More About the YAG

Since 1982, this journal has documented much of the world's experience in the use of the neodymium-yttrium aluminum garnet (Nd-YAG) laser in bronchology by reports of clinical investigations and editorial comments. The experience of Kvale et al, which is reported in this issue of Chest (see page 283), further demonstrates the effectiveness and safety of the Nd-YAG laser in treating tracheobronchial disorders, especially inoperable malignant obstruction of large airways. In this report, two-thirds of 25 patients with tracheobronchial malignancy and five of seven patients with benign lesions were treated successfully with an acceptable complication rate. Although this is a small series compared with a recent multicenter report of Dumon et al, some important caveats of Nd-YAG laser bronchoscopy are raised.

First, the authors describe the characteristics of patients referred for laser therapy who on evaluation were not suitable candidates for the treatment. This is most important information for physicians contemplating referral of patients for Nd-YAG laser therapy. We also have found that external compression, very extensive bulky tumor, and difficulties with precise aiming of the laser prevent successful application of this technology. We would add total obstruction of the bronchial lumen and lesions of the upper lobe of the lung as relative contraindications. These are by far the most dangerous lesions because the direction of the distal airway is uncertain, and the chance of perforation with fatal bleeding is highest.

Second, the authors outline a protocol for diagnostic evaluation of patients being considered for Nd-YAG laser therapy. Of primary importance in assessment are the patient's symptoms, such as dyspnea, cough, hemoptysis, and obstructive pneumonitis. Therapy using the Nd-YAG laser is for palliation, and symptoms must warrant the inherent risks of treatment. We have found conventional tomography of the trachea and mainstem bronchi to be most helpful in assessing the type and extent of airway obstruction by tumor or benign stenosis. Computed tomographic scans have not been as helpful to us and certainly add considerably to the overall cost of laser therapy.

The best method for selecting patients for laser therapy is fiberoptic bronchoscopy. Favorable lesions appear as polypoid endobronchial tumors with little submucosal infiltration or external compression of the airway, allowing assessment of the direction of the airway distal to the obstruction. Rarely do tumors present with the "ideal" lesion, but treatable tumors should have some of these characteristics.

The third point raised by Kvale et al is that of the technique of laser application. The excellent efficacy and safety record of Dumon et al was achieved using the laser through a rigid bronchoscope. Kvale et al demonstrate safe application of the laser through the flexible fiberoptic bronchoscope, a technique that seems popular in the United States. We prefer application through the rigid bronchoscope for tracheal and mainstem lesions because this offers advantages of constant suction, control of bleeding, mechanical removal of bulky tumor after laser photocoagulation, and maintenance of adequate ventilation using a special proximal Venturi jet or conventional anesthesia equipment. Flash fires, as reported by Kvale et al, have not occurred using the rigid endoscope. The other advantage of rigid endoscopy is that the lesion is usually adequately treated in one procedure, and thus does not leave the patient with partial airway obstruction that might predispose to obstructive pneumonitis in the perioperative period as noted in two of Kvale's patients.

The question of who should perform Nd-YAG laser endobronchial therapy remains to be addressed. Laser therapy should not be considered an extension of fiberoptic or rigid bronchoscopy; it is an entirely new, powerful therapy with definite risk that is applied through bronchoscopes. We would urge that anyone who is considering performing this technique be familiar with rigid and flexible bronchoscopy; take at least one hands-on course devoted to the theory, practice, and safety of laser bronchoscopy; and visit an institution where this technique is performed. This technique need not be limited to one specialty. In fact, we have found a team approach that includes medical and surgical personnel with input from colleagues in anesthesiology to be most rewarding.

Moses recently reviewed the benefits and drawbacks of presenting data from a series of consecutive cases without controls. At this juncture, all of our knowledge about Nd-YAG laser endobronchial therapy is derived from reports of series of cases. A single interview with a patient whose 90 percent tracheal
obstruction has been removed with Nd:YAG laser therapy after failure of conventional therapy quickly convinces one that a control trial is not in order in these circumstances. For this indication, the Nd:YAG laser certainly has, in Moses's terminology, given us a "slam-bang" effect. However, much remains to be learned about this technology. We would hope that such questions as the benefits of rigid vs flexible application, the role of laser therapy as an initial therapy for stage III lesions, anesthetic techniques, and combination therapies using the Nd:YAG laser and hematoporphyrin photoradiation therapy or endobronchial radiation be answered by well-controlled multi-institutional prospective studies.

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REFERENCES

Immune Responses in Asbestos-Exposed Individuals

Over the past 20 years, much has been learned about asbestos-associated pulmonary diseases (eg, asbestosis, carcinoma, predominantly in smokers, and malignant mesotheliomas), and progress has been made in controlling asbestos work-related exposures. Nevertheless, asbestos remains an important health problem because there continues to be exposure (albeit low) in our environment, and with the long 20 to 30 year latency period of asbestos-related diseases, the effects of heavy past exposure of workers are now becoming evident.

The pathophysiology of asbestosis and asbestos-related malignancies remains controversial. Many aspects of immunologic testing have been explored, including serum immunoglobulins, antinuclear antibodies (ANA), rheumatoid factor (RA), immune complexes, T and B lymphocytes, in-vitro assays, and delayed hypersensitivity skin testing (DTH). The protocols of these studies have varied, and this editorial compares and contrasts their study designs and analyses.

Case and Control Selection

Fundamental to comparing results of asbestos exposure and immunologic abnormalities is the study design of case selection with matched controls. Asbestos exposure is difficult to document and quantify and is usually measured by the years of exposure reported by the worker. Absolute exposure may vary greatly over time because of job change, industrial hygiene, and environmental control. Workers selected randomly from a payroll roster are likely to be quite different from those who seek medical attention. The length of time since last exposure is also important, as asbestos-related diseases have a long latency period, often 20 years or more. Control cases should be matched for such variables as age, sex, and smoking habits, and multivariate analysis should be used in the data analysis. Many immunologic parameters change with age, and since individuals with asbestosis have a long exposure history, confounding may occur. Simply comparing the mean or median ages of cases and controls is often inadequate, for the distribution of ages may be quite different.

Immunologic Parameters

Several factors are important in evaluating immunologic studies of asbestos workers. As humans age, there is an increase in prevalence of autoantibodies of virtually all types. Several studies have documented increased positive ANA titers in the elderly with the prevalence varying from 15 percent to 36 percent in those over 60. The prevalence of RA in this age group also increased with rates to 15 percent and there was a marked increase in reactivity after 60 years. T-cell numbers generally decrease with age, and DTH skin testing also shows decreasing reactivity with age. These changes with age emphasize the importance of using a well-matched control group, as well as interpreting with caution studies which compare their findings to "normal" populations of young and healthy individuals.

Cigarette smoking also changes immunologic status. Studies have demonstrated decreased immunoglobulins in chronic smokers. Decreases in in-vitro response to mitogens and "killer cell" activity have also