Letters

Approach to the Diagnosis of Sarcoidosis

To the Editor: We read with interest Dr. DeRemee's review of sarcoidosis, which was published in the February 1995 issue of the Mayo Clinic Proceedings (pages 177 to 181). We agree with Dr. DeRemee about tissue confirmation for diagnosis of stage I sarcoidosis; however, we think it is reasonable to consider not only the benefits but also the risks and costs of the various diagnostic techniques.¹

Lung abnormalities are almost universal in sarcoidosis, independent of the sarcoidosis stage. Transbronchial biopsy is the most adequate initial test for stage I sarcoidosis.¹ Four of the most important current studies that assessed transbronchial biopsy of sarcoidosis showed that this procedure had a sensitivity of 66% for the diagnosis of stage I sarcoidosis.¹² Moreover, a work by Wang and colleagues³ on the value of flexible transbronchial needle aspiration showed a sensitivity of 83% for the diagnosis of stage I sarcoidosis. Inasmuch as computed tomography (CT) of the chest is more sensitive than chest roentgenography, CT is helpful for localizing affected areas for biopsy of chest x-ray-determined stage I sarcoidosis.¹ Thus, the sensitivity of the transbronchial tests could be even greater when CT of the chest is performed.

Severe complications are uncommon with transbronchial biopsy.¹³ The most frequent problems are pneumothorax, which has been reported in less than 3% of cases, and insignificant bleeding, which has been described in 1.7%.² The reported complication rate associated with mediastinoscopy varies. Sarrazin and Dyon⁴ reported a mediastinoscopy complication rate of 1.5 to 3.8%. Recently, mediastinoscopy was assessed as an outpatient procedure; complications occurred in 1.37% of patients, and significant complications were noted in 1% who required hospitalization.³ Finally, transbronchial biopsy-induced mortality was described as being as low as 0 to 0.12% in comparison with 0 to 0.5% for mediastinoscopy.²⁴ The 95% sensitivity of mediastinoscopy for stage I sarcoidosis¹⁴ and its low complication rate are handicapped, however, by the cost and requirement of general anesthetic.

On the basis of these comparisons, if a biopsy specimen by transbronchial tests is negative for granuloma and if clinical examination and thorax CT performed a few weeks later do not add any diagnostic clue, mediastinoscopy should be considered for the diagnosis of stage I sarcoidosis.

In response: My response to Dr. Bordon and associates concerns only the relative merits of mediastinoscopy versus transbronchial lung biopsy in the diagnosis of stage I sarcoidosis. My colleagues and I have not assessed the Wang technique of needle aspiration of mediastinal lymph nodes for pathologic study pertinent to sarcoidosis, and hence I cannot make a valid analysis of this procedure. I suspect, however, that the sensitivity rate of 83% is the result of Dr. Wang's expertise and special interest in this area, which probably cannot be duplicated in many institutions.

Both mediastinoscopy and transbronchial lung biopsy have very low associated risks of morbidity and mortality. In light of the young population in whom these procedures are used in sarcoidosis, they must be essentially equal in these regards. Hence, in selecting these procedures, the main considerations are cost; patient discomfort, both physical and mental; and final accuracy of diagnosis. In regard to cost at Mayo, mediastinoscopy is approximately two times that of the bronchoscopic approach. Thus, if one assigned two units of cost to mediastinoscopy and one unit to bronchoscopy and considered 100 patients with stage I sarcoidosis apparent on chest roentgenography, one could make the following calculations. With the bronchoscopic approach, the sensitivity is 66%, and thus the cost will be 100 units for 66 diagnoses; however, 34 patients will need to undergo another procedure, most likely mediastinoscopy, incurring an additional 68 units to the already expended 100 units for bronchoscopy. For the 100 patients, the total units will be 168. If the patient initially undergoes mediastinoscopy, which is virtually 100% sensitive, the total cost would be 200 units, a difference of 32 units in favor of the bronchoscopic approach; however, if the sensitivity of the bronchoscopic approach is 50%, which it is in many institutions, no difference exists between the two approaches.

In former times, I was accustomed to using the bronchoscopic route, but having been frequently frustrated because of a negative result and having to explain to the patient the need for yet another procedure, and in light of the success rate and low morbidity associated with mediastinoscopy, I changed my practice. To some extent, this approach is tempered by the nature of my practice.

