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Operation — Death.

BY

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A CASE OF METASTATIC ABSCESS OF THE BRAIN; OPERATION; DEATH.[1]

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Physician to the Neurological Department of the Massachusetts General Hospital; Clinical Instructor in Neurology, Harvard University.

T. F., thirty-five years of age, a brakeman, was first seen by me in consultation with Dr. Duff, of Charlestown. The history given by Dr. Duff was as follows: He was well up to last July. On the 22d of July he went to bed with pulmonary symptoms, remaining there two days. On the 28th he was in bed again, with symptoms of pneumonia of a fetid character. The convalescence was fair up to August 17th, when he came home reeling, and dropped upon the sofa unconscious (embolus). There was frothing of the mouth and twitching of the hands and feet. He had three or more of these attacks in the course of that day, unconsciousness lasting in the first one about twenty minutes. A numbness of the right arm supervened, which quickly passed away. He was treated with carbonate of ammonia, digitalis, brandy, and warmth to the feet and cold to the head. He had another attack at midnight. Examination of the urine proved negative. The next morning at five another seizure occurred. From all these attacks he recovered without loss of power or permanent loss of sensation. On the fourth day he had another attack, and within the following week three more. The history of all those attacks was the same with the exception of the last. In all except the last he had a peculiar sensation, which started at the ribs on the right. The patient described this as a

[1] Read before the Section for Clinical Medicine, Pathology and Hygiene of the Suffolk District Medical Society, October 19, 1892.

tickling sensation. This rose to the shoulder, then spread down the arm to the hand, when he lost himself. Severe headache followed the last attack. After the first attack there was copious bloody expectoration. In the last the sensation went first down the leg, then up to the shoulder and down the right arm. Both legs and both arms twitched in all these attacks, but in some the twitching began in the right arm, and in all the right arm has been most affected. For the last two days there has been severe headache, principally on the left side.

The physical examination at this time showed a patient with considerable emaciation, of good intelligence, complaining of a dull headache, principally in the left temporal region. There was no loss of motion or sensation, no irregularity of pupils or reflexes — a normal tendon reflex on the left, an exaggerated reflex on the right — and no drawing of the face, or other sign of affection of the cranial nerves. Examination of the heart was negative.

That night an attack followed of more serious nature than any preceding. The right arm and right foot were attacked with violent convulsive movements without any loss of consciousness. A motor paralysis of the right arm followed, which lasted a few hours. The patient was then recommended to enter the hospital with a question of operation, the diagnosis of abscess being assured. He entered the hospital on September 2d in the service of Dr. M. H. Richardson. The pulse was at this time 52, full; the temperature 97.4°; and the mind clear. There was profuse sweating. The patient continued to complain of pain in the temporal and occipital regions, principally on the left. The pupils, which the day before were equal and moderately dilated, were now considerably contracted and reacted to light. The knee-jerk was very active on the right,

with a tendency to ankle-clonus. On the left the reflex was normal. The movements of the right leg were somewhat impaired, and very decidedly ataxic. The sensation of the left leg was normal, as of the right. There was no absolute paralysis of any muscle or group of muscles in the legs. The movements of the right hand were decidedly ataxic. He could not button his shirt with this hand, nor touch his nose, excepting by fumbling. This difficulty was apparently in part through lack of coördination, and partly through numbness. That there was absolute loss of power was shown by the feeble grasp, although there was no complete paralysis of any muscle distinguished. No paralysis of the face was noticed at this time. There was a decided loss of tactile sensation over the right hand to the wrist. Although his mind is apparently clear and he answers questions with intelligence, his mental processes appear somewhat sluggish.

Examination of the lungs by the house-officer: The examination is difficult on account of pain in the head increased by movement. Respiration very superficial in the right lung; fine and coarse râles at the apex and in front under the clavicle. The rest of the lung is dull, with no evident respiratory murmur. A question of pleuritic effusion on account of flatness and absence of voice-sounds low down in the axillary line in this side. Examination of the left lung is negative.

Examination of the heart negative.

Urine normal, acid, 1,022, a trace of albumen, calcic oxalate, normal and abnormal blood, a few fatty renal cells, leucocytes.

