Diagnosis of Cancer Of the Lung*

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CASE 1

A. R., a contractor and driller, aged 57, was first seen by me on March 7, 1929, and died on March 28, 1929. The duration of his illness was five months.

Previous History: Influenza in 1918 was followed by chronic bronchitis. This was worse during the winter months. The bronchitis was not sufficiently severe, however, to interfere with his work and general activities.

Present Illness: In October, 1928, he had an attack which was diagnosed as influenza. He was rather ill for several days; following this, cough was increased. Patient began to lose weight and strength; cough gradually grew worse; there had been a loss of twenty pounds in weight. For the past week there had been a distinctly foul odor to the sputum, which had also become bloody. No marked hemorrhage. Vomiting had been present during the past week. Sputum varied in amount and occasionally large quantities were expectorated with no relief of the general symptoms.

Examination: Evidently a very ill individual; temperature, 101°; pulse, 120. Examination of the chest shows, on the right side, well-defined dullness, evidently outside from root to base, both anteriorly and posteriorly with marked diminution of breath sounds. There were moist rales heard over this area, not increased by cough. Trachea, slightly to the right. Abdomen presents some diffuse tenderness; no masses palpable. Patient was sent to the hospital and seen in consultation with the late Dr. I. D. Bronfin of Denver. The diagnosis rested between lung abscess and malignancy. On March 11, 1929, artificial pneumothorax was instituted on the right for diagnostic and possibly therapeutic value. Two treatments of 300 c.c. and 500 c.c. were given with fair compression of the right chest, but no displacement or compression of the mass seen at the right hilus. Following the second treatment the patient became dyspneic and there was evidence of displacement of the mediastinum to the left. Closing pressure at the time of the last treatment was plus 5. To relieve the dyspnea it was decided to withdraw air and plus 8 was recorded on inserting the needle. Six hundred c.c. of air withdrawn gave neutral pressure. A further puncture secured foul smelling pus.

Diagnosis: Malignancy of the right lower lobe with spontaneous rupture into the right pleura with resulting empyema. No metastases could be made out, but patient's rapid decline suggested metastases.

Autopsy: Large tumor mass at the right root with ulceration and perforation in right pleural cavity. Many metastases in liver and kidneys. Microscopic Diagnosis, made by Dr. C. T. Ryder of Colorado Springs: Bronchogenic carcinoma of the right lower lobe, with metastases in liver and kidneys.

In the differential diagnosis between malignancy and lung abscess, it is important to remember that in lung abscess the expectoration of large amounts of foul smelling sputum is followed by marked temporary improvement. In malignancy no improvement is noted.

CASE 2

F. S., a cleaner and dyer, a male, aged 57, was seen in consultation with Dr. R. H. Kampmeier, formerly of Pueblo. He was first seen June 20, 1931, and died on July 10, 1931. The duration of illness, nineteen months.

Previous History: Negative.

Present Illness: Onset, eighteen months prior to being seen. First complaint, weakness...
and cough. Twelve months after onset, expectoration was present. Dyspnea and loss of weight, fifteen pounds. Cough, spasmodic in character. Expectoration, scanty, one frank hemorrhage of half an ounce. In May, 1931, a diagnosis of aspergillus infection had been made from the sputum. Patient had failed to improve on large doses of potassium iodide.

Examination: Emaciated individual, marked lagging of left chest and extension of the normal mediastinal dullness to the left, most prominent at the second space anteriorly. Over this area were heard sibilant rales, increased during inspiration. No increase in rales after cough.

Diagnosis: Cancer of the left bronchus.

Autopsy: Small carcinoma extending upward and outward from the left root, encircling the upper lobe bronchus. Some breaking down of this tumor and a small cavity filled with pus. Culture from this pus showed aspergillus. No metastases were noted.

Microscopic Diagnosis: Cancer of the left upper lobe.

Points of Interest: Small size of tumor; aspergillus recovered from the sputum, death from pulmonary hemorrhage.

CASE 3

W. S. B., male, printer, aged 61, was first seen on August 9, 1933. He died on December 30, 1933. The duration of illness, two years.

