

Office-Based Pulsed-Dye Laser Surgery for Laryngeal Lesions: A Retrospective Review

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Summary: Objectives. The 585-nm pulsed-dye laser (PDL) is used for in-office treatment of recurrent respiratory papillomatosis (RRP), premalignant/early malignant lesions, vascular lesions, and proliferative lesions of the larynx. Reported advantages of this technique include avoidance of general anesthesia, improved efficiency, lower overall cost, and treatment of the anterior commissure with minimal web formation. Our objective was to review our experience with office-based PDL procedures for laryngeal lesions.

Study Design. Retrospective review.

Methods. A chart review of patients undergoing office-based PDL procedures of laryngeal lesions from the years 2005 to 2012.

Results. Of 33 patients, 32 (97%) tolerated the procedure without complication. One patient experienced an anxiety attack and the procedure was aborted. There were no complications. The following pathologies were treated: vascular lesions (n = 10), RRP (n = 8), granuloma (n = 5), premalignant lesions (n = 5), benign mass (n = 2), amyloidosis (n = 1), and anterior web (n = 1). Six (19%) patients, all with vascular lesions, were treated successfully with the in-office PDL and no operating room (OR) procedures. All six patients reported complete resolution of symptoms at 6 months posttreatment. Twenty-six (81%) patients were treated with a combination of in-office PDL and OR procedures, most commonly for RRP (n = 8). Seventeen patients had complete resolution of their symptoms with in-office PDL and OR procedures.

Conclusions. PDL treatment is a safe, well-tolerated, effective, adjunctive therapy and may function as monotherapy in the treatment of selected laryngeal lesions.

Key Words: Pulsed-dye laser—In-office procedure—Larynx.

INTRODUCTION

New technologies have emerged to offer in-office treatment of laryngeal lesions. These technologies include fiber-based laser systems, such as pulsed-dye laser (PDL), pulsed potassium titanyl phosphate (KTP) laser, CO₂ laser, and thulium:yttrium-aluminum-garnet (Tm:YAG). Each laser has a unique wavelength. For example, KTP's wavelength is 532 nm, and PDL's wavelength is 585 nm. The energy from these wavelengths is absorbed selectively by oxyhemoglobin, allowing the laser to preferentially cause photoangiolytic destruction of blood vessels. When the exposure time of the tissue to the dye laser and/or KTP are pulsed, the usual zone effect of destruction is minimized, thus protecting the surrounding tissues.¹ The laser is delivered through a fiberoptic cable that is fed through the channel of a flexible endoscope. In the office, the patient is anesthetized topically with either lidocaine, a mixture of benzocaine, amino-benzoate and tetracaine, and/or benzonate. The in-office procedure is performed with the patient awake and usually unседated.

There are several advantages to this technique: avoidance of a general anesthesia, improved efficiency, lower cost than the

operating room (OR) procedure, simultaneous treatment of bilateral lesions, and treatment of the anterior commissure with minimal anterior web formation.² Some disadvantages of this technique are as follows: poor exposure compared with the OR in some cases, patient intolerance, and the absence of a pathology specimen. Most patients allow good exposure with the flexible endoscope, and the majority tolerate the procedure well. Because no specimen is produced from the procedure for pathologic examination, it is recommended that lesions are first biopsied to confirm the pathology.^{1,2} Patients may be biopsied in the OR or in-office using indirect instruments.

In our practice, we have an in-office PDL laser that was used to treat laryngeal lesions. This technology has been used in our practice since 2005. We have also treated patients with pulsed KTP laser, usually in the OR. Our PDL machine suffered a malfunction in mid-2012 and in debating whether to repair the equipment, we reviewed our experience with the in-office PDL as a treatment modality. Our objectives were to review the tolerability and safety of in-office PDL, pathologies treated, number of in-office PDL treatments per patient, and whether the patient also underwent OR procedures. Our hypothesis was that our experience would be similar to other tertiary care laryngology practices.

METHODS

A retrospective chart review was conducted of all patients who underwent in-office treatment of laryngeal lesions by the three senior authors (Y.D.H., V.D., and R.T.S.) in a tertiary care laryngology practice. Charts were reviewed from the introduction of the technology in our practice in 2005–2012. Patients were excluded if they were treated in the OR or if the charts had

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insufficient data. The Institutional Review Board of Drexel University College of Medicine granted approval for the study.

