Nd:YAG Laser Usage Under General Anesthesia in a Mentally Retarded Patient

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Summary: The patient was 20 years old, mentally retarded, and suffered from chronic seizures. Some teeth required scaling and filling, and gingivectomy and gingivoplasty for gingival overgrowth in the distal area of the mandible were also necessary. General anesthesia was used for this patient because the routine treatment was impossible for her with these medical problems. After scaling and filling of two teeth, gingivectomy was done with a scalpel in order to reduce the time of anesthesia; then Nd:YAG laser was used to reshape the gingiva and control bleeding. As the patient was mentally retarded and had chronic seizures, bleeding control was very important.

Keywords: Nd:YAG laser, gingivoplasty, bleeding control, mental retardation, seizure, general anesthesia.

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Dental treatments for mentally retarded patients with chronic seizures are difficult. These patients have poor cooperation and poor oral hygiene. There is a possibility of seizure attacks for them in the dental office.[1] Some of the anti-seizure drugs, such as phenytoin, cause gingival overgrowth.[2] General anesthesia is a good approach to manage these patients for dental treatment.[3] Bleeding control after surgery is also difficult for them.

CO_2 laser has been used successfully for gingivectomy under general anesthesia for such patients.[4] We used Nd:YAG for gingivoplasty and bleeding control under general anesthesia for a patient with these medical problems.

CASE REPORT

The patient was a 20-yr-old mentally retarded female suffering from chronic seizures. She had had seizures from the age of 1.5 years. Clinical examination revealed no anatomical abnormality in the brain, CT, or MRI, but an electroencephalogram (EEG) showed general abnormality. The drugs she used for seizure control were Na Valporate 1200 mg/day, phenobarbital 100 mg/day, and lamotrogil 10 mg/day. Even with these drugs, she had a seizure attack every week. Physically, her appearance was mongoloid. Lungs, heart, and musculoskeletal system seemed normal. Vital signs and laboratory results were normal.

Examination of the oral cavity showed heavy calculus on her teeth and fibrotic gingival overgrowth in the molar area of right mandibular side (Figs 1 and 2). The

Fig 1 Right mandibular arch of patient. Note heavy calculus and gingival overgrowth.

Fig 2 Panoramic radiograph of patient.

Fig 3 Nasal intubation of patient for general anesthesia.

Fig 4 Enlargement of gingiva was excised with a scalpel.

parents wanted to save all her teeth; thus gingivectomy in the molar area was considered.

Induction of anesthesia was done with O_2/N_2O and halothane. After sedation of the patient, an IV line was inserted and fentanyl 75 mg and thiopental Na 250 mg were given intravenously. After hyperventilation, a nasal intubation (6.5 mm) was performed (Fig 3). Then a wet pad was put in the pharynx to prevent aspiration. Anesthesia with O_2 (50%), N_2O (50%) and halothane (1.5%) was maintained with spontaneous ventilation until the end of the procedure.

Two of the patient's teeth were scaled and restored using amalgam. Then gingival overgrowth of the right mandibular segment in the molar area was excised with a scalpel in order to reduce the time of anesthesia (Fig 4). The Nd:YAG (Fotona, Fidelis plus II; fiber 300 µm, 4 to 8 W energy, frequency 50 Hz) was used in contact mode on the gingiva for gingivoplasty, and in some areas, gingivectomy around the molar teeth. At some sites, hemostasis was performed with the same fiber (4 to 5 W, 50 Hz) in noncontact mode (Fig 5).

After the procedure, the tracheal tube was removed in deep anesthesia and the patient was turned to a lateral position with 6 liters/min O_2 through a face mask.

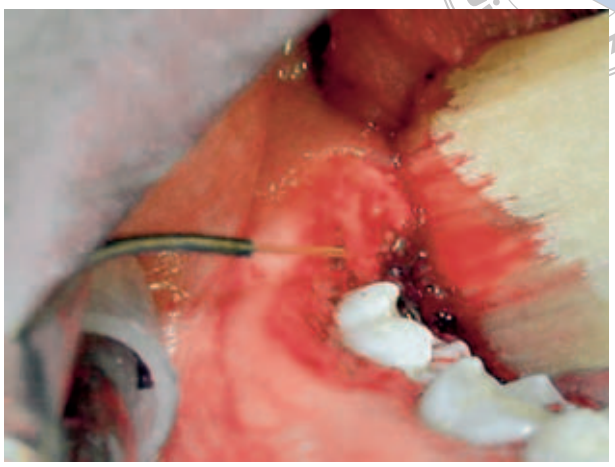

Fig 5 Nd:YAG laser used for bleeding control and gingivoplasty. Tongue depressor used for photography when laser was not emitting.

Recovery time lasted 2 h and 20 min. The patient had no problems during anesthesia and recovery time, or one month postoperatively.

DISCUSSION

Mentally retarded patients are usually unable to cooperate sufficiently in dental treatment. In cases of uncontrolled seizure, a hazard for dental work exists.[1] Under general anesthesia, the dentist can work without needing the patient's cooperation.

The Nd:YAG is a near-infrared laser with a wavelength of 1064 nm. The tissue absorption model is based on the pigments melanin and hemoglobin.[5] Some uses of Nd:YAG laser are hemostasis, gingivectomy, and gingivoplasty.[6] CO_2 laser has also been used for gingivectomy in phenytoin-induced gingival hyperplasia in mentally retarded patients under general anesthesia. No intra-or postoperative bleeding occurred, and no surgical dressing was applied.[4]

Our use of Nd:YAG laser in this case seems to be the first report of Nd:YAG laser usage for gingivoplasty and bleeding control for a mentally retarded patient under general anesthesia. While using Nd:YAG laser for this patient, gingivoplasty was good and bleeding was controlled. There was no need for dressing the surgical area, and no bleeding after surgery was seen. In order to prevent the instruments of anesthesia from catching fire in the mouth,[7] nasal intubation was done. The other main advantage was ease of work in the mouth.

The Nd:YAG laser provided hemostasis after surgery, which represents an important advantage for mentally retarded patients with chronic seizures.

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