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SURGICAL TREATMENT OF ABSCESS OF THE LUNGS.

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Pulmonary abscess is said by Osler to be easy of recognition, but for my own part I have to confess that I have met with cases in which grave doubts existed in my own mind as to the question of differential diagnosis between abscess of the lung and encysted empyema. I have also met with cases in consultation in which the attending physician was in error touching the existence of any abscess at all. It is no doubt true that an abscess discharging through a bronchial tube may be recognized without much difficulty, but previous to this time I am quite certain it may be easily overlooked.

Pneumonia is now generally recognized to be an infectious inflammation of the lungs, due in the majority of cases to the influence of the diplococcus pneumoniae of Fraenkel. The disease generally pursues a well-defined course marked by certain pathologic changes; once in about fifty cases it is said the pathologic changes result in the formation of an abscess. The consolidation which results from the inflammation appears to impair the resistance of the lung to a degree which, under favorable conditions of infection, may lead to the formation of pus, and the extension of the infection leads to an accumulation of pus to the extent of forming an abscess of greater or less size, or to more than a single abscess. In view of the fact that pneumonia is a disease due to a microbe which sometimes has the faculty of setting up pyogenic processes, it is quite a matter of surprise that in this disease abscesses of the lungs do not more frequently occur. A considerable number of conditions may lead to the formation of pus in pulmonary tissue, but the most frequent causes are pneumonia and tuberculosis. The complicated character of abscesses or cavities in tuberculosis or other diseases of the lungs than pneumonia, or the inflammation following injuries or foreign bodies renders surgical procedures of doubtful utility, except in rare cases. My experience being confined entirely to abscesses following pneumonia renders it hazardous for me to go outside of pus accumulations arising from this cause.

In a case of pneumonia, if after the end of two or three weeks there is still fever and absence of improvement in the respiratory murmur, or if marked improvement in the general condition of the patient has taken place at the usual period of convalescence, together with an improvement in the respiratory condition of the affected lung, the fever reappears, and the area of consolidation extends, it may be assumed that some complica-

tion exists. Among the complications may be found consolidation of the lung, hydrothorax, empyema or abscess. Which of these conditions we have to deal with I am confident can not always be determined. If bacteriologic investigations show the tubercle bacillus, it is of course significant. The absence of bacilli is not conclusive. The usual symptoms of fluid in the pleural cavity may be looked for, and if discovered the nature of it can be determined by the use of the aspirator needle. It is usually possible, however, to determine the nature of the fluid by the clinical symptoms; the presence of chills, morning and evening temperatures, rapid pulse, and the general symptoms of septic infection are significant, but it is best not to rely on this alone, for in some cases the presence of pus may not be revealed in this way and the exploring trocar should be used to determine the facts absolutely.

Encysted empyema will not reveal itself by the ordinary symptoms of fluid in the chest cavity and it is often difficult to distinguish between this and an abscess in the lung. An examination of the lung may show that the air enters the anterior or posterior surface—more particularly the anterior in my practice—while the opposite surface is solid, showing an entire absence of vesicular or bronchial respiration. While the air may enter the anterior or posterior surface, the respiratory murmur is abnormally feeble. I have a patient on whom I operated some time ago, where well-marked but rather feeble respiratory sounds were found on the anterior surface of the right lung, but the posterior was absolutely solid; this condition had existed for about eight months, large quantities of pus being discharged through the bronchial tubes every morning. This differed from an abscess of the lung only in the absence of an offensive odor and the absence of a cavity. The diagnosis was confirmed by the introduction of an aspirating trocar between the ribs at the lower border of the scapula. A portion of rib was resected and the cavity drained. An exploration of the cavity by the finger revealed the encysted empyema.

An abscess of the lung is a much more serious condition than an empyema, on account of the difficulty of surgical drainage. In an abscess of the lung, after discharge through a bronchial tube has taken place, the drainage is frequently so unsatisfactory that after the first discharge of pus, it continues to partially fill and discharge for a considerable length of time or until the patient is exhausted. In cases where it is possible to drain by surgical means better results may be obtained. It will sometimes be observed in abscesses of the lungs that a single abscess forms, discharges, the cavity gradually contracts, and finally the patient is cured. In other cases several abscesses form and discharge at different times; this will occur when several foci of pus infection appear in a lobe which has been damaged by the intensity of the inflammatory process, even in cases which are not of embolic origin. These cases are no doubt more serious than where a single abscess forms.

