Putrid Lung Abscess

Most surgeons classify this type of lung abscess and gangrene together for diagnosis and treatment. Probably there is no sharp distinction to be made. However, we are inclined to associate the gangrenous case with acute, fulminating conditions, where large areas or the entire lobe is necrotic; and we diagnose those more localized areas of pus surrounded by pneumonitis, as abscesses. A change in the organism may convert the abscess into a gangrenous condition.

Putrid lung abscess is definitely a clinical and pathological entity. It is produced and maintained by pathogenic anaerobes and is bronchogenic in origin.

Putrid lung abscesses are due to aspiration of infected material. In my most recent case, which will be more fully described later in this paper, the abscess was apparently due to a blade of caterpillar grass, which went into the smaller bronchial tubes of the right lung, and was located near the site of the operation, too deep to be reached or seen by bronchoscopic examination. This was coughed up, after the patient left the hospital, and was easily recognizable, the only change in the piece of grass being the loss of a few of the bristles.

Bacteriologically, most frequently the Aspergillus or a mixture of Vincent’s and other anaerobes are found. The musty, foul odor of the sputum is due to the action of these organisms.

In my experience, these lesions are nearly always situated near the surface of the lung, and early produce a pronounced reaction in the overlying pleura. This cavity contains foul detritus and liquefying sloughs of the lung. The cavity remains filled with this class of material, and seldom shows a fluid level in the acute and sub-acute stages. The bronchial drainage is simply an overflow of this material crowded through the pneumonitis and plugged bronchial tubes, producing, of course, irritative bronchitis, manifesting itself in cough and foul sputum.

I have never found a putrid lung abscess more than six centimeters from the pleural wall.

Dr. Frederic T. Lord, of Boston, states, calling attention to the usual peripheral site of the lung abscesses, “proximity to the pleura is in general a striking feature of the cases coming to autopsy in the Massachusetts General Hospital.”

The infected material containing the anaerobes, such as the Aspergillus Niger, is carried down into the small bronchioles of the fourth or fifth diameter, where a stenosis of the bronchus results in the production of an infection that ulcerates through the bronchus and into the lung, where it sets up a small, parenchymatous lung abscess.

Hemorrhage is an early symptom, and is the result of the ulcerating extension into the blood vessels. Frequently, no cause can be demonstrated for the hemoptysis. Some authorities say that hemorrhage in a putrid lung abscess is more frequent than it is in early tuberculosis. The typical putrid lung abscesses coming under my observation confirm the finding of hemorrhage as an early symptom.

The course of the disease depends largely upon the degree of bronchial drainage. The extension of the abscess by necrosis makes the abscess irregular in outline. These so-called multilocular abscesses are surrounded by fibrotic tissue.

Clubbing of the fingers and toes, as in other chronic suppurative lesions of the lung, is a curious complication of this disease. This phenomenon does not show any enlargement of the bones. In the chronic cases, there may be a hyperplastic periostitis as a late complication of any type of pulmonary suppuration.

When amyloid degeneration is found, it simply denotes the chronicity and severity of the lesion.

As the fibrosis increases, more or less severe bronchiectasis develops. This com-
dition can be seen in the case that I am reporting, after the pneumonitis has subsided and the abscess is quiescent. Of course, it can only be shown by Lipiodol injections.

The extension of the gangrenous process may perforate the pleura and result in an empyema. In the pus thus formed, the anaerobic bacteria may produce gas, which will show in the x-ray picture as an empyema with partial pneumothorax.

The most striking clinical feature of putrid lung abscess is the violent coughing, with a large amount of foul sputum. The cough continues violently, even though sedatives are given. The sputum is frequently streaked with blood. The odor of the sputum increases if allowed to remain in a vessel. However, the odor is variable; if extremely foul, it is indicative of putrefaction, and is described as pulmonary gangrene.

Due to the close proximity of the pleura, pain is frequently a symptom.

The fever is not constant. The patient usually shows an afternoon rise. As new areas of lung tissue are invaded, a septic type of temperature, with morning remissions and high elevations in the evening, may develop.

After four or five months with free drainage, the abscess wall with fluid level can be detected with the x-ray and on physical examination; however, the full extent of the cavity is rarely indicated. Prior to that time, fluid level and evidences of cavity can rarely be discovered.

The physical signs in cases of putrid lung abscess and gangrene are not distinctive. It is common knowledge that small cavities are frequently overlooked by methods of ordinary physical examination. Of course, bubbling and metallic rales may be heard. The x-ray appearance and the physical signs may be more easily determined immediately following postural drainage than in any other manner. The bronchoscope can seldom locate this type of foreign body, because it is situated in the periphery of the lung, in the small bronchial tubes, which are inaccessible to this instrument. It is of value in excluding foreign body in the large bronchus, and has been of therapeutic value in promoting drainage.

Intratrachial Lipiodol injections are not of direct diagnostic value, because, the bronchioles being blocked with necrotic material, the Lipiodol does not enter the purulent lung abscess. However, they are of indirect value, in showing the extent and location of the abscess, when they show the patent bronchioles beyond the area of pneumonitis.

