

THE DIAGNOSIS OF HODGKIN'S DISEASE BY ASPIRATION BIOPSY

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BIOPSY by means of aspiration through a needle has become at Memorial Hospital an indispensable method of obtaining tissue for microscopic diagnosis. The technic is now well established, and the method has been repeatedly described.¹⁻⁵ Admittedly, skill in performing aspiration biopsy and in interpreting the tissue so obtained cannot readily be acquired except in centers in which considerable numbers of cases of neoplastic disease are treated, and in which the pathologists will take the trouble to familiarize themselves with the appearance of the material derived from various tumors by aspiration. It may be emphasized again that aspiration biopsy, as its name implies, is a method of aspiration of tissue through a hollow needle and is not a punch biopsy.

During the period of development of aspiration biopsy at Memorial Hospital, there was at first little or no attempt to apply it to the diagnosis of the lymphomatous tumors, as it was believed that it would seldom be reliable in that field, in which histologic diagnosis is so notoriously uncertain even with the benefit of having unimpeachable whole node sections. However, in recent years a number of cases has accumulated in which it has been shown that a diagnosis of lymphosarcoma or Hodgkin's disease can be reliably made on material obtained by aspiration. The immediate smear is seldom sufficient for a diagnosis of Hodgkin's disease. In nearly all cases the diagnosis rests on a paraffin section of the blood clot.

The purpose of this paper is to report the experience of five preceding years (1940-1944), and also in cases at present in the active files of Memorial Hospital, in establishing the diagnosis of Hodgkin's disease and related diseases by means of aspiration biopsy.

There are various conditions in Hodgkin's disease that may make it either impossible or undesirable to obtain conventional surgical lymph node biopsies. The patient may not present any significantly enlarged accessible peripheral nodes, while he may at the same time have an enlarged spleen or an infiltration in the lung. Enlarged peripheral nodes may be present, but forming one confluent mass, from which it would appear unwise to excise a wedge. The only accessible node may be in a location—e.g., directly on the spinal accessory nerve—that renders excisional biopsy hazardous, or it may lie so close to the thyroid that it simulates thyroid cancer. One case not included in this series, because proof of diagnosis had previously been made by formal node biopsy, presented a periurethral mass, felt through the vaginal wall, that simulated urethral carcinoma. In one of the cases in this series a presternal tumor was at first thought to be a sternal chondroma.

Since a sound basis for rational treatment of neoplastic disease can be assured only by exact knowledge of its histology, the management of such cases as those just mentioned would be handicapped by much uncertainty on the part of the therapist, if it were not possible to obtain early in their course a proof of the

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diagnosis. The so-called therapeutic test of diagnosis by irradiation is not to be trusted.

METHOD

Aspiration biopsy is a method of aspirating tissue into the bore of a hollow needle. As developed and practiced at Memorial Hospital, this method has certain orderly steps:

1. The site within the tumor into which the point of the aspirating needle is to be inserted, is accurately localized.
2. The overlying skin is prepared by shaving if necessary, and with iodine and alcohol.
3. A wheal at the site in the overlying skin selected as the appropriate place for introduction of the needle, is anesthetized with 1 per cent novocain.
4. A tiny incision is made clear through the skin with a no. 11 Bard-Parker bistoury, so that elastic fibers of the skin will exert no drag on the needle.
5. An 18-gage needle accurately fitted with a stilet, and having a rather short bevel, is carefully introduced through the incision in the anesthetized skin until the point of the needle reaches the desired site within the tumor.
6. The stilet is removed and a 20 cc. Record syringe is attached to the needle. The piston is then drawn back so as to create a strong negative pressure within the needle-syringe system. While this negative pressure is maintained, the needle is slightly advanced and withdrawn a few times, sometimes with rotation. If negative pressure is partially lost by leakage, the syringe is detached and the air is expelled from it; then it is reattached and negative pressure is again produced. When soft tumors are being aspirated, from 0.5 to 3.0 cc. of bloody material may be sucked into the syringe. Firm or hard tumors may yield only a tiny bit of tissue, found within the bore of the needle. Occasionally nothing significant will be obtained, and the procedure may have to be repeated, if possible.
7. The pressure within the syringe is allowed to become nearly normal, so that when the needle is withdrawn there will be no spattering of blood and tissue inside the syringe, and the needle is then withdrawn.
8. Any material collected within the syringe is allowed to clot if it will. The clot is removed, placed on a small square of blotting paper, and then dropped into a small "biopsy" bottle containing 10 per cent formalin. The clot is run through paraffin like any tissue biopsy, and sectioned.
9. Material in the needle is pushed out by means of the stilet and blown onto slides; other fragments may be found inside the syringe walls or on the face of the piston. This material is firmly crushed and smeared between slides and is quickly stained with hematoxylin and eosin. This is known as the "immediate smear."
10. The procedure used when a tumor within the chest is aspirated does not differ essentially from that described above.

