Intraoral Stone Removal in Wharton's Duct Using a CO₂ Laser: Clinical Results

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Background and Objectives

This study provides a review of the results of intraoral stone removal in distal Wharton's Duct performed using a CO₂ laser.

Materials and Methods

A total of 13 patients were treated under local anesthesia at initial presentation in the outpatient clinic.

Results

All patients experienced immediate relief after surgery. Clinical follow-up of up to three months showed that all 13 patients were asymptomatic. Although some glands had no function clinically, they were asymptomatic and did not require further treatment.

Conclusion

Salivary glands that are nonfunctioning clinically should only be removed when there is a recurrence of symptoms.

Key words

Sialolith; Laser; CO₂

INTRODUCTION

Sialolithiasis is the most common cause of salivary gland obstruction.¹ Obstruction can be complete or partial and may cause recurrent symptoms. The retained saliva exerts retrograde pressure on the salivary gland, and may cause transient or total damage to the parenchyma and the ductal system. It is accepted treatment to postpone sialolithectomy in the acute stage, particularly in those cases in which removal of the sialolithis surgically difficult. In such cases, antibiotic treatment is given until the swelling and pain subside and surgery becomes possible.

However, whenever possible, it is preferable to perform immediate sialolithectomy even in the acute stage because this facilitates immediate relief of glandular pressure by draining the exudate and releasing the retained saliva. This eases the pain and enhances recovery.^{2,3} Azaz et al.,² in 1989, were the first to describe sialolithectomy with CO₂ laser and its advantages. The current study reports on 13 immediate sialolithectomies with the CO₂ laser, the course of clinical healing, and the correlation with the postoperative findings.

MATERIALS AND METHODS

The study included 13 patients, 7 men and boys and 6 women and girls, with mean age of 45 years (range, 15 to 45 years), who had sialolithectomies performed with the CO₂ laser.

Of the 13 patients, 12 stones were in Wharton's duct, and one were in the Stenson's duct (Table 1). The preoperative evaluation included recording of clinical symptoms such as pain, swelling, flow of saliva through the main duct, and body temperature. The number and location of the sialoliths in the duct or the hilus were determined from the imaging data. Sialolithectomies were carried out using CO₂ laser with the power set on the 2.5 Watt super-pulse mode. The postoperative data included clinical evaluation of pain, swelling, recurrence of sialolithiasis, and body temperature same as pre-operative parameters.

RESULTS

The documented clinical symptoms indicated that 12 patients had obvious submandibular swelling, and one had swelling in the parotid region. Eleven patients suffered from pain, 10 complained of transient swelling related to meals, 9 had suppuration or exudate from the duct orifice, and 1 patient were febrile.

Most patients had combined symptoms. The most common combination included swelling, pain, and discharge of exudate. Radiographic examination with computed tomography was restricted to the patients with non-palpable stone because of mucosal swelling. The combination of the occlusal and panoramic radiograph was found to be sufficient for diagnosis, but the occlusal radiographs did not permit visualization of the posterior third of the Wharton's duct. The number of stone varied among the patients.

Nine patients had one sialolith, 2 patients had two, and 2 patients had three or more. The sialoliths in Wharton's duct were located in the anterior two thirds of the duct in 12 of the 13 patients.

All 13 patients had surgery on the day of initial presentation at outpatient clinic. Surgery was performed under local anesthesia with lidocaine 2% and epinephrine 1: 100,000. All patients had postoperative therapy with antibiotics for 3 days. All patients returned for follow-up examination after 14 days. Most of the patients had noticeable improvement, but 2 were still having minimal discomfort. Eleven patients returned for follow-up examination 3 months after surgery. At that time, all patient was found to be normal.

DISCUSSION

Treatment with the CO₂ laser yields excellent results, with almost no bleeding, minimal scarring, and little discomfort through healing period.^{4,5} In oral surgery, it is used for biopsies and treatment of malignancies,^{6,7} removal of gingival hyperplasia,⁸ and vaporization of leukoplakia.⁹ However, there are few publications describing use of the CO₂ laser for sialolithectomy and the results. In medicine, it is used for many procedures.¹⁰⁻¹³

Table 1. Age, sex, and location of sialoliths in patients with sialolithiasis

Mean age (year)	Sex		Submandibular gland		Parotid gland		Total
	Male	Female	Right	Left	Right	Left	
45.1	7	6	5	7	1		

This approach has several advantages in the treatment of sialolithiasis. It permits surgery in outpatient clinic under local anesthesia even during the acute stage, and it is a bloodless, sterile, and noncontact surgery. Removal of the obstructing sialolith results in immediate drainage of the exudate and retained saliva. As the CO₂ laser beam encounters the sialolith, it sparkles and indicates its exact location. A week after surgery, almost all patients showed excellent improvement.

Yoshimura et al.¹⁴ attempted to define the indications for sialadenectomy in relation to sialolithiasis. They concluded that after sialolithectomy the gland has good or improved recovery potential. The current findings support their study.

Eleven patients who returned for follow-up 3 months or more after surgery were without objective clinical signs. Clinically, 12 patients showed normal flow of saliva through the orifices of the common duct, 7 had diminished flow, and 8 had complete cessation of the salivary flow. Among the 5 patients who had repeated scintigraphic studies after surgery, 2 had no functional improvement, 1 showed improvement, and 2 regained normal function. None of these 5 patients had clinical complaints.

It is reasonable to assume that most of the patients who did not return for follow-up examination were asymptomatic, because otherwise they would have returned for further treatment. One may conclude that asymptomatic salivary glands that are proved to be nonfunctioning clinically and scintigraphically after sialolithectomy should not be excised. Sialadenectomy of the involved gland should be considered only in patients who suffer from recurrence of symptoms.

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