparing this technique to other accepted means of performing lingual tonsillectomy would help clarify comparisons between the various surgical methods.

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