An ice-bag applied to the head and hot water to the feet, and the patient put upon liquid diet. A sixtieth of a grain of sulphate of strychnia four times a day was given. In the afternoon eight grains of phenacetin, with fifteen grains of bromide. The patient rested quietly all night.

Operation was seriously considered at this time, but it was thought best by Dr. Richardson, Dr. Carter and myself to postpone interference until more urgent symptoms appeared. These symptoms appeared on the following day, in the afternoon, when vomiting began at about three o'clock with intense headache, described by the patient as if the bones were splitting, and sufficiently severe to cause him to cry out. His pulse dropped to thirty during this attack, and he was covered with profuse perspiration. A quarter of a grain of morphia subdued the pain, and his pulse rose to sixty. He was comfortable until nine that evening, when another similar attack occurred, with pain and vomiting. During the night he vomited three times, and complained of intense headache. Two injections of morphia, each an eighth of a grain, were required to stop the pain, whereas the night before eight grains of phenacetin sufficed.

There was obstinate constipation after, as well as before entrance to the hospital. During the night the patient was dull and apathetic. His four hourly temperature varied little from 97°. His pulse varied from 50 to 60, once only rising to 80. When I saw him the following morning, the pulse was 52. The patient was lethargic; the numbness in the right arm extended to the elbow; and the movements of the right arm were very weak and fumbling, he being hardly able to find his nose at all with his right hand. The right corner of the mouth drooped slightly, and when one of the fingers was inserted between the lips they were not so firmly compressed upon the right as upon the left. The wing of the nose was not elevated as well upon the right as upon the left; the patient could, however, whistle. There was no affection of the upper branches of the facial nerve. Dr. Cheney's examination of the fundus showed no optic neuritis. A con-

sultation with Doctors Gannett, Cutler, and Conant was held, in which the question was considered whether the urgency of the symptoms did not demand immediate operation, Dr. Richardson being away. It was decided best to operate at once, and this was done by Dr. Conant, who was substituting at the time.

OPERATION (DR. CONANT).

The patient was shaved ; the scalp scrubbed with green soap, permanganate of potash and oxalic acid. A corrosive poultice was applied of 1–1000. The fissure of Rolando was marked out, a point was chosen at about its middle, and a circular flap turned down, The hæmorrhage was arrested with forceps and sponges. The periosteum was retracted and a one-inch trephine applied. The bone was not very thick. There was no notable bleeding from the skull. The dura mater was found tense and bulging, dull in color, non-pulsating. There was a small hæmorrhagic spot in the dura mater. A circular incision was made at the lower segment of the opening; and upon raising the dura mater, the brain bulged out, was non-pulsating, and revealed distinct fluctuation. There were minute hæmorrhagic spots in the pia mater. There was no sign of meningitis. A fine aspirating needle was plunged directly down, without result. It was then withdrawn and passed more forward, with the result of withdrawing a suspicion of fluid. Pressed more deeply in the same region, aspiration was followed by free evacuation of puriform fluid, with broken-down brain-tissue and a little blood. There was about an ounce removed. The opening in the skull was enlarged downwards and forwards by the Rongeur forceps. The brain, which previously to the evacuation of the pus protuded freely and was non-pulsating, receded and pulsated normally. The pulse

rose from 40 to 100. A portion of the gray matter was removed with the scissors to allow of more complete drainage. This was followed by a lively hæmorrhage, which required the ligation of a branch of the middle cerebral artery. The finger being introduced a large cavity was distinctly felt. The wound was packed with sterilized gauze, which led through the opening. The dura was then coapted around the gauze with two fine silk sutures and the skin flap coapted with interrupted silk sutures. The drainage was left at the posterior end of the incision. A sterilized absorbent dressing was applied. The patient after operation was in fair condition; pulse 90, strong; respiration good.

The operation lasted an hour and a half. After it the patient was given a sixth of a grain of morphia suppository. The pulse was strong and full, but slightly intermittent.

