processes was indicated by roughly marking them on the patient's back with iodine.

An examination of deep and superficial reflexes detects nothing abnormal, though the knee jerk is somewhat pronounced. There has never been any loss of control over the bladder and rectum, or difficulty of any sort with these organs. There is likewise nothing in the history suggestive of the lightning pains and crises of locomotor ataxia, nor girdle pains, nor hyperæsthesia of any character. The special senses and their respective organs are quite normal, the mind unaffected.

In summing up the case the analgesia in the hands, the dystrophy of the wrist-joint, the loss of fingers by whitlows, all point to the diagnosis of Morvan's disease and furnish its most salient characters. The retention of the tactile sense with the marked blunting of painful and thermic impressions, *per contra*, constitute the so-called pathognomonic indication of syringomyelia. This therefore is probably a mixed case. Such a number of speculations as to the exact location of the lesion in the cross section of the cord present themselves, that their discussion is idle. This much seems certain, the anterior horns and the pyramidal tracts are not implicated. The solution must be left to a post-mortem examination which, fortunately for the patient, appears to be a distant contingency.

167 Dearborn St., Chicago.

ABSCESS OF THE LUNG.

Read before the St. Louis Medical Society, December 14, 1890.

BY WILLIAM PORTER, M.D.,

PROFESSOR OF DISEASES OF THE THROAT AND CHEST IN THE ST. LOUIS COLLEGE OF PHYSICIANS AND SURGEONS.

I have not thought to present an exhaustive essay upon this theme. The subject is interesting, its literature comparatively meagre, and it is closely related to the progress of that most aggressive department of our science—surgery; so that at least I may offer a few conclusions regarding it for your discussion.

Permit me at the outset, by way of definition, to say that it is not intended in this paper that the term abscess should apply to those accumulations of pus secreting cavities which are so often found in the later stages of phthisis, but only to the circumscribed suppuration which may arise independently of tubercular processes. The history of pulmonary abscess as given by the older writers is not very exact. They generally supposed that the condition was the result of delayed resolution of pneumonia, and that if the inflammation did not subside by the twenty-first day suppuration was sure to result. This latter proposition is not in accord with modern knowledge, yet we do find that abscess is often preceded by a pneumonia more or less severe. Stokes places abscess as the fifth and last stage of pneumonia,

while Leyden further recognizes a form of chronic abscess, occurring in chronic pneumonia, resembling the vomica of phthisis. While there may be many causes that predispose to pulmonary abscess, the positive causes aside from traumatism and foreign substances are easily placed in three classes: 1. Inflammation within the lung; 2. Perforation of pus cavities from without, as for instance, from the liver or pleural sac; 3. Embolism from right endocarditis or from the systemic veins. I believe also that we may sometimes have the first and third conditions combined. In croupous pneumonia, for instance, there is not only the local inflammation within the pulmonary structures, but often a marked depression of the vaso-motor system and of the motor ganglia of the heart. As a consequence there is in addition to the local pneumonia, a distension of the pulmonary vessels, oftentimes of the right ventricle itself, and greatly diminished circulatory force within the lung, conditions that must favor obstructions in either the bronchial or pulmonary system with destruction or infection of the tissues beyond the occluded point. Several cases of circumscribed abscess of the lung that I have examined closely gave no evidence of preëxisting pneumonia, while everything pointed to the hypothesis that the local lesion was the result of infarction from embolism.

A few points in the etiology of pulmonary abscess may be noticed in passing. The first is the statement found in most of our books upon the subject, that local inflammations in the lung cause the single abscess, while the results of embolism are multiple. Not always is the latter proposition correct. There certainly may be a blocking up of a single branch of a bronchial artery from embolism, sufficient to cut off all supply from that portion of the pulmonary structure beyond, causing gangrene; so also we may have a single branch of the pulmonary artery plugged by an infectious embolism, and consequent infarction and the disintegration of the surrounding structures.

A second thought closely associated with the etiology of pulmonary abscess is the fact that while occlusion of a bronchial artery is more likely to produce gangrene than an occlusion of a pulmonary branch, yet the latter conditions may also cause gangrene by the infarction and often consequent apoplexy, destroying the bronchial circulation and thus cutting off nutrition.

While then we may believe that an embolism in either the bronchial or pulmonary systems may produce gangrene, is it not also probable that an embolism in a bronchial branch may produce an abscess? The fragments from this form of endocardiac inflammation are known to have septic properties and to lead to suppurative infarctions. Why not in a small bronchial artery as well as elsewhere?

