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On the Diagnosis and Treatment of Abscess of the Lung.

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ON THE DIAGNOSIS AND TREATMENT OF ABSCESS OF THE LUNG.

By CARL BECK, M. D.,
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While the surgical principle "*Ubi pus, ibi evacua!*" is nowadays followed more than ever before as regards even those parts of the human body that are accessible only under great difficulties, there seems to be some exception in regard to pus accumulations in the lungs, although they are by no means of rare occurrence. This hesitation in attacking lung abscesses with the surgical knife is apparently caused by the widespread prejudice that they are all of a tuberculous character and could consequently not be cured by simple evacuation. But while there is no doubt that the presence of one tubercular abscess presupposes the affection of a more or less extensive area of lung tissue, the nature of which would certainly be but little influenced by opening a single abscess, still there are many abscesses of a less formidable character which are caused by preceding inflammatory processes, by suppurative bronchitis, bronchiectasis, etc. These being of a non-tuberculous character, they are

curable, if treated after true surgical principles. If this fact were fully realized, the medicamentous armamentarium of euthanasia would be given up in many cases of alleged phthisis. Here, in the difficulty of the diagnosis, is the critical point. Still, the diagnosis of lung abscess is much easier than its localization.

The presence of copious purulent expectoration, its admixture of elastic fibres and blood pigment, the history of a preceding inflammatory process, particularly of pneumonia, which has run no typical course, the physical signs of the presence of a cavity, the absence of tuberculous manifestations, etc., should point to the existence of a lung abscess. As to localization, it has to be borne in mind that while the cavities in the apex contain more or less air, those situated farther below contain purulent secretion only. If in the latter variety expectoration is copious, so that the cavity becomes evacuated, the respiratory sounds become tympanitic on percussion, and are well perceptible on auscultation. If, on the contrary, the cavity is filled up, there is complete dullness, and the respiratory sounds are hardly if at all audible, pectoral fremitus also being absent. Cavities of recent origin are easier localized than old cases, not only because the course of the precursory disease furnishes some elucidation, but also because the physical symptoms are much more clearly pronounced. Old cavities are, with few exceptions, deeply situated, and can generally be reached below the lower angle of the scapula.

Exploratory puncture, while quite reliable in pyothorax, often fails to disclose lung abscess, and has therefore to be replaced by exploratory pleurotomy or pneumotomy. (Compare the writer's article on Exploratory

Pleurotomy and Resection of Costal Pleura, *New York Medical Journal*, June 15, 1895.)

The treatment is governed by the same principles as those which determine in any case of abscess—that is, *thorough evacuation and drainage*. This can be well done only by making a wide opening in the chest wall. To accomplish this the resection of at least two, preferably of three or four, ribs is required.

The technique is as follows: Thorough asepsis is just as necessary as in any other operation. Particular attention must be given to the skin of the patient and to the hands of the surgeon, scrubbing with green soap first for three or four minutes, then washing with alcohol or ether, and subsequently with bichloride (1 to 500). To sterilize the skin of the patient thoroughly it is advisable to cover the field of the operation with a poultice of green soap. If there is enough time, the poultice may remain for twenty-four hours. I regard this an essential factor for the disinfection of the skin, because I do not believe that under ordinary circumstances the epidermis, which shelters a multitude of pathogenic bacteria, can be rendered sterile by the usual methods of disinfection, which are generally not carried out longer than from ten to fifteen minutes. A period of twenty-four hours gives the soap a chance to permeate the epidermis thoroughly, so that scrubbing on the following day is much more effective. Sometimes, indeed, the poultice macerates the epidermis so that it can be wiped off easily.

All the appliances needed at the operation must, of course, be sterilized; the instruments, ligatures, etc., in boiling soda solution, and the towels, sponges, etc., in steam.

As a rule the eighth rib is selected. The incision, about five inches in length, should be made in the centre of the selected area and carried directly down to the periosteum of the rib. An incision is then made along both borders of the rib, and the periosteum, both in front and behind, is raised by means of a periosteal elevator. Having freed the periosteum, the elevator is pushed beneath the rib, between it and its posterior periosteum, and allowed to rest on both edges of the wound. With a blunt hook the tissues are retracted along the rib toward the axilla, and by means of bone shears the rib is cut between hook and elevator. Next, the elevator is pushed toward the sternum, forcing the rib from the last fragment of adhering periosteum; the retractor is inserted into the end of the wound, and with the scissors the rib is cut through on the other side. Now the costal pleura underneath is incised; a large aneurysm needle is introduced through one of the pleural incisions and conducted underneath the costal pleura to the other. With strong silk sutures the tissues, containing fascia, muscles, periosteum, costal pleura, and intercostal arteries, are ligated close to the surface of the rib. Then a vertical incision is made through the tissues between the two ligatures, thus creating a wide opening. By retracting the skin forcibly the skin incision can be utilized for the resection of the rib above. If, as rarely occurs in these cases, adhesions should be absent, the lung may collapse, so that it is found impossible to draw it forward, then the final incision has to be deferred for a day or more. If the lung moves freely beneath, it is essential to shut off the pleura by packing gauze tampons around the margins in order to prevent infection from the escaping pus. This pro-