Previous History: Influenza in January, 1931, with complete recovery.

Present Illness: In January, 1932, he had a diagnosis of influenza, more severe than his previous attack, without recovery or improvement. Chief complaints, dyspnea, loss of appetite and strength, cough, profuse sputum, marked loss of weight, and pain in the chest.

Examination: Marked dullness over left root posteriorly. Many moist rales. Rales also heard at right base. In September, 1933, enlargement of the axillary glands on both sides was noted. Sputum became blood streaked and later foul smelling.

Autopsy: Carcinoma of the left root with extension into the vertebrae on this side with breaking down. Small mass at the extremity of the right lower main stem bronchus, also carcinomatous and cavitated.

Microscopic Diagnosis, by Dr. C. T. Ryder: Carcinoma of the lung and hilum nodes. Metastases into dorsal vertebrae and axillary nodes.

CASE 4

W. D., a printer, male, aged 47, was first seen August 26, 1927, and died January 28, 1928. Duration of his illness, thirteen months.

Previous History: Negative.

Present Illness: Onset, March, 1927, with cough, pain, and loss of appetite. These symptoms have continued.

Examination: Marked dullness over left root with increase in dullness over the left root. On December 24, 1927, 50 c.c. of bloody serous fluid was obtained from the right pleura. On January 3, 1928, pleura again yielded bloody fluid. No relief in symptoms. A few cells characteristic of carcinoma were seen in centrifuged sediment.

Autopsy: Primary bronchogenic carcinoma of both roots. No microscopic examination made.

Microscopic Diagnosis: Cancer of the lung and hilum nodes. Metastases into dorsal vertebrae and axillary nodes.

CASE 5

J. A. M., a male printer, aged 29, was first...
seen November 1, 1933. He died January 13, 1934. Duration of illness, four years.

**Previous History:** Diagnosis of ulcer of the stomach or duodenum was made in 1928. Patient treated medically with improvement.

**Present Illness:** Onset, February, 1930, with bloody sputum which has continued to the present time. Pain in right upper abdomen, severe, extends down the legs and is marked in the right arm. Cough, moderate in amount.

![Fig. 4. J. A. M., Case No. 5, taken December 22, 1933.](image)

**Examination:** Marked dullness over right lower chest, well limited. A few bronchial rales. G. I. examination revealed definite ulcer of the duodenum but no evidence of rupture. Exploratory puncture of right lower chest failed to secure pus, the needle passing through a hard, fibrous area. On account of the marked G. I. symptoms on January 15, 1934, an exploratory laparotomy was done and a large ulcer found on the first portion of the duodenum which was excised. At the time of operation it was determined the liver was in normal position and of normal size with no evidence of abscess either within or above the liver.

**Diagnosis:** Carcinoma of the right lower lobe.

**Autopsy:** Carcinoma of the entire right lower lobe with involvement of the mediastinal glands. No metastases were noted.

**Microscopic Diagnosis:** Same.

**Points of Interest:** Because of the presence of ulcer in the G. I. tract there was the possibility of its rupture with resulting subphrenic abscess. The irregular, septic type of temperature together with the dense shadow at the right base were confusing.

**CASE 6**

W. E. B., aged 69, male, printer, was first seen August 20, 1932. He died January 21, 1933. Duration of illness, three years and five months.

**Previous History:** Negative.

**Present Illness:** Onset, 1929, with substernal pressure, pain and dyspnea. In August, 1931, he was examined at Ford Hospital in Detroit. Bronchosoped; tissue was removed. Diagnosis, bronchogenic carcinoma. A course of x-ray treatment was instituted.

**Examination:** Marked dullness at the right base with absence of breath sounds. No change in condition until January, 1933. At that time marked increase in cough and expectoration of bloody fluid. Aspirated 125 c.c. of fluid from the right pleura without appreciable relief.

**Autopsy:** Five hundred c.c. bloody fluid in right pleura. In the right lower main bronchus about two inches from the bifurcation was a hard, well defined mass extending posteriorly and laterally. The mass surrounded the right lower bronchus, producing stenosis but not a complete occlusion.