Again, we may ask the question as to the relation between a slowly resolving pneumonia and pulmonary abscess. Generally the influences of the local inflammation may be directly the cause of the consequent suppuration and we nearly always find the abscess at this site of the pneumonia. I believe it possible, however, for septic material to be carried from the lung itself, during the processes either of suppurative pneumonia or pulmonary tuberculosis, to pass from the pulmonary venous system through the left heart into the aortic and by way of the bronchial arteries back into the lung, and so producing infarction and infection. My reason for this hypothesis is the result of an autopsy in a case of croupous pneumonia, which had become suppurative, and the finding of a hæmorrhagic infarct and tissue degeneration in the opposite lung, in which were no post-mortem evidences of pneumonia.

Believing embolism, either of a bronchial or pulmonary arterial branch, to be a frequent cause of abscess in the lung, I would not underestimate the effect of local inflammation in the lung as a causative agent, for after all, most of the cases of abscess are the result of such conditions. This is what we might expect where restoration to the normal is delayed, especially after pneumonia. In the croupous type, and indeed, in the catarrhal also, the epithelial lining of the vesicle is destroyed, and if a suppurative process follows incomplete resolution it is not hard to understand how the pus-bathed vesicular wall, with impaired blood and nerve supply, may break down and the vesicles coalesce in abscess cavities.

The close parallelism which exists in the etiology of abscess and that of gangrene is also found in the study of the pathology. It is claimed by some that where the abscess is the result of embolism, that in the obstructed vessel are found specific micrococci having pathogenetic or pyrogenetic force. Ogston found microorganisms present in a large number of cases of abscess of the lung, and other observers have made the same statement. In one case I found large colonies of the bacillus tuberculosis, the abscess being undoubtedly tubercular, although the rest of the lung was not infected so far as could be determined. After the destructive tendency has been once established the conditions of progress do not vary much from what is known of abscesses in any soft tissue. The main difficulty in the diagnosis of pulmonary abscess is its oftentimes close resemblance to gangrene. It is fortunate for us that it is not necessary to establish positively the existence of one or the other, in reference to treatment. Whether it be a simple abscess, destructive gangrene, or, as often happens, gangrene with liquefaction, the indications for interference are generally plain enough.

I need not long detain the members of this

Society in discussing the diagnosis of abscess of the lung. If in addition to the physical symptoms of localized dulness and absence of vesicular murmur, we have the sudden appearance of large quantities of pus in the expectoration, an abscess may be suspected, especially if we find the presence of the elastic fibers of the alveoli, in addition to brownish red pigment and hæmatoid crystals. The absence or presence of these substances, as well as the history, will do much toward determining the differential diagnosis between abscess of the lung and pus cavities penetrating the lung from without.

Many writers have thought that the main physical symptom in making a diagnosis between extra-pulmonary cavities and those within the lung was the pectoral fremitus. Fremitus is often absent where the abscess is outside the pulmonary tissue, and increased over an intra-pulmonary cavity communicating with a bronchial tube, and partly filled with liquid, but in a paper by Fenger and Hollister in the *American Journal of Medical Sciences* for 1881, they concede the doctrine so far as consumptive cavities are concerned, but doubt whether it is true in cases of abscess or gangrenous cavities. In several cases that I have examined, where the diagnosis was afterwards confirmed by operation, the pectoral fremitus was greatly increased. The diagnosis between abscess and gangrene is not easily made so far as the physical symptoms are concerned, but the more marked depression, the horribly characteristic odor, not only of the sputum, but of the breath, and the greyish green expectoration of gangrene will not be easily forgotten. The lower layer of the sputum from gangrene, when allowed to stand, contains peculiar plug-like structures called "mycotic bronchial plugs" by Eichorst, from which Jaffe obtained a snow-white substance which turned blue when iodine was added, but which was neither albuminoid nor saccharine. He and Leyden gave this fungus the name of "*leptothrix pulmonalis*," resembling as it does the *leptothrix buccalis*. This cannot be estimated as an unfailing evidence of gangrene, as the same fungus is found in the sputum of other diseases when allowed to putrefy.

When an abscess of the lung has been recognized, the manner of treatment is a worthy subject for discussion. Shall we, in the words applied to other conditions by the venerable Dr. Boissac, "maintain a masterful inactivity" or shall we formulate expectant measures for relief, or shall we go still further and undertake active surgical interference?