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The remainder of the products of inflammation are removed by absorption or by expectoration, but the case is more protracted.

Two cases treated surgically by myself will illustrate this fact. About seven years ago I was called in consultation to see a man weighing 250 pounds, who had been attacked by croupous pneumonia two months previously. The pneumonia had pursued the ordinary course, and apparent convalescence occurred. About two weeks subsequent to this, the fever began to rise and soon after an expectoration of exceedingly offensive pus occurred. The discharge was through a small bronchial tube and the cough was almost incessant, interfering seriously with sleep or comfort. When I saw him this condition had existed about three or four weeks; it was not quite clear to our minds whether we had to deal with an abscess of the lung or an encysted empyema.

The respiratory murmur was quite clear over the anterior surface of the right chest, although somewhat feeble. The posterior surface was quite solid; not even bronchial respiration could be discovered and the area of consolidation did not change on account of the position. The patient was placed under the influence of chloroform. The posterior surface of the chest was prepared for an operative procedure and an aspirating trocar introduced deep into the chest, first between the sixth and seventh ribs just posterior to the axillary line, with negative results, again between the fifth and sixth ribs, a little farther back, with the same results. The needle was introduced a third time, between the fourth and fifth ribs, in the angle between the scapula and the vertebral column, and obtained a free flow of pus; leaving in the trocar, as a quite free incision was made through the thick mass of muscles down to the ribs. The space between the ribs was not sufficient for satisfactory work and $1\frac{1}{2}$ inches of the fifth rib was resected. Following the needle I found that the two pleural surfaces were united and, thereby, the pleural cavity was protected from pus infection. I pushed a pair of straight, broad-ligament-forceps boldly over the needle through an inch of lung substance into the abscess cavity, separated the blades freely, introduced a large rubber drainage-tube, and a large quantity of pus escaped. The cough and expectoration of pus at once ceased and the patient made a rapid and uninterrupted recovery. In this case the discharge through the bronchial tube was only sufficient to remove the constantly forming pus, and therefore no cavity was permitted to form and one of the classic symptoms, the existence of a lung cavity, was absent¹. The point of differential diagnosis in this case lay between abscess of the lung and an encysted empyema communicating with a bronchial tube. The only symptom of value indicating an abscess was the offensive odor of the pus expectorated.

Another case more recently under observation was that of a young man who passed under a rather severe attack of pneumonia. Convalescence became partially established, but soon the fever began to rise, consolidation of the lung persisted, and it became evident that some serious lesion existed; cough and expectoration was slight; sputum was examined for tubercle bacilli, but with negative results. I saw the case in consultation, June 18, 1898. The lower lobe of the left lung was solid, except the anterior surface, in which the respiratory murmur was feeble; heart displaced toward middle line; temperature ranged from 101 to 103; no cavities; no expectoration of pus. After a most careful examination I could not make a complete diagnosis of the path-

ologic condition, but believed that pus existed in the lungs or in the pleural cavity as an encysted empyema. To clear up the doubt I introduced an aspirating trocar under aseptic precautions, between the fifth and sixth ribs, just posterior to the axillary line, and withdrew a large syringe of pus. A free incision was made in the track of the needle and the pleural cavity opened, but no pus was found, only a quantity of serous fluid. My finger, which had been carefully prepared, was introduced and the surface of the lung explored. The space between the ribs was wide, and no resection was necessary. It had been determined beyond doubt that an abscess of the lung existed, by the deep exploration of the needle, and as the pleural cavity was exposed I did not feel justified in incising or puncturing the lung for fear of infecting the pleura. I therefore packed the wound lightly down to the lung, with iodoform gauze.

A few days later a free discharge of pus occurred through the wound, with the result of bringing down the temperature to 98.5 in the morning and 100 in the evening, with a corresponding reduction in the pulse. For seven days the improvement was marked. The discharge of pus gradually lessened. At the end of this time the temperature began to rise. Fearing that the drainage was not sufficient the patient was again anesthetized, June 27, and my finger forced through the chest wound. It now entered an irregular cavity of considerable size, in the lung, but no accumulation of pus was found, showing that the drain provided for the discharge of all the pus formed. Any further operative procedures were deferred under the hope that if the pus was again forming it would soon find its way into the old abscess cavity as the evidence seemed to show that we were already in the area of infection.