Most men state that putrid lung abscess is potentially a surgical lesion from the outset. However, I believe that it is best not to operate in the early acute conditions, as the cavities are certainly more difficult to find, the pleura is not strong enough to allow extensive aspiration without danger to the remaining portion of the pleura. However, to wait until the fluid level can be determined carries a higher mortality, as amyloid degeneration will begin at this time.

Pneumothorax is too dangerous, and a dubious procedure, because of the danger of tear through the pleural adhesions, thus causing a fatal empyema.

Phrenic avulsion has been of assistance before operation, in stabilizing the lung at the time of operation and during treatment. The lung after operation is smaller in size than normal, therefore diminished capacity of chest by paralysis of the diaphragm is indicated, in order to equalize this atrophy of the lung, and prevent tension when the lung is fairly expanded.

In cases where we have a mixed infection, including the Vincent’s organisms, I have found Stovarsol, given several times a day, has had a beneficial effect in destroying this type of infection. Intravenous injections of Sodium Iodide have also been used with good results. The literature shows that some men prefer Neoarsphenamine.

In the early acute abscesses, it has been my practice to give the patients postural drainage, and use Stovarsol when indicated, according to the organism. By the use of the bronchoscope and by x-rays, both anterior-posterior and lateral, I en-
deavor to determine accurately the location of the abscess. If the abscess is near the periphery of the lung or the center of the lung, and I think it can be opened through the chest wall, I do so, first making sure that the pleura is attached. If the pleura is not attached, it requires a two-stage operation.

Recently, I have been using a rubber bag which is inserted under the ribs and inflated over the abscess, extrapleurally—in order to insure the formation of adhesions between the parietal and visceral pleura. I prefer this method to packing with gauze or with dental rubber dam. After eight or ten days, if the pressure is sufficient, the pleura will become adherent. I then remove the bag packing, insert an aspirating needle into the cavity and then enter with the electric cautery, burning my way around the needle into the abscess cavity. Drains are then inserted in the usual manner.

I have never had lung bleeding or a secondary hemorrhage since using the cautery and ligating the intercostal blood vessels. Post-operative pain is diminished by destruction of the intercostal nerves. Covering the edges of the ribs with redundant muscle has prevented osteomyelitis of the ribs in all my cases.

Case Report

Because of the extreme importance of a complete clinical history, I wish to give you a report on my most recent case, which, due to the etiology, the type of infection, the classical symptomatology and progress, the extent of the abscess and the end results, I consider one of the most interesting I have ever handled.

W. G., age 16, white. He began having hemorrhages which were thought to come from his throat. He was in good physical condition. He had a slight, hacking cough. Hemorrhages varied from a teaspoonful to half a cupful. He states he had no constitutional symptoms, and, in fact, gained in weight. The parents were fearful of pulmonary tuberculosis, but physical examination and x-rays did not bear out this diagnosis. A bronchoscopic examination did not reveal any foreign body, and the source of the hemorrhage was not found. Pain appeared in the right side of his chest after the illness had been present for two months. As the symptoms were not relieved, bronchoscopic examination was repeated two or three times. Following the last bronchoscopic examination, the hemorrhage was profuse. Aspergillus Niger was found in the sputum. Constitutional symptoms were present—pain, with tenderness in the right side of the chest, was more pronounced. His physician reports that physical examination was not sufficient to explain the hemorrhage. He was put to bed, and in a few days had a hard chill and a high fever. The x-rays now began to show increased density in the right lung opposite the 7th and 8th interspaces and near the axillary line.

He was acutely ill. The amount of sputum increased markedly, the cough was excessive, he began to lose rapidly in weight, and blood transfusions were given. The pneumonitis increased, and an abscess was considered. Later, the increased pneumonitis and pleuritis led to the belief that possibly fluid had formed, and the side was tapped, but no fluid was found. The patient was placed in my care about two years after onset.

The past history revealed that his tonsils were removed at four years of age, under ether anesthesia, but no untoward symptoms had developed following tonsillectomy. There had been no extraction of teeth or other operation that might have produced a hematogenous infection.

At this time, the patient recalled that he had swallowed a piece of grass, which he described as “caterpillar grass.” He had some cough at the time, but had no idea that this foreign body might be the cause of his trouble. However, the hemorrhages followed this accident.

His nutrition was poor, he had no appetite. He had lost in weight from 167 to 100 lbs. The cough was almost constant, and the amount of sputum in 24 hours was about 300 ccs., with a foul odor. The skin
on the right side of the mouth was irritated and showed excoriation. The throat was a distinct turkey red.