**Microscopic Diagnosis,** by Dr. C. T. Ryder: Bronchogenic carcinoma of the right lung.

**Points of Interest:** Diagnosis by biopsy seventeen months prior to death. No change in condition for a considerable period.

**CASE 7**

F. G., male, aged 61, pharmacist. He was first seen March 25, 1933, with Dr. C. F. Stough, Colorado Springs. Died, April 20, 1933. Duration of illness, seven months.

**Previous History:** Negative.

**Present Illness:** Onset, September, 1932, with pain in the chest and marked dyspnea. Aspirated two quarts clear fluid from the right pleura which failed to relieve dyspnea. Following this he was frequently aspirated of amounts from 1000 to 2000 c.c. without more than temporary relief. Opiates required for relief of pain. Shortly before death, aspirated fluid became bloody.

![Fig. 5. F. G., Case No. 7, taken September 20, 1932, before aspiration.](image)
DISEASES OF THE CHEST

Fig. 6. F. G., Case No. 7, taken September 22, 1932, after aspiration.

Examination: Right chest flat apex to base with all physical signs of fluid in the pleura.

Autopsy: Right pleural cavity filled with cloudy, bloody fluid. Pleura generally and markedly thickened. Visceral, parietal and diaphragmatic portions about 2 mm. thick and showing a net-work of ridges and nodules of the same consistency. Right lung showed carcinomatous involvement with no ulceration. Many metastases in the liver.

Microscopic Diagnosis, by Dr. C. T. Ryder: Carcinoma of the right lung, right pleura and liver, the picture corresponding very closely with pleural endothelioma.

There is a question whether the origin of this tumor was in the pleura or in the lung with marked pleural extension.

CASE 8

J. S. T., male printer, aged 71, was first seen July 18, 1934. He died October 21, 1934. Duration of illness, four months.

Previous History: Negative.

Present Illness: June 15, 1934, severe pleuritic pain in right chest with cough and bloody expectoration. Sputum continues to be bloody. Constipation marked. No history of vomiting or tarry stools.

Examination: Very ill individual with dullness at both apices, more marked on the left. Sibilant rales heard over entire chest. Abdomen shows marked fullness in upper midportion with considerable tenderness. Patient too ill to be examined fully.

Autopsy: Tumor growth about three inches in diameter in the left lung. At the head of the pancreas was a definite tumor growth, considered primary, and in the spleen a single area of metastasis. Liver, filled with small tumors.

Microscopic Diagnosis: Primary adenocar-

Fig. 7. J. A. T., Case No. 9, taken June 23, 1930.

Case 9

J. H. J., male printer, aged 67, was first seen January 23, 1928. He died on September 25, 1933. Duration of illness, one year.

Previous History: Negative.

Present Illness: For some months, muscular soreness in arms. Slight incontinence of urine.

Fig. 8. J. H. T., Case No. 9, taken January 21, 1933.

Points of Interest: At no time cough or expectoration, dyspnea being the most prominent symptom.

CASE 10
L. Mc., a male printer, aged 52, was first seen December 23, 1929. He died on May 4, 1930. Duration of illness, eleven months.

Previous History: Negative.
Present Illness: In June, 1929, hoarseness and swelling of right side of neck and loss of weight and appetite.
Examination: Marked enlargement of cervical glands on the right. Chest showed scattered areas of dullness, but no rales.
Diagnosis: Malignancy of the right side of the neck with metastases to the lungs.
Autopsy: Malignancy of the right side of neck with metastases to the lungs, liver, spleen, kidneys, abdominal glands and mesentery.
No microscopic examination.
Points of Interest: No expectoration. Extensive metastases.

