Objectives/Hypothesis: Many laryngopharyngeal disorders are effectively managed in the office. Herein, an in-office method utilizing the 532-nm potassium-titanyl-phosphate (KTP) laser for the treatment of benign laryngeal and vallecular mucoceles is described.

Study Design: Retrospective case review.

Methods: A review was performed of patients who had their vallecular or laryngeal mucoceles marsupialized in the office using KTP laser.

Results: Outcomes included long-term follow-up laryngoscopy for evidence of recurrence, significant intra-procedural complications, tolerance of the procedure, final pathology of the specimen, and resolution of symptoms.

Conclusions: In-office KTP marsupialization of laryngeal and vallecular mucoceles is effective and well tolerated, with no episodes of recurrence to date.

Key Words: Potassium-titanyl-phosphate laser, KTP laser, vallecular and laryngeal mucoceles.

Level of Evidence: 4.

INTRODUCTION

The pulsed photoangiolytic 532-nm potassium-titanyl-phosphate (KTP) laser has proved to be an invaluable tool for laryngeal surgeons. Since its introduction in 2006, a myriad of indications have evolved for its use, ranging from treatment of early glottic cancer to benign lesions of the glottis and intraoral mucoceles.\(^1,2\) Use of the laser in the office has also been established as safe for treating many conditions with similar outcomes compared to microlaryngoscopic surgery performed in the operating room.\(^3\) The pulsed KTP laser has a wavelength of 532 nm, the approximate absorption peak of hemoglobin, and is ideal for in-office use. It has excellent hemostasis and its selectivity and pulsed nature result in minimal tissue injury secondary to stray shots during treatment of a moving target in an awake patient.\(^4\) In-office treatment has been shown to be successful in disorders such as recurrent respiratory papilloma, vocal fold polyps, Reinke’s edema, and laryngeal dysplasia.\(^3,5–8\) Office-based laryngeal procedures represent a favored alternative to the use of the operating room or other resource-intensive settings, and are classically very well tolerated by patients.\(^9\) The relative ease and safety of clinic-based procedures provides a welcome change to the scheduling difficulties and financial constraints incumbent on ambulatory or inpatient surgical centers. In a study by Helman and Tan comparing office-based versus operating room-based tracheoscopies using a flexible laryngoscope, office-based patients were charged $1,478.4 USD less than controls.\(^10\) Similar cost savings have been found for in-office laryngeal biopsy, injection, and laser treatments.\(^11,12\)

Understanding the safety of in-office laryngeal procedures as well as the cost savings and decreased patient morbidity compared to direct laryngoscopy in the operating room under general anesthesia, this study seeks to evaluate the use of the 532-nm KTP laser for the marsupialization of laryngeal and vallecular mucoceles. These are common benign lesions of the aerodigestive tract that often present with globus or dyspnea or are found incidentally on laryngoscopy or head and neck imaging.

MATERIALS AND METHODS

Case Patients

A retrospective chart review was performed after approval by the New York Eye and Ear Infirmary of Mount Sinai Institutional Review Board. Evaluation of the operative attending physicians’ KTP laser logbook was performed to identify patients who underwent in-office KTP laser treatment of their laryngeal or vallecular cyst. Four patients, aged 53, 74, and 77 (two patients) years, underwent transnasal marsupialization of their lesion using 532-nm KTP laser photoangiolytic ablation followed by removal of the top of the cyst. History concerning the presence of clinical symptoms, the location of the lesion,
preoperative and long-term follow-up laryngoscopy findings, the presence of significant intraprocedural hemorrhaging, tolerance of the procedure, and final pathology of the specimen were recorded during review.