Six days later, July 31, the temperature, which had ranged from 101 to 103, fell to 99.6, with a corresponding improvement in his general condition. Under these circumstances it was deemed best to defer operative procedure; nevertheless, a point on the posterior surface of the chest between the fifth and sixth ribs was selected for exploration providing the patient did not continue to improve.

Three days later, however, the temperature began to rise and ranged between 101 and 104. It now became certain that another collection of pus existed and that further operative procedures were necessary. Accordingly, on July 15 exploration was made between the fifth and sixth ribs on posterior surface—at the point selected on the previous visit—and a large amount of pus found; resection of a portion of the fifth rib permitted an exploration of the cavity of the lung.

We now had two lung cavities separated by a mass of lung tissue, no doubt in condition of consolidation, offering a degree of resistance which did not permit the pus of one cavity to enter the other. The irregular outlines of both cavities could be determined by pushing the finger deeply into the wound. The improvement which followed the last operation did not continue long. Three days later the temperature rose to 104 and on July 19 I found a bronchopneumonia in the right lung. This condition had no doubt arisen from the insufflation of pus germs during chloroform narcosis, for, during the few days previous to the last operation a small quantity of pus had escaped through a bronchial tube. The condition appeared to be desperate, but fortunately the bronchopneumonia subsided and the patient made an uninterrupted and rapid recovery, thanks to the skillful care of Dr. Ruml of Cedar Rapids, Iowa.

While it may be difficult or impossible to differentiate

¹ Reported Chicago Med. Rev., May, 1893.

in a considerable percentage of cases between abscess of the lung and an encysted empyema, it may be said that the means of absolute diagnosis is the same, viz., puncture of the suspected area by an aspirating needle. If pus is found it should be evacuated by free incision, resecting a rib if necessary, to obtain sufficient drainage. If on entering the chest cavity no pus is found, the finger should be introduced for the purpose of exploration. The failure to obtain pus after its presence has been demonstrated by deep aspiration may be taken as evidence that the abscess is in the lung itself. If the finger reveals the fact that the pleural membranes are not adherent, then gauze may be lightly packed against the pleural pulmonalis to invite adhesions and thus protect the pleural cavity from the danger of infection, when subsequently the abscess is opened. There are no doubt cases where the immediate danger is so great as to warrant the surgeon in ignoring the risk of infecting the pleural membranes and opening the abscess at once, but I can not agree that this is the safest course when a few days' time can be spared. In the case I have referred to may be mentioned the fact that there was serious effusion sufficient to hold the pleural surfaces apart and thus prevent the adhesions which would otherwise probably have taken place.

I do not think it is a good practice in cases of either pulmonary abscess or empyema to use irrigation; it can do no good and often causes distressing irritation of the lung. In my earlier practice I resorted to injections of solutions of boric acid, but I have not done so of late years. As to the administration of medicines, very little can be said. It is true that certain means may be employed with great advantage for the purpose of supporting the strength of the patient, but these are indicated on general principles, regardless of the fact of a pus accumulation. It is no doubt true that if the pus is due to the pyogenic action of the pneumococcus degeneration and absorption may take place, but if it is due to a mixed infection or to the streptococcus, as is usually the case, no such fortunate result can be expected. The disease then becomes certainly a surgical disease and should be treated by surgical means adapted to the individual case, always having in view the necessity of drainage. In a certain proportion of cases the abscess discharges itself through a bronchial tube and a spontaneous cure is accomplished in this manner. While this can not be looked on as a scientific termination of a case, it is, however, the best that can be looked for in a certain number of cases.

DISCUSSION.

DR. A. H. LEVINGS, Milwaukee, Wis.—I am very much interested in the subject which the Doctor has so well placed before us, and think it is one which has not received the attention its importance merits. Some noted clinician has said, "Before treating a pulmonary abscess one must make a diagnosis, and not only make a diagnosis, but must locate the abscess." A reliable diagnosis of abscess of the lung will depend on the history, the symptoms, the character of the sputa and a thorough physical examination of the chest. An abscess of the lung is usually a secondary process; its symptoms will be more or less intermingled with, and marked by those of the original disease, in common with other acute affections of the lungs; there is pain, disturbed respiration, fever and cough; on percussion, there will be circumscribed dullness, provided the area affected be of sufficient size and superficially situated, with bronchial breathing and more or less râles. With the formation of a cavity, if the process be superficial, a portion of the dull area will have changed to tympanites, and if the costal pleura be implicated, there will be the friction sounds of pleurisy.