There are certain conditions which must be considered before these questions are definitely answered. It must be remembered that it is not impossible that a pus cavity with such free exit as exists in the lung may fully empty itself, and the walls contract and cicatrize. Much depends upon

the character of the general symptoms. If there is free expectoration, little interference with respiration, absence of pyrexia, and nearly normal pulse there may be no great danger in delay. These conditions are exceptional, however, and the temperature and the pulse, as well as the quantity of pus expectorated, point to rapid disintegration which calls for active treatment. The location of the abscess may have something to do with the question of treatment. Fortunately the direct danger from suppuration is not great. The large vessels and nerves are well to the median line, except in the upper part of the chest, and abscess in a lower lobe is comparatively easily reached. Just here let me say that contrary to the statements of many of our best authors, I have not found abscess of the upper lung even comparatively frequent, except in tuberculous cases. Nearly all of the cases of which I have notes were found in the lower lobe, and generally on the left side. I would not, however, place the experience of a single observer in opposition to the aggregated result of many.

The size of the abscess cavity may be an important consideration in determining the treatment, while we might be willing to wait the further development where the lesion is small and non-aggressive, yet we would not procrastinate in cases of opposite conditions. I believe it is a recognized principle in surgery that when there is pus it should, if possible, be evacuated. That this principle should apply to pus in the lung as well as elsewhere is a reasonable conclusion, not only theoretically, but as a deduction from practice. Even in cases where the abscess is small, where the general symptoms are mild and the local disintegration limited, it is a question as to whether the abscess should not be treated as it would be did it occur in any other part of the body within reach.

But where there is evidence of rapid breaking down of the lining structures, where the general symptoms of fever, restlessness and great depression are prominent, it seems to me that there can be little doubt as to what should be done, and done quickly, lest there be further infection from the pus cavity. The indications for operation may not, however, apply to tubercular cavities if there be general pulmonary infection.

Where there seems to be a demand for removal of the pus, we may ask with Fenger and Hollister, "Is the cavity so situated that we may get at it from the outside, and is the pleural cavity covering it obliterated by adhesions, so that we do not run any risk of causing a fetid pyo-pneumothorax by opening into the abscess and allowing the decomposed matter to enter the pleural cavity?"

The surgeon of to-day who removes ovaries from the abdomen and tumors from the brain, would scarcely hesitate to explore any part of the thorax did he have a reasonable prospect of good

result. Certainly the largest part of the lung below the mammary and axillary regions are within reach of the exploring needle, and if need be, the knife.

The second question is of serious import; for surely we would gain little did we but transfer the infectious pus producing process from the lung to the pleural sac. There is comfort in the thought that if the abscess be large and near the surface, there are often adhesions obliterating the pleural cavity and removing the danger in this direction. The authors above referred to assert that it is quite possible to determine the existence of adhesions by making an incision down to the intercostal muscles and passing a needle through both pleural walls. If the needle moves synchronously with the respirations, there are adhesions; if not the pleural walls are not adherent and the operation may be abandoned.

The above is a valuable suggestion but the conclusion may be modified. Under no circumstances would I abandon an operation for pus so situated, unless the life of the patient were in immediate peril. The fact of a non-adherent pleura may change the character of the operation, but the desired result should be obtained in the evacuation of the pus.

When the necessity for surgical treatment is apparent, there still may be a question as to the nature of the operation. Mosler, some twenty years ago, drained a superficial tubercular cavity through a silver tube. Fenger, a decade later, recommends a double soft rubber drainage tube, and both of these avoid resection of the rib. I believe that a better operation, especially where the abscess is large and low down, is to excise a large piece of the rib directly over the cavity and make a free opening into the pleural sac. This free opening into the serous chamber not only does away with the danger of subcutaneous emphysema but enables us to keep the pleural cavity thoroughly aseptic and lessens the difficulty spoken of by Fenger and Hollister, where there are no adhesions. If the cavity be large, the excision of the rib is better for the same reason that it is almost necessary empyema in that it permits a quicker and better closure of the abscess cavity. This is the method advocated by Ruenberg, of Sweden, and adopted by some of our best surgeons, although others object to the excision of the rib on account of possible periostitis and necrosis.

After the pleural sac has been freely opened a much smaller incision may be made into the pulmonary tissues. Within the lung, even at the base, are arteries and veins sufficient to cause considerable hæmorrhage, which may be difficult to control. Sutton warns against plunging the knife into the lung, and Fenger suggests a small opening made by a trocar gradually dilated by blunt instruments till large enough to admit a good sized soft rubber tube.

As the patient will necessarily remain in bed for a considerable time the opening should be made far back on the side to allow free drainage. The tube may be kept in place by a safety pin passed through its outer end and fastened to an adhesive strip. An absorbent compress and bandage will not only take up the pus which will continue to come away for some time, but will prevent the exit and entrance of air during respiration.