CASE 11
C. E. H., a male printer, aged 43, was first seen September 9, 1933. He died October 28, 1934. Duration of illness, eighteen months.
Previous History: Negative.
Present Illness: Onset, April, 1933, with swelling in the jaw from abscessed tooth. Following this sudden pleuritic pain in the right side. Sputum streaked with blood, fever, severe cough, expectoration, mucopurulent in character with distinctly foul odor. Loss of weight from 125 to 97 pounds.
Examination: Slight dullness in right upper chest with moist rales suggestive but not pathognomonic of pulmonary tuberculosis. Patient had remissions with normal temperature and improvement in general condition. April 3, 1934, artificial pneumothorax was instituted. Some improvement with decline in temperature and decrease in the amount of sputum. Marked exacerbations with high temperature.
and profuse sputum. In October, 1934, severe pain in right chest, cyanosis, temperature, 103°. Air and purulent fluid were aspirated from the right pleural cavity without relief and permanent drainage instituted by trochar.

**Diagnosis:** Malignancy of the right upper lobe with rupture into the right pleura.

**Autopsy and Microscopic Diagnosis,** by Dr. C. T. Ryder: Lung abscess, chronic pneumonia, empyema. No evidence of malignancy.

**Points of Interest:** The marked increase of the apparently consolidated area with sharp outlines as seen in the x-ray plate and the failure of compression by artificial pneumothorax led to the erroneous diagnosis of cancer of the lung. The marked remissions and exacerbations, if carefully considered, should have led to a diagnosis of suppurative disease rather than malignancy.

**CASE 12**

W. C., an oil operator, aged 54, was first seen on January 10, 1935. The duration of his illness at that time was five months.

**Previous History:** Appendectomy, 1912. Suppurating cervical glands, in 1912, proved to be non-tuberculous. Gastric ulcer in 1919, permanently relieved by diet; tonsillectomy, 1933.

**Present Illness:** In August, 1934, noticed occasional blood streak in sputum with cough. Cough increased by exercise and more particularly by bending forward. No frank hemorrhage.

**Examination:** Sibilant and a few moist rales at the extreme right base. Slight dulness. Auscultatory signs increased by voluntarily producing cough. Bronchoscopy not satisfactory. No tissue removed. X-ray findings grew more pronounced.

**Diagnosis:** Carcinoma of the right lower lobe. Lobectomy, by Dr. R. D. Churchill of Boston, was followed by apparent recovery.

**Conclusions**

Progress of cancer of the lung may be slow, but definite periods of improvement are usually lacking. Lung abscess and other suppurative conditions improve after periods of profuse expectoration. Physical examination shows some differences from findings usually seen in pulmonary tuberculosis which comprises the major portion of pathologic chests. Sputum examination is valuable in excluding tuberculosis and other infections. X-ray is of greatest value in diagnosis, particularly if oblique and serial plates are available. Bronchoscopy is helpful in a small percentage of endobronchial growths. Exploratory puncture with recovery of pleural fluid or broken down tumor, valuable. Negative puncture is also valuable if evaluation of the density of the tissue penetrated is carefully considered.

Pleural effusion contraindicates surgical removal.

**ABSTRACT OF DISCUSSION**

C. T. Burnett, M.D. (Denver): It is interesting that Dr. Giese should encounter eight cases of primary cancer of the lung during an ordinary period of a man's active work. Dr. Bronfin reported, in this Society two years ago, nine cases that he had encountered in the National Jewish Hospital during his lifetime. Dr. Giese hasn't said anything about the increased incidence of primary cancer of the lung. Only a short time ago it was thought to be an exceedingly rare condition. Lord, in his book printed in 1925, found eight cases from the Massachusetts General Hospital in 4,704 autopsies. He had had eight cases in his private practice. In other words, a man with a very extensive practice in New England, very largely limited to pulmonary diseases, had encountered only sixteen cases. Goltz, from the University of Minnesota, found that there were no cases reported prior to 1912. He notes a ten-fold increase since 1920.

Suffice it to say that for some reason cancer of the lung is a much more important clinical condition than it was a few years ago. No doubt the x-ray has helped us, because most of these cases are first diagnosed on the basis of x-ray without biopsy proof.