Chest: The percussion note was slightly dull in the scapular line, as far as the anterior axillary line, right lung. Dullness extended to the back and front, on the right side of the sternum, above the liver. The left side was essentially negative. Right auscultation showed diminished vesicular breathing on the posterior surface, axillary surface, and to the nipple line on the anterior surface. In this area, bronchial breathing was increased. From the fourth to the eighth rib in the axillary line, normal breath sounds were not heard. There were areas in which no sounds were audible. Bronchial breathing, large rales with clicks and rhonchi were heard. No cavernous breathing or sonorous sounds were heard. There was tenderness on pressure in the posterior axillary line opposite the 5th, 6th and 7th interspaces.

Heart: There were no murmurs. The size and position of the heart were within normal limits.

X-rays made with patient propped up in bed failed to show abscess cavity. The films resembled an unresolved pneumonia, with thick pleura. The working diagnosis was putrid abscess of the right lung, in the midaxillary line opposite the 6th interspace. He rebelled against postural drainage, stating that it had been tried, and he was too weak and sick to attempt it again. The patient was taking H. M. C. No. 2, every three hours, for the relief of cough, pain, and to produce sleep.

Under Novocaine local anesthesia, the right phrenic nerve was cut. The operating room table was placed in a marked Trendelenburg position, patient rolled on his side, and postural drainage was accomplished. About 400 ccs. of foul bloody sputum was raised by the patient. He was at once transported to the x-ray room, where anterior-posterior and lateral x-rays were made. As a result, the shadow of an apparently small abscess about the 7th interspace was located, but without fluid level. With the patient still in the Trendelenburg position, amphoric and cavernous breathing, with large, moist rales, could be heard.

During the next five days, he had some relief, but morphine was used as before. The amount of sputum began to increase, but the character remained the same.

The morning of the fifth day, under H. M. C. and nerve block with Novocaine, an incision was made in the axillary line over the 7th rib. Portions of the 6th and 7th ribs were removed. Resection of intercostal muscles and nerves, ligations of intercostal blood vessels, and covering of the raw edges of the ribs with intercostal muscle (as outlined previously) were carried out. A large aspirating needle was inserted in the general direction of the cavity outline. A flow of gas was encountered, and it had a very foul odor. In a short time, a large amount of putrid, disintegrated lung tissue was aspirated. In all, 750 ccs. of this material was obtained. The needle was left in situ, and a portion of the parietal and adherent pleura and lung tissue, about an inch in diameter, was removed with the cautery. There was no hemorrhage. Cough, which had been incessant in spite of sedatives and anesthesia, ceased. A McCarthy Endoscope was inserted through the opening, and the large, irregular, multilocular cavity was carefully examined. Part of it had perfectly smooth walls and other portions showed necrotic material, which was removed. Plainly visible through the Endoscope were many small bronchial tubes, plugged with this necrotic material.

The x-rays and physical signs had given no adequate conception of the full extent of the cavity.

Into this cavity, a free flow of oxygen was passed for about five minutes. A large rubber tube was inserted, and fastened to the skin and muscles of the wound.

The patient returned to bed in good condition. He remained free of cough. Oxygen was passed through the drainage tube several times daily. Morphine was discontinued at the end of three or four days. The amount of discharge was seldom over

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stand in the first interview that it is his disease, that it is his life that is at stake, that it is he who must take the cure, that you can point the way and be the guide, but that you cannot and will not take the cure for him, and that whether he gets well or not will depend, to a large extent, upon his ability to reconcile himself to what he has, what he must do and how he must do it. That is, treat him with judicious sympathy.

While we must have certain general rules and regulations, especially in large institutions, I do not believe in trying to get the patient to take the cure by furnishing him with printed rules and regulations. Speaking from my experience as a patient and as a physician as well, I feel regulations and rules handed out in that manner engender in the average patient a strong desire to break them.

Some may feel that what I have outlined as to the regulation and enforcement of these phases of the cure is too great a task for the physician and that he does not have time to go into such details. If the physician feels that way, he is too busy for his job. The ideal sanatorium has been described as an atmosphere, which reflects the attitude of the physician not only toward his patient, but toward life in general.

It may also be said that a certain class of patients may be handled in this manner while others, especially those of low intelligence, can not. From my experience of seventeen or eighteen years, devoted intensively to the handling of tuberculosis in private practice and in public institutions, I am convinced that, while certain patients are more amenable to this method of handling, there are no patients, as a class, that cannot be thus managed. It is also my conviction that it is by far the most effective method for getting tuberculous patients well and that it brings to the physician the greatest degree of satisfaction and joy through a work well done.

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two or three ounces, and by the end of ten days, was not more than one ounce. He gained rapidly in weight, and at the time he was discharged, he weighed 187 pounds, and was free of cough and expectoration.

Conclusions

1. Putrid lung abscess is definitely a clinical and pathological entity, bronchogenic in origin, produced and maintained by pathogenic anaerobes, usually Aspergillus or mixture of Vincent's and other anaerobes.


4. Surgery the treatment of choice. Phrenic avulsion, followed by aspiration and drainage, using electric cautery, destroying intercostal nerves, ligating intercostal blood vessels, and covering edges of ribs with redundant muscle to prevent osteomyelitis.

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