Surgical Approach

After a comprehensive discussion of the risks, benefits, and alternatives of the procedure, phenylephrine and 4% lidocaine are administered via an atomizer to decongest and anesthetize the nasal passages. Three milliliters of 4% lidocaine is then nebulized for preliminary anesthesia. A distal chip flexible transnasal esophagoscope is passed transnasally (Pentax Medical, Montvale, NJ). The larynx is then inspected and further anesthetized with 4% lidocaine dripped through the working port of the scope on the lesion, making sure to work within a safe volume of lidocaine and the maximum dose of 4.5 mg/kg. A 0.4-mm laser fiber is then passed through the working port. The top half of the mucocele is treated with laser until it is ischemic with the KTP laser set at 40 W, 20 milliseconds, and 3 Hz. Joules used has ranged between 53 and 183. Once the top of the lesion is devascularized, a large microcup forceps (Olympus Biopsy Forceps, 1,550 mm; Olympus America, Center Valley, PA) is exchanged with the laser fiber. The ischemic top of the mass is removed, effectively decompressing and marsupializing the mucocele. The tissue is then sent for pathology. No active bleeding has been seen beyond that which is experienced during the typical in-office laryngeal biopsy, and no special steps are needed for hemostasis. The operative approach is similar regardless of the site of the lesion.

RESULTS

Two mucoceles involved the aryepiglottic (AE) fold; two involved the lingual surface of the epiglottis (one concomitant with an AE fold mucocele), and one was an extremely large vallecular mucopyocele resulting in airway obstruction. One patient presented with a concomitant right AE fold mucopyocele. In two patients, computed tomography scanning was used to evaluate the full extent of the lesions. Three of the patients presented with globus, and the fourth complained of globus and airway obstruction when lying supine. The patients uniformly tolerated the procedure well. There was minimal and often no bleeding. There were no complications. In all instances, the pathology was consistent with a benign mucosal cyst and the patients’ symptoms resolved. The patients all healed well, and there has been no evidence of recurrence with follow-up ranging from 6 months to 1 year (Figs. 1–3).

DISCUSSION

This review of four patients presents evidence of the ability to successfully treat small and large laryngeal and vallecular mucoceles via marsupialization using in-office KTP laser. There were no complications and often no bleeding. Occasionally, what bleeding occurred was the same as what is experienced during the typical in-office laryngeal biopsy, and no special steps were needed for hemostasis. This is likely due to the excellent hemostatic properties of the KTP laser. The procedure was uniformly well tolerated by our cohort. The patients all healed well without evidence of recurrence with follow-up between 6 and 12 months, and all symptoms resolved.

Other options for treatment of mucoceles include cryosurgery, laser vaporization, and surgical resection. Cryosurgery and direct surgical resection are not options for in-office treatment of laryngeal lesions. The carbon dioxide (CO\textsubscript{2}) laser (10.6 µm) is absorbed by intracellular water, allowing for maximal heat concentration and minimal absorption of deeper tissues; it will

Fig. 1. Preoperative. Laryngocele abuts the right aspect of the epiglottis and extends into the right aryepiglottic fold. A concomitant mucocele is present on the lingual surface of the epiglottis.

Fig. 2. Intraoperative. Status after laser ablation of the superior aspect of each laryngocele, prior to marsupialization.

Fig. 3. Postoperative. Surgical site is well healed with no scarring and resolution of laryngoceles.
also cause injury to any tissue it interacts with. Despite being useful for mucocele resection during direct laryngoscopy, CO₂ laser is not preferred for in-office treatment of these lesions for a number of reasons: the CO₂ in-office laser is not readily available, the cost of the CO₂ fiber is extremely high, the laser is less hemostatic compared to the KTP laser, and there is decreased accuracy without a guidance beam. Most importantly, there is increased risk of inadvertent tissue injury with a moving target in an awake patient due to the absorption coefficient of the CO₂ laser. Lasers more similar in wavelength to the KTP laser system and with capability to be used safely in the office may potentially be used in a similar capacity to that described here. The diode laser may be one such laser.

In-office KTP laser marsupialization of vallecular and laryngeal mucoceles appears to be safe and effective, and the KTP laser is ideally suited to this function. The practice of the laryngeal surgery has increasingly found itself moving from the operating room to the in-office setting. The myriad of benefits due to this transition are clear and include ease of scheduling, decreased patient morbidity, cost benefits to the patient and national health system, less resource-intensive requirements, and expedited return to work. This study describes an additional procedure that may be successfully transitioned from the operating room to the office.

CONCLUSION

In-office marsupialization of laryngeal or vallecular mucoceles using a KTP laser is a safe and effective procedure. It should be considered as a viable alternative to treatment of these lesions in the operating room via direct laryngoscopy under general anesthesia.

BIBLIOGRAPHY