THE DIAGNOSIS OF PRIMARY CARCINOMA OF THE LUNG BY ASPIRATION

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The diagnosis of primary carcinoma of the lung is difficult. The clinical features and x-ray findings are frequently inconclusive. A bronchoscopic examination furnishes a method by which biopsy material may be obtained and a definite diagnosis established in a large percentage of cases. However, it is only of value when the carcinoma appears in the field of vision. Only when the process has extended down within the lumen of a bronchus to one of the main divisions, or when it has invaded directly the walls of one of the main bronchi, is the bronchoscope of advantage. Early lesions located in either of the upper lobes or in the parenchyma near the periphery of the lung, therefore, offer the greatest difficulty with the present diagnostic methods.

An effective procedure has recently been described by Martin and Ellis for the biopsy of tumors which lie beneath the body surfaces where surgical methods are contraindicated. Their method, biopsy by needle puncture and aspiration, is particularly adaptable to primary carcinomas of the lung. The technic is relatively easy, and with some experience an immediate histologic diagnosis may be made without hospitalization.

Martin and Ellis demonstrated sixty-five aspiration cases, and of these, two are primary carcinomas of the lungs. The technic of needle puncture and aspiration used in these instances was described fully by them, and reference should be made to their original paper. Brief summaries of their two cases are given below, followed by one by the author, in order to furnish some basis for judgment of the advantages of this diagnostic procedure.

Case 1: N. S., male aged forty-five, was admitted to the Memorial Hospital December 22, 1928, complaining of hemoptysis. Two years previously a cold developed, followed by a persistent cough during that winter and the winter following. Eight months before admission several teeth were extracted and two months later hemoptysis was first noticed. The cough became productive and was associated intermittently with
pain in the right chest. Four months before admission the patient was ill with what was diagnosed as a mild pneumonic pleurisy. A profuse expectoration resulted, which was frequently blood-streaked, and the previous two weeks as much as two cupfuls had been raised daily. The sputum was frothy, yellow, blood-streaked mucus with very little odor.

FIG. 1. PRIMARY CARCINOMA OF THE LUNG IN THE RIGHT UPPER LOBE. CASE 1.

On examination the man was found to be in fairly good condition, and the examination showed nothing of significance except for the chest. The thorax was barrel-shaped. Expansion was more marked on the left. The percussion note over the right upper chest anteriorly above the fourth rib was tympanitic. The coin test was negative. Each apex posteriorly and each interscapular area showed dulness. There were scattered moist râles throughout both lungs. The breath sounds in
general were harsh, except over the area of tympany, where they were somewhat decreased.

The clinical diagnosis was a probable carcinoma of the lung, with a question of lung abscess.

X-ray report by Dr. Herendeen: "Evidence of an extensive infiltration in the right upper lobe is seen in the films of the chest. It appears to be limited entirely to this lobe. The nature and origin are undetermined." (Fig. 1.)

Bronchoscopic examination by Dr. Martin: "The instrument passed without difficulty. The trachea and carina were normal. There was a great deal of mucous discharge from the right main bronchus and as the instrument was advanced this was seen to be coming from the upper lobe bronchus, the opening of which could not be seen. The other bronchial openings seemed to be clear, with only very little discharge. The mucosa of the right main bronchus at its distal portion was reddened and edematous. No ulceration or granular tissue was seen."

Aspiration was performed two days later. A point was selected over
the fifth interspace posteriorly, 2 inches from the vertebral margin. On entering the pleural cavity, some resistance was encountered, which persisted. Serous blood-tinged fluid, mixed with tissue, was obtained.

Pathological report: "A smear of the aspirated fluid showed epidermoid carcinoma." (Fig. 2.)

The patient died in July, 1929, fifteen months after the onset of the illness.

CASE 2: A. S., male aged sixty-seven, was admitted to the Memorial Hospital October 21, 1927, complaining of pleuritic pain in the left chest. He had had a persistent cough for years, but it was not until three months previously that a pleuritic pain in the left scapular region
appeared with it. The cough was non-productive and hemoptysis was never noticed. There was no loss of weight or strength.

The examination showed a man in fairly good general condition with negative findings except for the chest. The thorax was symmetrical, and expansion appeared equal on both sides. An area of dulness was outlined over the left apex, extending down to the level of the fifth rib posteriorly. Breath sounds were diminished over this area.

The clinical diagnosis was endothelioma of the pleura.