5.30, P. M.: The ice-bag has been kept to the head. Respiration 40, irregular. 6 P. M.: Inhalations of oxygen, five minutes in every twenty. 7.15, P. M.: Began to be very restless. Complains incessantly of feeling cold. An enema of brandy, warm milk, salt and laudanum. 8 P. M.: A subcutaneous injection of a sixth of a grain of morphia; five minutes later a sixtieth of a grain of atropia. 11.30, P. M.: Seemed to be fully conscious and would answer questions. One minim of croton oil. 11.45, P. M.: Vomited about a drachm.

September 4th. 12.30, A. M.: Respiration became very labored and superficial. The face is drawn, and the eyes show a tendency to roll upwards. A sixtieth of a grain of strychnia subcutaneously. 2 A. M.: Vomited two ounces. 2.15, A. M.: Respiration less labored. 3 A. M.: Enema of peptonized milk, brandy and Carnipeptones. 4.30, A. M.: Vomited three ounces. Condition improved. Respiration easier; color better.

During the night slept about two hours in short naps. Was restless most of the time. 9 A. M.: Gradually losing ground. Intellect much less clear. Dressing changed; very little staining. Some free blood escaped in removing the superficial packing. The gauze drain was not touched. 10.45, A. M.: An enema of peptonized milk, brandy and Carni-peptones. 1 P. M.: An enema of Epsom salts, glycerine, aloes, turpentine and water, given high, was retained three-quarters of an hour and voided in bed, with a little fæcal matter. 2 P. M.: Seemed to rally for a short time. During the latter part of the afternoon the respirations became shallow and irregular, color much cyanosed, and strong odor to breath. Took no notice of anything. 7.10, P. M.: Nitro-glycerine, two minims subcutaneously. 7 P. M.: Enema repeated. Became comatose; sank slowly; died at 10.40, P. M.

During the time after operation, motion was confined to the left arm and leg. The reflexes at the knee were normal on both sides. The pulse full and strong to the end. No autopsy allowed. The finger introduced through the wound showed the abscess-cavity and another abscess higher and towards the median line from the wound, apparently situated near the ascending frontal convolution, the cavity the diameter of a robin's egg, and running from that downwards, inwards and backwards. The index finger could just reach the end of the cavity.

Examination by Dr. Whitney showed pus-cells and disintegrated brain-tissue in the substance evacuated at the operation.

The literature on the subject of operation for metastatic abscess in the brain is very meagre, this being, as far as I can ascertain, the first recorded case of successful diagnosis and evacuation of this variety of ab-

scess. The operation has, however, been successfully performed in abscesses resulting from trauma, as well as from middle-ear disease, a result which renders operative procedure in metastatic abscess imperative where such a diagnosis has been arrived at. By far the most satisfactory treatise of this subject in its surgical bearing is that of von Bergmann,[2] from which I draw largely in the following *résumé*.

Probably a quarter to a half of all cerebral abscesses are due to extension of suppurative process from the skull, more especially resulting from middle-ear disease. Of the remainder, a large portion are due to trauma, leaving only a comparatively small number resulting from either tuberculosis or from metastatic processes. In a certain number of these cases the pus-formation in the brain is a part of a general process, as in pyæmia, there being a similar deposit in the joints, the lungs, the liver and the kidneys. In the latter case the cerebral lesion forms so small a part of the general clinical picture as to render operative procedure hardly worthy of consideration. In the case of tuberculous abscess the promise is hardly greater. As regards the metastatic abscesses, with which we have here immediately to do, these were first demonstrated by Virchow as resulting from gangrene of the lung. Biermer demonstrated similar trouble after bronchiectasis, and Näther[3] reported cases as following pulmonary abscess, gangrene, impaction, pneumonia, wound of the lung with exudative pleurisy, and empyema. The latter author found these eight cases by autopsy among one hundred cases of pulmonary gangrene, fetid bronchitis and bronchiectasis.

The chief difficulties in the way of operating for metastatic abscesses are, in the first place, the difficulty

[2] Archiv. f. klin. Chirurgie, 1887, xxxiv, p. 759.
[3] Deutsch. Archiv. f. klin. Med., bd. 34, s. 169.

of diagnosis and localization; in the second place, the probability that such abscesses are multiple.