Naturally great care must be used—first, in accurate localization of the tumor by means of straight postero-anterior and straight lateral roentgen films; second, in fluoroscopic check of the position of the point of the needle; third, in avoidance of trauma to the lung; fourth, in avoidance of any reflux or injection of tumor ma-

terial or air into the lung or into a blood vessel; fifth, in keeping the patient horizontal during the procedure, and very quiet for some hours afterward.

Currently at Memorial Hospital a considerably greater number of intrapulmonary malignant tumors are yielding microscopic diagnoses as a result of aspiration biopsy than by means of bronchoscopic biopsy, though the latter procedure is always given precedence unless it would obviously be useless.

MATERIAL

A tabular review of the method and site of biopsy in 242 cases of proved Hodgkin's disease, 121 of them seen in the years from 1940 through 1944, and 121 now in the active files of the hospital, is presented in table 1.

Of the 242 cases reviewed, open biopsy was the method used in 228, and cervical nodes were the type most often removed.

Aspiration biopsy established the diagnosis in 14 cases, or in about 1 case in 17. In addition to these 14 cases in which the diagnosis was made by aspiration biopsy,

TABLE 1.—Types of Biopsies Performed

Year	Formal Surgical Biopsy			Miscellaneous*	Aspiration Biopsy	Total
	Cervical Nodes	Axillary Nodes	Inguinal Nodes			
1940	25	6	1	1	3	36
1941	25	4	2	0	0	31
1942	23	3	0	0	0	26
1943	15	1	0	0	1	17
1944	5	3	1	0	2	11
Active	92	13	7	1	8	121
Total	185	30	11	2	14	242

* This group includes 1 case in which biopsy was obtained at laparotomy and 1 case in which thoracotomy was performed.

11 other cases were found in which for one reason or another aspiration biopsy had been tried first but had failed to yield satisfactory or sufficient material, and a subsequent formal biopsy had been required. Thus, of 25 cases in which for some reason aspiration biopsy was chosen as the first biopsy method, it succeeded in 14, or 56 per cent, and failed in 11, or 44 per cent. Failure of aspiration biopsy, unlike failure of a formal biopsy, does not mean leaving the patient with the scar of a useless operation.

Among the 11 cases in which aspiration biopsy was unsuccessful, the reports in 5 showed a finding of lymphoid tissue; in 2 the reports suggested tuberculosis or Hodgkin's disease; in 1 a suggestion of lymphosarcoma was made; in 2 Hodgkin's disease was suspected, but open biopsy to confirm the suggestion was requested; and in 1 an insufficient amount of material was reported. In some instances such reports have helped at least to make the examiner veer away from a previously considered diagnosis of carcinoma.

Among the 14 cases in which aspiration biopsy was successful in diagnosing

Hodgkin's disease, there were 9 in which the procedure was applied to enlarged peripheral nodes that were considered not easily amenable to open biopsy. The provisional diagnoses before aspiration biopsy in these 9 cases are shown in table 2.

In 1 case a presternal nodule, at first believed to be a chondroma, was punctured for aspiration.

The remaining 4 cases among the 14 with successful aspiration biopsies for Hodgkin's disease did not have accessible nodes or masses suitable for surgical biopsy. Two presented pulmonary infiltration suspected of representing bronchogenic carcinoma. In one of these, bronchoscopy was negative, and in the other the patient would not cooperate to permit bronchoscopy to be accomplished. In the third case the only finding was a mass projecting into the left lung field, in a patient with constitutional symptoms suggestive of Hodgkin's disease. In the fourth patient, there was no peripheral lymphadenopathy, but the liver and spleen were considerably enlarged and the symptoms suggested Hodgkin's disease. In this case splenic puncture was performed.