X-ray report by Dr. Herendeen: "Films suggest that the shadow is cast by a malignant tumor invading the lung and pleura. Lipiodol injection does not aid in the diagnosis." (Fig. 3.)

Aspiration was performed Nov. 9, 1927, through the third left interspace posteriorly in the interscapular area. A few drops of bloody fluid, mixed with tissue, were obtained.

Pathological report: "A smear of the material showed fragments of a malignant tumor, large polyhedral hyperchromatic carcinomatous cells." (Fig. 4.)
The patient died Feb. 12, 1928, seven months after onset.

The bronchoscopic examination was not of diagnostic benefit in the first case, and this is usually true of the early carcinomas located in the upper lobes. The aspiration, however, made possible a pathological diagnosis of carcinoma from a smear of the aspirated material and with the clinical picture the lesion was considered to be primary in the lung.

A similar problem was encountered in the second case. The clinical and x-ray findings demonstrated more definitely a malignant tumor, with a tentative diagnosis of endothelioma of the pleura. This was supported clinically by the prolonged pleuritic pains, the non-productive cough and lack of hemoptysis, and the pleural involvement as shown by x-ray. However, the smear of the aspirated material furnished a diagnosis of carcinoma.

The following case demonstrates the difficulty of diagnosing a primary carcinoma of the lung located far out in the parenchyma of the left lower lobe. The accuracy and efficiency of needle puncture and aspiration are clearly demonstrated in this case. A small tumor was located and enough material was obtained for histological diagnosis with no apparent complications.

CASE 3: S. C., male, aged fifty-four, entered the Memorial Hospital Aug. 14, 1930, complaining of hemoptysis. The patient stated that he had been perfectly healthy and had been working as a machinist when in February 1930, six months previously, he had a pulmonary hemorrhage for no apparent reason. A pleuritic pain and cough developed which lasted about two weeks. He seemed well for two months, when another hemorrhage occurred. This was followed by intermittent coughing spells with hemoptysis. The sputum had no odor. The pleurisy did not recur. No loss of weight or appetite was noted.

The examination showed a well developed and well nourished man apparently in good health. The general examination revealed nothing of significance. No abnormal physical signs could be elicited in the examination of the lungs.

X-ray examination of the chest revealed evidence of some peribronchial thickening in the region of the hilum of the lungs. There was a small opaque mass in the left lower lung, slightly posterior to the apex of the heart; it was elongated and rather sharply demarcated. It had the density of a new growth, although it appeared atypical. (Fig. 5.)

The clinical diagnosis was primary carcinoma of the lung.

Bronchoscopic examination by Dr. Martin: "The trachea and carina are normal. There is no evidence of hemorrhage from any bronchus. At the juncture of the left inferior lobe bronchus and left upper lobe
bronchus, there is a definite thickness and irregularity in the mucosa. Both superior and inferior lobe bronchi seem clear as far as can be seen below this juncture. I believe the clinical (bronchoscopic) diagnosis of carcinoma may be made. Specimen is taken from the above mentioned irregular area." This specimen proved to be negative.

The method of aspiration was the same as that described by Martin and Ellis. The tumor process as shown in the illustration was localized carefully by the stereoscopic x-ray films. The patient was placed in a sitting position on the table with the left arm held up and out by a suspended sling. A point was selected over the left sixth interspace 4 cm. lateral to the apex of the heart. A small nick was made in the skin. An 18-gauge needle, to which was attached a Record syringe, was inserted
through the thoracic wall. As it entered the pleural cavity, the needle was directed upwards and posteriorly. An increased resistance was encountered 6 cm. deep, and with maximum vacuum the needle was advanced and withdrawn twice between the 6 and 10 cm. depths. The needle was found to contain a small plug of blood-stained tissue, which was smeared on a glass slide. The procedure caused no discomfort and the patient had no untoward after symptoms.

The pathological report made a few minutes later by Dr. Fred Stewart was epidermoid carcinoma. (Fig. 6.)

**Conclusion**

Bronchoscopic examination is indicated in all suspected neoplasms of the lungs and at such times a biopsy should be done if questionable tissue is encountered. However, should the lesion be in one of the upper lobes, biopsy can seldom be done with the bronchoscope. Similarly, lesions in the parenchyma near the periphery of the lower lobes often offer the same difficulty. In this group of cases aspiration is shown to furnish a positive specimen and it may, therefore, supplement the bronchoscope to advantage.

**Reference**