Intratracheal Fire Ignited by the Nd-YAG Laser during Treatment of Tracheal Stenosis*

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Intratracheal combustion of a fiberoptic bronchoscope and an endotracheal tube occurred during the treatment of severe tracheal stenosis with the neodymium-YAG laser. This recognized hazard of CO2 laser surgery has not been reported previously with the use of the Nd-YAG laser. Fire hazard is inevitable when a laser is used in the airway, but the risk can be diminished. Rapid removal of the burning endoscope and endotracheal tube is essential to prevent serious complications.

Laser photoablation with the Nd-YAG laser (neodymium-yttrium aluminum garnet) may be a valuable tool for palliative management of benign and malignant airway lesions.1,4 Complications of this treatment include bronchial perforation, hemorrhage which may be massive, and problems related to anesthesia.1,4 Recently, an incident occurred in our laser surgery unit which resulted in the intratracheal combustion of a fiberoptic bronchoscope and a polyvinyl chloride endotracheal tube. Fire in the airway is a well-recognized hazard of the surgical use of the CO2 laser, but has not been emphasized as a potential complication of Nd-YAG laser photoablation.

CASE REPORT

A 19-year-old traumatic quadriplegic woman was referred to the laser surgery unit for treatment of severe tracheal stenosis resulting from prolonged intubation. The stenotic segment was approximately 6 cm long. In several places the airway closed completely on expiration. The patient was dependent upon mechanical ventilation through an oral endotracheal tube which had been forced past the obstruction. She was not felt to be a candidate for reconstructive surgery, so informed consent for laser surgery was obtained. The ventilator was delivering 10 breaths per minute with a tidal volume of 1.0 liters and 5 cmH2O of end-expiratory pressure. It was later discovered that the patient was receiving high FIO2, at least 0.80, instead of the intended 0.40.

A Teflon-sheathed quartz laser fiber was passed through the channel of a standard Olympus BF1TR flexible bronchoscope. A one-second inspiratory hold was created which permitted treatment during full inspiration, thereby decreasing the inhalation of smoke and fumes from combustion of tissue. The treatment session lasted almost two hours during which the patient received topical lidocaine and was heavily sedated with diazepam and morphine. Nd-YAG laser energy (16,000 joules) was delivered to the tissue in 266 pulses averaging 56 watts and 1.1 sec duration each. A patent airway of 7 to 8 mm diameter was produced. The wall of the trachea became charred over the entire treated area.

Near the conclusion of the procedure, the bronchoscopist saw a sustained flare of yellow light through the bronchoscope. He immediately removed the bronchoscope which was burning briskly. An alert assistant quickly removed the endotracheal tube which was also burning. The ventilator had cycled into expiration so that the large volume of thick, black smoke produced was exhausted from the airway as the endotracheal tube was being removed. The bronchoscope and endotracheal tube were both removed within five seconds of ignition. Within one minute the patient was reintubated.

Subsequent bronchoscopy on successive days revealed an ulcerated burn of the carina 2 to 3 cm2 in area (Fig 1) (which healed quickly) and the laser-induced carbonization of the treated area (Fig 2). High-dose corticosteroids (methylprednisolone 250 mg daily) and broad spectrum antibiotics were administered. She was extubated.

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FIGURE 1. Close-up view of carina 24 hours post-treatment showing mucosal edema and ulceration.

FIGURE 2. View of distal trachea 24 hours post-treatment showing oval lumen, extensive carbonization, and necrosis of the treated area.
Intracavitary Thrombi in the Right Heart Associated with Multiple Pulmonary Emboli*

Report of Two Patients

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Two-dimensional echocardiography identified intracavitary masses in the right heart in two patients presenting with extensive pulmonary embolism. In one, a right ventricular mass was identified which was confirmed at subsequent autopsy to be an organizing thromboembolus. In the second patient, a right atrial mass was identified; it disappeared with thrombolytic therapy which was accompanied by clinical improvement. We demonstrate that intracardiac thrombi associated with pulmonary embolism may be identified noninvasively by two-dimensional echocardiography. We suggest the presence of thrombi may represent a large intravascular thrombus. This recognition may influence therapeutic decisions.

Two-dimensional echocardiography has become the technique of choice for identification of intracavitary masses. Intracavitary masses in the right heart, however, are an unusual finding.1,3 We recently encountered two patients presenting with extensive pulmonary embolism. One had a right atrial mass and the other a right ventricular mass detected unexpectedly by two-dimensional echocardiography. We report these two patients as examples of unsuspected associations that may be detected as a result of the increasing use of two-dimensional echocardiography and discuss the prognostic and therapeutic implications.

Intracavitary Thrombi in Right Heart (Ouyang et al)