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REFERENCES

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which often involves patients from afar for whom a prolonged stay necessitated by multiple procedures is a substantial cost consideration. In institutions in which the patients live nearby, one might more easily justify the approach advocated by Drs. Bordón, Blanco, Mosteiro, and Acuña. As I indicated earlier, the particular interests and expertise of the institution might also influence the method of diagnosis. In the final analysis, each institution must develop its own approach based on its own realities. Although my Spanish colleagues and I may differ somewhat on the approach to the diagnosis of stage I sarcoidosis, we are nonetheless in accord that making a diagnosis at this early stage is a desirable goal.

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BLB Oxygen Mask and Aviation

To the Editor: The historical profile of Dr. W. Randolph Lovelace II in the April 1995 issue of the Mayo Clinic Proceedings (page 316) was a well-deserved acclamation. Perhaps, serendipity guided this surgical fellow to devise a means of oxygen delivery that would revolutionize air travel.

Initially, Dr. Lovelace was interested only in finding a way to deliver oxygen more efficiently to patients than with the oxygen tent, which had many disadvantages. After the BLB mask was perfected for clinical use, the thought was that pilot error, related to hypoxia, could be abated by use of the same mechanism.

Cerebral hypoxia had long been recognized as a hazard of high-altitude flight. Northwest Airlines and other flight providers were profoundly concerned with the increasing number of airplane crashes worldwide. The idea that the use of oxygen by mask could prevent these accidents was appealing to Dr. Lovelace and the airline. Providing oxygen to personnel and passengers by mask might, therefore, mark a new beginning in aerospace medicine.

The most critical problem for the aviator was the oxygen supply, which is at a barely acceptable level at 10,000 feet. Hypoxia causes a serious evil at this and slightly higher altitudes in which light-headedness, irresponsibility, and irritability may progress to stupor, unconsciousness, and death. In 1875, Gaston Tissandier and two companions rose to 21,000 feet in a balloon. They had three bags of oxygen with them and intended to breathe from them when they were weak. Lack of judgment led to loss of consciousness and the deaths of the two companions.

The demonstration of an easy method of oxygen delivery to prevent accidents at altitudes higher than 10,000 feet was vitally necessary. To test the hypothesis, Northwest Airlines installed a large tank of oxygen and connected it to individual outlets and BLB masks on a Lockheed 14H twin-motored airplane. On Mar. 10, 1939, the 1,150-mile flight from Minneapolis to Boston was made in 4 ½ hours. The airplane flew at about 270 miles an hour at an average altitude of 23,000 feet. Coming into Boston only a few minutes before a raging blizzard that reduced visibility to zero, the airplane carried the simple equipment that would allow commercial aircraft to fly safely at high levels and thus attain great speeds.

The uneventful flight was made in conjunction with a conference on physiologic problems of aviation at the Harvard Fatigue Laboratory. The passengers included Drs. Walter M. Boothby, Lovelace, and Arthur H. Bulbulian, the inventors of the BLB mask. The representatives of Northwest Airlines were Mal B. Freeburg and Erick Paselk, pilot and copilot, respectively, and Karl O. Larson and Ralph E. Girot. In addition, H. T. Lewis of Trans-Canada Airlines and Violet Freeburg, the wife of the pilot, were on board. Dr. Alfred Uihlein and I were invited guests.

The advent of pressurized cabins has provided a sealed cabin into which air is pumped to maintain an effective internal altitude considerably lower than that at which the airplane flies. As a safeguard, the mask is still present above all airplane seats and is readily available to provide oxygen in emergency situations. Although not routinely used, the BLB mask remains to signify a considerable advance in aviation medicine.

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The Editor welcomes letters and comments, particularly pertaining to recently published articles in the Mayo Clinic Proceedings. A letter should be no longer than 500 words, contain no more than 5 references, and be in a double-spaced, typewritten format. The letter should be signed. It is assumed that appropriate letters may be published, at the discretion of the Editor, unless the writer indicates otherwise. The Editor reserves the right to edit letters in accordance with the Mayo Clinic Proceedings style and to abridge them if necessary.