Patient charts were reviewed and data were entered into an Excel database (Microsoft Corporation, Redmond, WA). Anonymous demographic, surgical, and outcome data were collected from the clinic charts. The number of professional voice users was also recorded. The American Academy of Otolaryngology-Head and Neck Surgery defines a professional voice user as “anyone whose voice is essential for their job.”³ Pathology reports were reviewed where available. Descriptive statistical analyses were conducted with Excel. Means, standard deviations, percentages, maximum, and minimums were analyzed. There was no control group of OR patients because the objective of this study was not to compare the in-office PDL procedure with the OR procedure.

RESULTS

Thirty-three patients underwent in-office treatment for laryngeal lesions from 2005 to 2012. Demographic data are shown in [Table 1](#). Mean age at the time of first treatment was 49 years old (range 26–85, standard deviation 16). Twenty-one (64%) patients were male and 12 (36%) were female. Fourteen patients (44%) identified themselves as professional voice users. Of a total of 33 patients, 32 (97%) tolerated the procedure with no difficulty. One patient had anxiety shortly after the introduction of the telescope and did not tolerate in-office therapy at all. This patient had a granuloma that had been excised previously in the OR and that recurred. There were no complications from the PDL procedures, for example, epistaxis or airway compromise.

Pathologies treated in the office are presented in [Table 2](#). Of the 32 patients who were treated successfully, 26 (81%) had a pathologic diagnosis from tissue collected in the OR during a separate procedure. The most common types of lesions treated in the office were vascular (n = 10, 31%), followed closely by recurrent respiratory papillomatosis (RRP) (n = 8, 25%), granuloma (n = 5, 16%), and premalignant lesions (n = 5, 16%). Seventeen (53%) patients had complete resolution of symptoms with a combination of in-office PDL and OR.

TABLE 1.
Demographic Data of Study Population

Characteristic	Result
Male/female	21/12 64%/36%
Age at first treatment (mean ± standard deviation)	49 ± 16 y
Age range	Youngest: 26; Oldest: 85
Professional voice users	14 (44%)
Tolerability	32 (97%)
Complications	0 (0%)
Patients with only in-office PDL	6 (19%)
Patients with in-office PDL and OR	26 (81%)
Number of in-office PDL procedures	
1	21 (66%)
2	6 (19%)
3 or more	5 (15%)

TABLE 2.
Pathology Treated in Office

Pathologies	N (%)
Vascular lesion*	n = 10 (31%)
Papilloma (RRP)	n = 8 (25%)
Granuloma	n = 5 (16%)
Premalignant (dysplasia)	n = 5 (16%)
Benign mass	n = 2 (6%)
Anterior glottic web	n = 1 (3%)
Amyloidosis	n = 1 (3%)

* Vascular lesions include hemorrhagic polyps, hypervascular masses, ectasia, hemangioma, and hemorrhages.

Six patients (19%), all with vascular lesions, were treated with in-office PDL procedures only ([Table 3](#)). Of these six patients, all reported complete resolution of their symptoms at 6 months posttreatment. Of the vascular lesions treated successfully in the office, two (33%) were hemorrhagic polyps, one (17%) was a hypervascular mass, and there were one (17%) ectasia, one (17%) hemangioma, and one (17%) hemorrhage with an identified feeding vessel. In the cases involving masses, PDL therapy was directed at the mass and associated vessels in all cases but one (17%), in which only the vessels were treated. Of these six patients, four (67%) required only one laser treatment and two (33%) required either two or three in-office laser treatments.

Twenty-six (81%) patients had operative intervention other than in-office PDL therapy ([Table 4](#)). The most common reason for repeated OR procedures was RRP. Eight patients received repeated therapies in the office with the PDL laser. All these cases involved RRP. Of the 26 patients (81%) who required OR procedures and in-office laser treatments, 17 (65%) were treated with only one in-office PDL and nine (35%) received multiple treatments in the office.

DISCUSSION

The most common lesions treated in our practice by in-office PDL treatments were vascular (n = 10, 31%), followed by RRP (n = 8, 25%). In the study by Koufman et al,² the most common lesions in descending order were RRP (n = 212, 52.2%), dysplasia (n = 79, 19.5%), and granuloma (n = 40,

TABLE 3.
Patients Treated Exclusively With In-Office PDL (N = 6)

Pathologies	N (%)
Hemorrhagic polyps	2 (33)
Hypervascular mass	1 (17)
Ectasia	1 (17)
Hemangioma	1 (17)
Hemorrhage with an identified feeding vessel	1 (17)
Number of PDL treatments	
1	4 (67)
2 or more	2 (33)
Patients exclusively treated with in-office PDL	6 (19)

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