cedure renders suturing of the pleura to the lung unnecessary, as well as the artificial formation of adhesions by the use of caustics. Especially if the abscess is located superficially, infection of the pleural cavity might be caused by the stitch canals. The further steps must be taken with great care and patience. If palpation of the pulmonary area has failed to give information, an exploratory needle of moderate size may be slowly pushed into the lung. If necessary, this must be repeated at different points. If the focus is not reached by the needle, the pulmonary pleura is carefully divided and the thin, slightly red-heated point of a Paquelin cautery thrust into the suspected portion. I have found it advisable to construct a thin director, made of platinum, which fits round the heated platinum tip of the Paquelin cautery, just as a stylet fits to a trocar. After the tip and encircling director have perforated the lung tissue, the tip is withdrawn and the director left *in situ* to ascertain whether any pus appears at the groove of the director. If so, a small Péan forceps is introduced and the opening is gently dilated. The great advantage of the Paquelin cautery is that it prevents infection. The exploratory needle, while entirely harmless in pyothorax, is apt to cause infection in the lung tissue.

After the cavity is exposed, no irrigation or exploration with the finger is advisable, as these procedures might provoke hæmorrhage. A narrow strip of iodoform gauze is carefully introduced into the cavity. The pleural cavity is then once more thoroughly cleaned and examined, and then packed with iodoform gauze. The whole is protected by a large piece of moss board. The dressing need not be changed more frequently than every second or third day, unless there should be signs of re-

tention of pus. It is advisable to tell the patient to blow at intervals with his mouth and nostrils closed, which helps to evacuate the purulent discharge.

The patient should get up after a few days if possible. During the first few days of the after-treatment small doses of morphine are administered for the purpose of immobilization, especially when cough is present. If the pulse be weak, strophanthus and caffeine may be added. Nourishment must be given frequently and in small quantities at a time.

Anæsthetics should be used only if the pulse be strong enough, which in such cases is an exceptional circumstance. Ether being contraindicated in respiratory disturbance, only chloroform can be employed; and I need not call attention to the danger to which the use of this paralyzing drug subjects the heart. Since, for a well-trained surgeon, the operation does not take very long, it would be better to use an ether spray or ethyl chloride, and to give a morphine injection before the operation. Even cocaine has its dangers. If chloroform is employed, only a few drops should be poured into the mask at a time, and the pulse, the respiration, and the color of the face should be very carefully watched.

My own experience comprises four cases of lung abscess, all of which recovered. In two of the cases, however, the diagnosis of pyothorax, and in one of subphrenic abscess, had been made before resection. As the diagnosis of lung abscess, however, was made before operation in only one case, I may be permitted to give its history:

M. B., thirty-one years of age, merchant, Austrian by birth, had pneumonia when ten years of age; in November, 1895, pleuropneumonia, after which cough and

copious expectoration of an offensive odor remained. Once in a while hæmoptysis, chills, and dyspnœa occurred. The treatment had consisted in the administration of expectorant mixtures and inhalations of turpentine. On February 21, 1896, the following conditions were present: The anæmic patient shows a flat thorax, which expands symmetrically. The left lung is normal. On the right side anteriorly below, tympanitic sounds, râles during inspiration. Posteriorly below, extensive dullness. Correspondingly bronchial breathing and râles. Above the apex of the heart, systolic murmur. Pulse soft, 110. Urine contains large quantities of indican. Sputa mucopurulent, about a hundred and eighty cubic centimetres in twenty-four hours. Pus corpuscles in abundance, also elastic fibres. On the following day, since the patient had expectorated but little, the dullness is much more pronounced, and the respiratory sounds are less audible. After the patient has coughed considerably the bronchial respiratory sounds become more audible again above the region of the ninth rib, where sometimes amphoric breathing can also be perceived.

On February 24, 1896, the weak patient is slightly anæsthetized with chloroform and an incision made over the ninth rib, extending from the posterior axillary line to the transverse process of the ninth dorsal vertebra. After the ninth, eighth, and tenth ribs, together with their soft tissues, were resected, the lung collapsed slightly, but soon expanded again. The pleura was packed with aseptic gauze, and then an exploratory needle was pushed forward into the centre of the exposed area. About an inch behind the pulmonary pleura gray pus, containing air and of a very offensive odor, was aspirated. After the opening was dilated, the needle having served as a guide, a little over an ounce of pus was discharged. While the cavity was packed with a small strip of iodoform gauze the patient coughed excessively. There was no hæmorrhage and no sign of shock. Twenty-four hours after the operation the patient had a temperature of 104° F., a soft pulse of 130, and a respiration of 30. There was considerable cough and copious ex-

pectoration with foul odor. After that the temperature went down gradually and the patient improved rapidly. From March 6th the patient was out of bed. The wound was obliterated by the end of April, two months after the operation. Gain in weight, twenty-three pounds. No pain or fever; once in a while a slight cough only, with expectoration of clear mucus. According to the latest news received from the patient he is perfectly well.

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