In a case under my observation, the percussion-note was ob-

served to alternate over a circumscribed area between dullness and tympanites. After a severe fit of coughing and the expectoration of a quantity of pus, the area which had previously been dull would become tympanitic, following this, if the patient did not cough much for twenty-four hours, and allowed the cavity again to fill, the percussion note would change to dullness. If the cavity be in full communication with a bronchus, the percussion-note will be higher with the mouth open than with it closed.

Gerhardt has called attention to the fact that if the cavity be longer in one direction than in another, and contains fluid, change in the patient's position will change the pitch. This interrupted change in pitch is considered pathognomonic, that is, with the mouth open a rise of pitch is noticed upon percussion only in a certain position, as in sitting up. While the location of the abscess is determined as nearly as possible, by a physical examination, this finding must be proved true, or corrected by the aspirating needle. If one fails with the needle to locate the abscess, then I believe it is imperative, if the symptoms are pronounced, to make a resection of one or more ribs, and palpate the lung.

DR. J. B. MURPHY, Chicago—I wish to speak of one condition in connection with the operation. In abscess of the lung, where we have pleural adhesions, is not difficult to operate. One can expose the lung, divide it with the scalpel, which is the best means, down into the abscess cavity, but we have an additional danger, and I paid for the knowledge, by sacrificing a patient a few days ago. It was a case of abscess of the lung following the inhalation of a peanut. The abscess was located under the angle of the scapula. There was a paroxysmal cough; expectorations of a half ounce every two or three hours. The abscess cavity could not be emptied by placing the patient in any particular position. There appeared to be no excursion of the lung. We believed there were firm adhesions of the pleura at the time of operation and did not carry out a plan which I have devised, demonstrated experimentally and which I shall always do in the future, regardless of adhesions, and that is determining the presence of adhesions by injecting into the pleural cavity a quantity of air, which should be done without force. If there be no adhesions, the air will be aspirated into the pleural cavity with each inspiration. What then happens? If adhesions exist, the dullness will remain and respiratory sounds will not change. If adhesions do not exist, the lung will collapse and respiratory sounds in that side will cease. In my fatal case, after resecting the ribs and exposing the pleura, I found very friable adhesions, with an increase in respiration, and the lung receded. The result was that several ounces of pus escaped from the mouth. He was resting on his healthy side. He inhaled some of the pus into the healthy lung and he died of infective pneumonia of the previously healthy lung, about forty-eight hours after the operation. I drew the infarcted portion of the diseased lung out into the incision, sutured it in the incision and had it ready for secondary opening with the scalpel or cautery, extrathoracic. I knew I could easily open it secondarily, as I had the diseased portion of the lung exposed, but he died of aseptic inhalation pneumonia produced by the pus inhaled during the anesthesia. I could have avoided that by putting the air into the pleura while he was awake and could expectorate it.

DR. D. S. FAIRCHILD, Clinton, Iowa—I have only a word in addition to say and that is in relation to physical examination. I have to confess that I am not sufficiently skilful in making a physical examination to determine whether its consolidation is due to abscess or to other causes, and I can do better if I introduce a needle. I should use the short—the smallest—needle consistent with ascertaining the real fact. I spoke of the long needle and deep exploration because we had a very large man, weighing 250 pounds. The fact in this case I did not offer as being a rule in guiding me in the matter of the long needle. I would not use a longer one than was necessary. The reason why I used a pair of forceps in pushing my way into the lung, where the abscess was located, was because I was too timid to use a sharp instrument. I used the forceps in this case and would use them again under similar circumstances.

Exophthalmic Goiter.—Dr. Pitres of Bordeaux reports that 1 c.c. of iodoformed ether injected into the parenchyma of the thyroid body at eight-day intervals for several months has cured six cases of exophthalmic goiter, and the cure has persisted two years. Six other cases were improved to such an extent that they were satisfied with the results of partial treatment and did not return to complete the course. He has thus made 120 injections and never observed any accidents.—