There may be some other factors. There has been a good deal of discussion as to why, aside from our diagnostic improvements, we may be encountering more primary carcinoma of the lung. Influenza, with the epidemic of 1918 and

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more recently, is thought by many to be a contributing factor. Other infections have been discussed. Some men feel that there is no relationship at all between tuberculosis and primary cancer of the lung. Certain it is that tuberculosis and cancer may coexist.

There are some possible chemical factors. One interesting observation that coincident with the building of oiled roads such as we have out all through this mountain district and through the state and the nation, there has been an increase in primary cancer of the lung.

Another interesting observation is the fact that, so far, primary cancer of the lung has not been found to have a predilection as to which lung it attacks nor is there any predilection as to the age at which it occurs. It is much more common in males than in females—80 per cent of the cases and is practically always a bloody effusion. Pleural effusion occurs in 33 per cent of the cases and is practiced by always a bloody effusion. It is most commonly confused with tuberculosis, lung abscess, Hodgkin's disease, aortic aneurism and pleurisy with effusion.

As to the diagnosis, there are several facts that are fairly well established. First, we know that it occurs most commonly in the fifth and sixth decades of life. I think the common age is from fifty to fifty-five. It is much more common in males than in females—80 per cent males.

There seems to be no predilection at all as to which lung it attacks nor is there any predilection for any particular lobe of the lung.

Pleural effusion occurs in 33 per cent of the cases and is practiced in always a bloody effusion. It is most commonly confused with tuberculosis, lung abscess, Hodgkin's disease, aortic aneurism and pleurisy with effusion. Clinically, there are several points of importance. First is the pain—in the chest as a rule—and this pain tends to increase rather than to abate as the disease goes on. Occasionally there is prominence of the chest on that side.

If in addition there is evidence of pressure on the large vessels or pressure on the structures of the mediastinum in a patient with cough, shortness of breath and bloody expectoration from the beginning of the disease, we have a right to suspect cancer of the lung. Also, if aneurism of the aorta can be fairly well ruled out and a bloody effusion is present, I think we have a fair right to assume that we are dealing with cancer of the lung. A positive diagnosis as to the nature of the tumor can only be made by detecting tumor shreds or so-called tumor cells in the sputum or in the effusion. Removal of a portion of this tumor by the aid of a bronroscope of course will settle the situation as to the diagnosis—or the removal of a near-by infiltrated gland. Our greatest aids in diagnosis are bronchoscopy and x-ray.

J. A. Sevier, M.D. (Colorado Springs): There seems to be definite evidence that carcinoma of the lung is on the increase. This is probably a relative increase. In the first place, we are looking for it more commonly. We are taking more chest x-rays as a routine procedure, and we are getting more autopsies.

Hill of Edinburgh, in a recent account, has reviewed the subject of carcinoma up to November, 1934, and he finds that 8 per cent of all the carcinoma at autopsy is carcinoma of the lung. That seems a high figure.

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C. F. Hoyen, M.D. (Denver): I am glad that Dr. Giese emphasized the importance of the chronologic history of the case of primary carcinoma of the lung. Of course the symptoms depend upon the location of that tumor in its inception. Cough is a very important thing in the bronchia, but when we have parenchyma carcinoma it is strikingly absent. The character of the sputum is of course important.

First we have an irritated, non-productive cough; there is a glairy, viscid mucus and then possibly a prune juice sputum. In the parenchymal carcinoma we do not have the dominant cough as a symptom and it is surprising to know how long these people will remain comparatively well until the beginning of the complications which so confuse the diagnosis.

The diagnosis is made most likely from history. It is corroborated or confused by the x-ray until the middle of the course and it is absolutely confused by the complications late in the course.

The phenomena of the history, then, depend upon its location and its complication. That it is on the increase I am certain. Some years ago I spent some time with Dr. Sauerbruch; whenever he received a case from a certain section in Bohemia he always made a diagnosis of carcinoma and stuck to it until he proved it otherwise. That it is on the increase, relatively as well as absolutely, in this country, I am convinced.

I saw a number of cases with the late Dr. Bronfin. I operated on some and removed pieces of tissue that were taken from cases of empyema that didn't get well, and the diagnosis was made before anything was deduced from the history.

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