EDITORIALS

When Not to Use the Bronchoscope For Hemoptysis

The advent, about ten years ago, of the fiberoptic bronchoscope revolutionized the practice of bronchoscopy. The flexibility of the instrument removed the discomfort, the risks of broken teeth, and vasovagal reactions accompanying extreme extension of the neck. There was no longer a need for an operating room. The smaller size and excellent visual field of the fiberoptic bronchoscope made a larger portion of the bronchial tree accessible to exploration. Biopsy of the lung via the transbronchial brush and forceps, which had been developed earlier, enjoyed enormous growth; their utilization improved the bronchoscopic diagnosis of both neoplastic and nonneoplastic pulmonary disease. Concomitant improvement in cytologic techniques increased the confidence with which a diagnosis of tumor could be excluded by fiberoptic bronchoscopic examination.

Although there are no supporting data, it is my impression that there was a great expansion in the use of the bronchoscope in the diagnosis of pulmonary disease following introduction of the fiberoptic instrument. Older and sicker patients were examined, who would likely not have been subjected to the bronchoscopic procedure with the rigid bronchoscope. Mortality accompanying the procedure is low (0.1 percent), and complications occur in about 8 percent of the procedures.1

Detailed considerations of sequelae are necessary in the balancing of risk against benefit, before undertaking fiberoptic bronchoscopic examination. Elsewhere in this issue (see page 7), in a provocative article, Weaver et al have reviewed their material on the fiberoptic bronchoscopic procedure in hemoptysis, in order to help us more intelligently evaluate the "benefit" side of the balance; they have attempted to determine the efficacy of the fiberoptic bronchoscopic procedure in establishing a diagnosis in patients with hemoptysis. The need for such an evaluation springs not only from the perspective of the physician caring for the individual patient, but from the ever more pressing need for the profession to make maximally effective use of health care resources. Among other questions, Weaver et al have tried to answer the query: When is it appropriate not to use the bronchoscope in a patient with hemoptysis?

In a group of 40 patients with hemoptysis who did not undergo the bronchoscopic procedure (88 percent [35] of whom were available for follow-up), bleeding was extrapulmonary or was satisfactorily explained by evident noncarcinomatous pulmonary disease in 25 patients (63 percent). Seven patients (18 percent) were judged too ill to withstand the bronchoscopic procedure. Although the establishment of these groups requires the exercise of clinical judgment, such an approach has long been accepted.2 In their 70 patients who underwent the bronchoscopic procedure, Weaver et al identify the following three risk factors which indicate a high probability of malignant disease: (1) age greater than 40 years; (2) any abnormality on the chest roentgenogram; and (3) hemoptysis lasting more than one week. Weaver et al suggest that if all three of these features are absent, the patient with hemoptysis need only be observed. Let us further examine the first two of these criteria.

Carcinoma of the lung is rare below the age of 40 years; of 955 patients with bronchogenic carcinoma seen at the Boston Veterans Administration Medical Center between July 1, 1968 and Sept 30, 1978, only eight patients (or 0.8 percent) were less than 40 years old at diagnosis, and 35 patients (or 4 percent) were between the ages of 40 and 44 years at diagnosis. Thus, the age cutoff chosen by Weaver et al seems quite reasonable.

Hemoptysis as a harbinger of bronchogenic carcinoma with a normal chest roentgenogram must indicate a tumor in the trachea or main or lobar bronchi. Tracheal carcinoma comprises no more than 1 percent of all cases of bronchogenic carcinoma,3 and about 25 percent of all tumors occur in main and lobar bronchi.4 Hemoptysis as the first symptom of a centrally located tumor in patients with a normal chest roentgenogram is an infrequent clinical finding in patients with hemoptysis; however, there can be no doubt as to the occurrence of this phenomenon. There were no such cases in the
series of Weaver et al but in three other series the frequency ranged from 6 to 16 percent, with a weighted mean in all four series combined of 12/106 (or 11 percent).

Bronchogenic carcinoma is rare in nonsmokers, and more than half of the patients in this small group have adenocarcinoma, a lesion which has a strong tendency to be peripheral. The increased risk of developing carcinoma of the lung is directly related to the number of cigarettes smoked daily, to the number of years smoked, and to the amount of smoke inhaled. There is also a strong inverse relation to the age at which smoking was begun. Thus, in one prospective study, the risk of death from lung cancer for men who started to smoke at less than 15 years of age was 16.8 times that for nonsmokers; for those who started to smoke from 15 to 19 years of age, it was 14.7 times that for nonsmokers, as compared to a risk of 4.1 times that of nonsmokers for those who started to smoke after 25 years of age. It is apparent that the history of smoking must also be taken into account in deciding whether or not to use the bronchoscope in the patient with hemoptysis.

To recapitulate, Weaver et al have usefully drawn to our attention three groups of patients with hemoptysis who do not need to undergo the bronchoscopic procedure. The largest group is made up of those with strong clinical evidence of nonneoplastic pulmonary disease. Smaller groups comprise patients with a demonstrated site of extrapulmonary bleeding and those whose clinical state is so poor that no action based on the bronchoscopic findings could be taken. Finally, there is a very small group of persons aged 40 years or less who have a normal chest roentgenogram and whose hemoptysis is of less than one week's duration. Of the 40 patients who underwent the bronchoscopic procedure in the series of Weaver et al, five were under the age of 40 years; two had abnormal chest roentgenograms; and three had normal chest roentgenograms but had had hemoptysis for more than one week. Thus, there were no patients in the aforementioned category (Norman H. Solliday, M.D., oral communication, January, 1979). Even in these persons the bronchoscopic procedure might be advisable if cigarette smoking had begun at an early age. In any event, cytologic examination of the sputum must be performed in patients who have had hemoptysis but have not undergone the bronchoscopic procedure.

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**REFERENCES**


**Intravenous Aminophylline**

The availability of determinations of serum theophylline, in addition to new interest in drug pharmacokinetics, has produced a plethora of articles with new information on theophylline. The half-life of theophylline varies from 3 to 12.8 hours (mean 7.5 hours) in adults and from 1.5 to 7.8 hours (mean 3.4 hours) in children. The half-life is prolonged in cases of congestive heart failure, liver dysfunction, obesity, ingestion of troleandomycin and erythromycin, viral infections of the upper respiratory tract, and fever. The half-life is shortened with prolonged administration of phenobarbital, in smokers, and possibly by dietary factors. The pharmacokinetics of theophylline clearly vary in relation to intercurrent disease. Clearance of theophylline may also vary in the same patient without intercurrent disease, but studies on this feature have produced conflicting data. In the few pregnant patients studied, clearance of theophylline was unchanged, but the volume of drug distribution was increased. The half-life of theophylline in premature infants is markedly prolonged. In the elderly, the half-life may not be significantly different, but the volume of drug distribution is lower, and this indicates the need for smaller doses. Now Resar and colleagues (see page 11) report that the volume of distribution of theophylline was larger in patients who were acendemic; thus, acendemic patients may tolerate larger doses of intravenous aminophylline.

Resar and associates used the dosage schedule for intravenous administration of aminophylline.