TABLE 2—Provisional Diagnoses in 9 Cases Presenting Enlarged Peripheral Nodes, in Which Aspiration Biopsy Proved the Presence of Hodgkin's Disease

Provisional Diagnosis	No. Cases
Hodgkin's disease	1
Lymphoma (unspecified)	3
Lymphosarcoma	1
Tuberculous lymphadenitis	1
Metastatic carcinoma	2
Carcinoma of thyroid	1

The case histories of the 4 patients who had no peripheral nodes are presented herewith.

Case 1. H. M., male, a naval lieutenant, aged 29 years, was admitted Mar. 31, 1942.

The history included cough for three months, hemoptysis for one month, loss of from 20 to 25 pounds in two months. The examination showed infiltration in the anterior part of the left upper lobe of the lung, clinically consistent with tuberculosis, bronchogenic carcinoma, or Hodgkin's disease; there were no enlarged peripheral nodes. The sputum was negative. Bronchoscopy performed Apr. 1, 1942, gave a negative finding.

In the aspiration biopsy of the lung, Apr. 8, 1942, the immediate smear yielded insufficient tissue; there were some cells suggesting carcinoma. The clot showed Hodgkin's disease (fig. 1).

Case 2. M. D., male, a longshoreman, aged 62 years, was admitted July 27, 1943.

The history showed productive cough for two years and increasingly severe. A diagnosis of tumor of the left lung was made by a local physician after roentgenography of the chest in April 1943. Pleural effusion then developed, and 2 thoracenteses had been performed before admission. The patient had lost 14 pounds in three months. The examination revealed emaciation, moderate hepatomegaly, a left pleural effusion obscuring the lung, moderate normochromic anemia, and polymorphonuclear leukocytosis (14,200 white blood cells, 88 per cent polynuclears). There were enlarged peripheral nodes.

Thoracentesis was performed Sept. 4, 1943. Roentgen examination then disclosed rounded density in the right hilar region and fairly well defined density in the left hilum, extending into the parenchyma

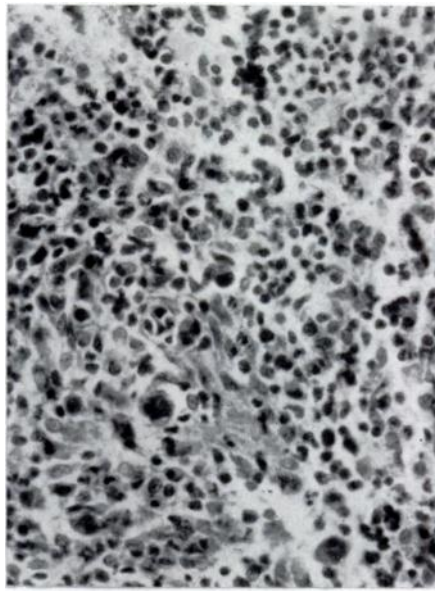


FIG. 1. CASE 1

Section of clot obtained from infiltrated portion of left upper lobe of lung by aspiration biopsy. Diagnosis of Hodgkin's disease made by means of this section confirmed clinically by subsequent course

