Thin Needle Biopsy of Chest Lesions: Time-Saving Potential*

Marjan Jereb, M.D., and Maria Us-Krasovec, M.D.

Aspiration biopsy with the thin needle was performed on 182 patients who had 196 chest lesions suspected for malignancy. The needle biopsy was generally performed as the last step in the diagnostic process, after the traditional diagnostic methods failed to yield a reliable diagnosis. The mean delay from the first sign or symptom to the cytologic diagnosis was 3.2 months, the mean delay from the first hospital admission to the diagnosis was 2.7 months. On the average, 3.6 days passed from the time of the biopsy to the clinical decision about the treatment. The wisdom of spending time on inconclusive diagnostic procedure is questioned in view of the fact that smaller (ie, earlier) lung tumors carry better prognosis.

Biopsies of 196 lesions were done in this series of 182 patients. Seventy-six of these lesions were hilar or mediastinal, 120 were in the pulmonary parenchyma, most of them in the periphery.

The pulmonary function had been studied in all patients prior to needle biopsy and has been found compatible with at least a possible lobectomy in all.

The aspiration biopsies were performed under local anesthesia. About half of the procedures were done on an outpatient basis. The needles used were Kifa, of 1.0 mm outer diameter, with a mandrene and a sharp, beveled edge. The biopsy was performed on a Siemens Orbiscop unit with bi-plane fluoroscopy for visual control of the needle (Fig 1A and B). The aspirated material was air-dried and dyed according to May-Gruenwald-Giemsa. A preliminary cytologic report was generally obtained within one hour, with the patient waiting for the biopsy to be repeated if necessary. A chest roentgenogram was obtained three to four hours after the biopsy. An asymptomatic pneumothorax was generally not treated. In cases or near-total collapse of the lung, dyspnea, or suspected tension pneumothorax, a suction chest tube was applied and the patient admitted.

Five was the maximum number of aspiration biopsies in one patient, the average number being 1.4. A biopsy was not performed more than twice on the same day.

Results

The yield of material suitable for cytologic diagnosis was 93 percent, the diagnostic accuracy was 82 percent with no false positive (for malignancy) and only five false negative cytologic reports while a definite cytologic diagnosis was not possible in 31 cases. The cytologic examination of 196 lesions in this series showed the following: malignant tumor, 127 cases; benign tumor, 5 cases; tuberculosis, 7 cases; inflammation (nonspecific), 26 cases; diagnosis impossible—material adequate, 20 cases; and diagnosis impossible—material inadequate, 11 cases.

There was no significant difference in the yield of adequate material from large as compared to small

The percutaneous aspiration of chest lesions with a thin needle has been increasingly accepted as a part of the diagnostic workup for malignancy. It has been recognized as a relatively safe and simple

For editorial comment, see page 249

procedure with a high diagnostic yield in peripheral pulmonary lesions, and lately, even in those centrally located. However, the place of aspiration biopsy as related to some other, more traditional diagnostic methods such as tomography, bronchoscopy, bronchography, etc, has not been established, nor has the assumed gain in time of the diagnostic workup, when using aspiration biopsy, been evaluated.

The aim of this study has been to evaluate the usefulness of the aspiration biopsy of chest lesions in terms of its potential for shortening the diagnostic process.

Materials and Methods

Our series consists of 182 patients who were referred to the department of roentgenology for needle biopsy from other services, mainly from the departments of thoracic surgery, pulmonary medicine, and the institute of oncology. All had been subjected to such other diagnostic procedures as repeated chest x-ray films, tomography, sputum cytology, "metastatic workup" including nuclear scanning, search for primary tumor elsewhere in the body, etc. Fiberoptic bronchoscopy with biopsy had been performed in 147 cases. Needle biopsy was requested when these methods were unsuccessful. There were 112 men and 70 women in this series, from 5 weeks to 71 years of age. The size of the lesion was from 0.6 to 10 cm, 86 lesions were 2 cm or less in greatest diameter.

*From the Institute of Roentgenology, Clinical Center, Ljubljana, Yugoslavia.
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(2 cm or less in diameter) lesions, or from the hilar and mediastinal as compared to the peripheral pulmonary lesions.

The rate and severity of complications also was about equal for these different groups. Pain (23 percent), pneumothorax (21 percent), and hemothorax (16 percent) were the only complications. They were mostly mild or moderate. No death or permanent damage to the patient occurred as the consequence of needle biopsy. Analgesics were required in 8 percent of the patients, chest tube suction in 4 percent, blood transfusion following hemothorax in one patient.

The mean time interval from the first recorded symptom or sign of the lesion in question to the biopsy with cytologic examinations was as follows: in patients with malignant tumors, 3.4 months; in patients with other conditions, 3.4 months; in patients with small (up to 2 cm) malignant tumors, 3.0 months; and in patients with small (up to 2 cm) benign lesions, 3.1 months. This time interval ranged from 11 days to 16 months.

The mean time from the first admission for the lesion in question to biopsy was 2.7 months in all the above groups of patients with the range of 9 days to 9 months.

The mean interval between the time of the aspiration biopsy and the clinical decision about the treatment (eg, patient transferred to surgery, oncology, patient dismissed) was 3.6 days in our series.

**DISCUSSION**

It is probably impossible to establish clear-cut specific indications for the use of a procedure like the aspiration biopsy, which is a part of extensive diagnostic workup, usually involving several different specialties. Some considerations that may be used as guidelines are:

(a) The diagnostic accuracy of the aspiration biopsy for malignancy is fairly high; particularly the rate of false positive diagnoses is negligible. Therefore, a “positive” cytologic diagnosis may be considered definitive and lead directly to treatment.

(b) It is very difficult to prove that a suspected lesion is not malignant. Repeated “negative” biopsies will increase this probability, but will often not outweigh the clinical suspicion of malignancy.

(c) All intrathoracic lesions are accessible to needle biopsy.

(d) In our experience, the complications of thin
needle biopsy were neither severe nor frequent.

The considerable delay reported here is calculated on the basis of a selected series of patients in whom other traditional diagnostic modalities, short of thoracotomy, did not lead to a diagnosis and were, therefore, referred for needle biopsy. Therefore, there are almost no centrally located large bronchial carcinomas in this series, these tumors being generally diagnosed by bronchoscopy. The delay is probably shorter in the overall population of patients with suspected chest tumors. Nevertheless, the question arises whether it is still justifiable to spend weeks, sometimes months, on repeated inconclusive studies such as tomography, bronchography, observation of tumor growth and calculation of doubling time, search for primary tumor elsewhere in the body if the pulmonary lesion is suspected to be a metastasis, etc, when there is a relatively safe, simple and reliable diagnostic method available.

It has been well established that smaller pulmonary carcinomas have better prognosis,7,8 and it is reasonable to assume that a larger percentage of smaller tumor will be detected if the duration of the diagnostic workup is shortened. One way of achieving that would be to apply aspiration needle biopsy when necessary much earlier in the diagnostic process.

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