Näther found in only one of the eight cases above mentioned a solitary abscess. The fact, however, that we may hope to find such a condition in one out of eight cases renders the operation not only justifiable but imperative when we consider the absolutely hopeless prognosis of abscess of the brain when treated expectantly or in any way other than by operative procedure. The hope that an abscess may become encapsulated, and hence become indefinitely latent, or that it may undergo cheesy degeneration and become innocuous, is practically *nil*, the tendency of abscess of the brain being in all cases either eventually to burst into the ventricle or into the vault, or to set up a diffuse meningitis. Even where the abscess has become encapsulated the tendency, as von Bergmann states, is to eventually break into the ventricle none the less. The futility of the hope that spontaneous evacuation may occur, either through the skull or into the ear, nose or other cavity, has been also dwelt upon by the same author. We have here, then, every reason for resorting to operation when the disease has become recognized and its localization made evident as being within the reach of the knife. We can offer, of course, very little encouragement in a case of this sort as regards the eventual result. Without operative interference, however, we can offer absolutely no encouragement, the fatal prognosis being practically certain.

As regards the diagnosis of abscess, the most important point is that of etiology. The number of idiopathic abscesses reported have been so greatly narrowed that it may be considered that the authentic cases are reduced almost to nothing, and even in those cases which are apparently idiopathic a more or less remote injury to the skull may be probably traced as the cause, if

not one of the other sources already mentioned. Von Bergmann was sufficiently assured upon this point to decline to operate in a case referred to him for operation by a distinguished neurologist, simply upon the ground of lack of etiology, an opinion which proved to be justified by the autopsy, which showed a diffuse inflammation, inaccessible to the knife.

In our case the etiology was evident. It is true that tumor or other disorder might chance to arise at this time and give somewhat similar symptoms. The burden of proof, however, would rest upon any other diagnosis than that of abscess. The diagnosis rests principally between abscess and new growth. In favor of abscess were the sub-normal temperature, the absence of choked disc, which, to be sure, occurs exceptionally in abscess, but far less frequently than in tumor. Certain authors have denied that subnormal temperature is characteristic of abscess, but it seems to me that a sufficient number of cases have been recorded to justify the opinion that this is an extremely characteristic symptom. The presence of chill and marked variations of temperature would have been even more diagnostic. These, however, failed completely in our case, the temperature running a more or less even course varying from subnormal to normal (from 97° to 98.5°), although it was taken every four hours to show variations had they occurred. The factor in diagnosis upon which almost absolute reliance was placed was the etiology, and the result certainly proved the wisdom of being thus guided. With regard to the size of the abscess, it could not be, of course, determined accurately whether a large or small one existed before operation. The chances were, however, in favor of a fairly large one, inasmuch as an abscess of this sort is apt to have grown to considerable dimensions before any localizing symptoms are produced,

even though it may be directly in or very near the motor region. I remember one case in which the autopsy, after a case of gangrene of the lung, revealed an abscess occupying nearly the whole of the white matter of one hemisphere, in which absolutely no cerebral symptoms had appeared, the patient dying of the pulmonary affection.

Senator [4] has reported a case as similar to ours as any with which I am familiar. In that case lung trouble had existed for six months previously, with dulness of the right upper lobe and copious expectoration with evening fever. There was a paralysis of the right arm ascending from the fingers to the upper arm; five days later an epileptiform attack, beginning in the right hand and spreading to the arm, without loss of consciousness; on the eighth day paresis of the right lower facial branches; on the ninth day, of the leg, especially in the foot; on the thirteenth day marked ataxic aphasia; and on the seventeenth, death. Autopsy revealed several cavities in the lung and numerous peribronchitic foci of inflammation. In the left hemisphere there was an abscess containing fifty grammes of pus, without any marked capsule. This nearly broke through the cortex. The convolutions from the fissure of Rolando forward into the frontal region were flattened and of a greenish discoloration, especially in the posterior part of the third frontal lobe. Von Bergmann in quoting this case states that operation was omitted on account of the rarity of single abscesses of this nature. The autopsy, however, showed that a solitary abscess really existed in this case, although the post-mortem results showed that the operation would have been futile on account of the still-existing pulmonary lesion.

[4] Berl. klin. Woch., 1879, Nos. 4–6.

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