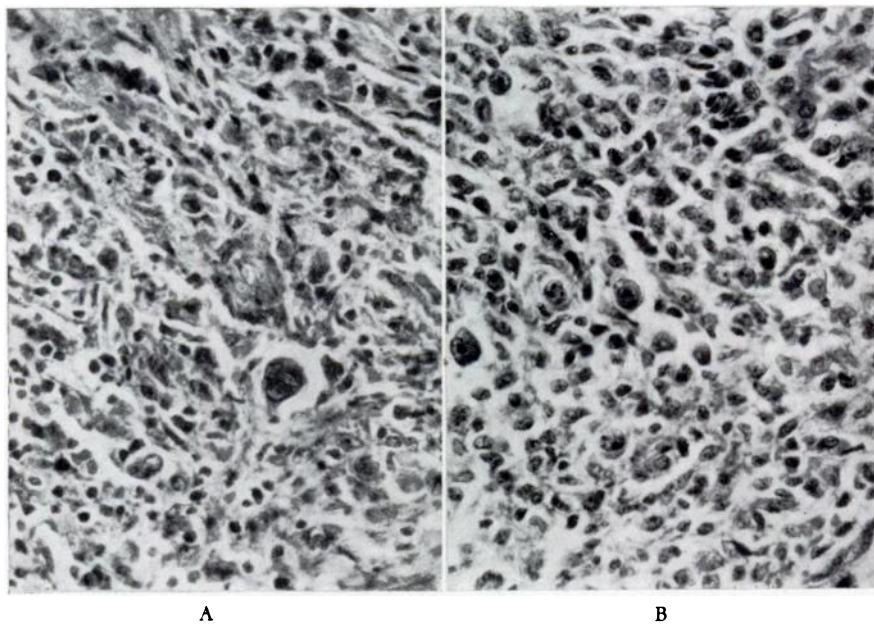


FIG. 2. CASE 4

- A. Aspiration biopsy from spleen before any nodes were available, showing Hodgkin's disease.
 B. Section of surgical biopsy from axillary lymph node two months later, confirming diagnosis obtained by spleen biopsy

of the lung. Bronchoscopy was attempted but was unsuccessful because of poor cooperation on the part of the weak patient.

In the aspiration biopsy of the left lung, the smear showed lymphoid tissue. The clot showed Hodgkin's disease.

By Sept. 30, 1943, the spleen had become palpable, and a left infraclavicular node and axillary nodes had become significantly enlarged. The enlarged left infraclavicular node was then excised and its analysis confirmed the diagnosis of Hodgkin's disease.

Case 3. A. H., female, a typist, aged 40 years, was admitted Aug. 25, 1944.

According to the history, the onset of her illness had occurred ten months before, with severe upper respiratory infection followed by persistent cough productive of white sputum. Two months later, persistent general itching developed. Increased fatiguability and dyspnea on exertion appeared shortly before admission. Examination showed a mass 9 cm. in diameter projecting from the left hilum into the lung, and slight widening of the mediastinum. Moderate normochromic anemia and polymorphonuclear leukocytosis were found. No nodes were available for biopsy.

Aspiration biopsy of the left lung mass was made Sept. 7, 1945. The smear suggested carcinoma. The clot findings were consistent with those in Hodgkin's disease.

Irradiation as for Hodgkin's disease produced marked, prompt regression.

Case 4. S. L., male, a tomato packer, aged 56 years, was admitted May 29, 1944.

The history placed the onset of illness at two years before, with general severe itching. There had been a weight loss of from 35 to 40 pounds over two years, and night sweats and intermittent fever for one year. Dyspnea and wheezing had appeared. In the examination, widespread excoriation of the skin from scratching, emaciation, and an appearance of chronic illness were found. The spleen was enlarged to the level of the iliac crest. The liver was enlarged by two fingers' breadth below the right costal border. There was roentgenographic evidence of some widening of the superior mediastinum, and of hilar infiltration. Moderate anemia was present. No peripheral nodes were suitable for biopsy.

Aspiration biopsy of the spleen was made June 28, 1944. The smear gave evidence consistent with the criteria for Hodgkin's disease. The clot showed Hodgkin's disease.

On Aug. 28, 1944, an enlarged node was found in the left axilla. Formal biopsy of this node confirmed the diagnosis of Hodgkin's disease.

SUMMARY

1. Among 242 cases of histologically proved Hodgkin's disease treated at Memorial Hospital for the most part within the past five years, the diagnosis was established by open biopsy in 228, while in 14 cases aspiration biopsy yielded a reliable diagnosis.

2. In the 14 cases of Hodgkin's disease in which the diagnosis was made by examination of the sectioned clot obtained by aspiration biopsy, the material was from lymph nodes in 9 cases, from a presternal nodule in 1 case, from the lung in 3 cases, and from the spleen in 1 case.

3. Among the 228 cases in which formal biopsy was used to prove the diagnosis, aspiration biopsy had been previously attempted but had been unsuccessful in 11 cases.

Thus in 25 cases of the total number of 242, aspiration biopsy had been selected for good reason as the first method to try, and was diagnostically successful in 56 per cent of the group.

CONCLUSIONS

In cases of Hodgkin's disease without enlarged peripheral lymph nodes, yet presenting nodes or masses accessible to needle puncture, the method of aspiration

biopsy has often proved successful in establishing the diagnosis. Success depends in large measure on examination of a sectioned blood clot from the aspirated tissue by an experienced pathologist.

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