That the operation is justifiable is shown by the record. In 1881 Fenger and Hollister reported six cases, one of which, their own, recovered, and Ruenberg (*London Medical Record*, 1887) collated eleven cases of abscess. Two recovered and in three cases the diagnosis was doubtful. In the three fatal cases death could not be attributed to the surgical operation. In seventeen cases of gangrene collected from medical literature, where pneumotomy was performed, seven recovered more or less completely (*Annual of Medical Science*, 1888).

Permit me to offer an abstract of the history of two cases of gangrenous abscess of the lung seen during the last year.

Case 1.—Mrs. G., of North Eighteenth street, a young married lady of good family history. I first saw her in March, 1890, in consultation with her family physician, Dr. A. S. Barnes. The statement was made that she had not been well since the birth of her child some months before, and meanwhile she had had a severe attack of influenza. She was greatly reduced in strength and flesh. The symptoms and physical signs before described as belonging to abscess of the lung were present. The odor was the most offensive I ever encountered. The lesion was in the lower left lobe and the diagnosis was gangrenous abscess of the lung.

Case 2.—The other case is that of Mr. M., of St. Louis, the well known business man, of middle age, prominent in athletic circles. I was called in consultation with his attending physicians, Drs. Kuhn and Ludeking, in October of this year. The lesion was evidently not of so long standing as in the former case, and there was no history of a predisposing cause. It was also in the lower left lobe. In addition to the usual symptoms of abscess, there was the phenomenon of marked tympanitis at the site of the lesion, which would be relieved by severe coughing and leave an area of dulness well marked. It was concluded that the tympanitis was the result of the cumulation of air in a partly filled cavity, whereby there was distension until it was forced out by a violent contraction from coughing. There was the same kind of offensive odor, but not so great, and the same grayish-green expectoration. The diagnosis again was abscess of the lung with gangrene. In each case the operation advised above was done and the diagnosis verified. The cavities were kept thoroughly washed out with a

weak carbolic acid solution and in each case complete recovery ensued. The fetid expectoration ceased, the temperature became less, and the patients began to improve immediately after the evacuation of the pus.

These cases will be more fully reported elsewhere from a surgical standpoint, but I have referred to them here to substantiate the position taken in this paper: 1. That abscess of the lung presents signs and symptoms which may admit of a positive diagnosis. 2. That abscess of the lung may be the result of, or complicate gangrene from occlusion of a bronchial artery. 3. That operation is often demanded, and that the safest operation is the excision of a rib, giving free opportunity to prevent accumulation in the pleural sac. 4. That the result of such operations indicate the value of this comparatively new field for surgical investigation.

2830 Locust street.

CYSTOMA OF THE ARYTENOID REGION OF THE LARYNX, WITH THE RE- PORT OF A CASE.

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BY W. E. CASSELLBERRY, M.D.,
OF CHICAGO.

PROFESSOR OF MATERIA MEDICA AND THERAPEUTICS, AND OF LARYNGOLOGY AND RHINOLOGY, IN THE CHICAGO MEDICAL COLLEGE; LARYNGOLOGIST TO THE WESLEY HOSPITAL, ETC.

Under this title it is proper to include only cysts, or neoplasms of predominating cystic formation, which originate from the immediate vicinity of one or other arytenoid eminence, including the neighboring part of the inter-arytenoid fold and of the ary-epiglottic fold.

Recent literature has contained numerous reports of cystomata occurring elsewhere in the larynx. Schwartz, cited by Garel,¹ places the proportion of cysts among laryngeal neoplasms in general at 3 per cent., whilst Garel himself, out of a total of sixty cases, has met with cysts of the larynx sixteen times—an unusually large proportion of 25 per cent. Most of these were situated near the anterior third of the vocal cords, and not one was in the arytenoid region. Massei,² of Naples, found among his 200 cases of laryngeal neoplasms thirteen cysts—6.5 per cent.

Cohen, in "Sajous' Annual" for 1889, cites five cases reported during the year; one of the epiglottis by Huijsman, three of the vocal cord, respectively by G. Hunter Mackenzie, Desvernine Hayward and Seifert, and one of the ventricular band by Audubert. None of the arytenoid region. Other cases of cyst of the vocal cord have

¹"Cysts of the Larynx." *Revue de Laryngologie*, June, 1887; *The Jour. of Laryngology and Rhinology*, Vol. i, p. 254.

²"Sui neoplasmi laryngei." *Tepografia del baglia*, 1885; *Internationales Centralblatt für Laryngologie, Rhinologie, etc.*, Jahrgang 11, S. 124.