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THE  
Journal  
OF  
Nervous and Mental Disease.

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Original Articles.

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ABCESS OF THE BRAIN—OPERATION—DEATH  
ON THE NINTH DAY.

BY J. T. ESKRIDGE, M. D.,

DENVER, COLO.

THE practical side of cerebral localization has attained to such importance as to demand that every case illustrating points in the diagnosis and treatment of lesions of the brain amenable to surgical interference should be published in full, no matter what the mistakes have been or how the case has terminated.

J. P., male, æt. 30, Colorado ranchman, contracted typhoid fever in the latter part of September 1887. By November 1, he was fairly convalescent from the fever, but the disease had left him with a purulent discharge from the right middle ear. Early in November his physician ceased to visit him, and he had no further medical attention until the evening of November 20th, when he was found in bed and delirious. It was learned that from early in November, when last seen by his physician, to about the middle of the month, he had appeared to be doing well, eating heartily and gaining in strength. About November 15, his appetite became indifferent, and he complained much of headache. He was observed to be feverish and irritable. Symptoms of ill-health gradually became more pronounced, and he had been slightly delirious for two or three evenings before his physician was called to see him.

November 20, 8 P. M., T. 101°; P. 100; R. 24. He was delirious and delusional, seeming to think that his attendants were trying to kill him. The muscles that move the left wrist were paralyzed. I was requested to see him the next day (Nov. 21) at 11 A. M., in consultation with his attending physician. We found him lying quietly in bed and intently observing the movements of every one in his room. His eyes followed us when we walked from one side of the room to the other, as one suspicious of the actions of those by whom he is surrounded. He said nothing unless some one approached his bed, when a shower of profane abuse followed. He recognized his attending physician and seemed to appreciate his efforts to relieve him, but was disturbed and irritated by the presence of any one else. He accused his attendants and me of seeking an opportunity to kill him, and damned us accordingly in the unpolished language of a western ranchman. The muscles of the left angle of the mouth were parietic. This angle of the mouth was neither depressed nor elevated when he was quiet, the usual fold was obliterated, but the depressor and elevator muscles seemed to contract slightly when he was talking excitedly. There was no aphasia. The extensor muscles of the left hand and wrist were paralyzed and flaccid, and flexors were parietic. When the arm was held up and the hand balanced at the joint it would invariably, without any apparent resistance, fall forward to the prone side of the forearm, but if the arm was carried a little further backward, and the weight of the hand thrown on the flexor muscles of the wrist, the hand slowly assumed an extended posture, and his efforts to again flex the hand were unsuccessful so long as the arm was held in this position. When the arm was lying at rest the fingers and hand were flexed. The other muscles of the left arm and the left leg muscles were unaffected. The tongue in protrusion deviated slightly to the left. There was an abscess in the cellular tissue of the right forearm, but there was no impairment of muscular movement on the right side. His mental condition precluded the possibility of accurately testing the special senses, or of getting from him an account of his

own feelings. I received profane abuse for every question that I put to him. On roughly testing vision it was found that he could see with either eye. Pinching or pricking over the paralyzed and paretic muscles was readily recognized. It was not possible to determine whether the sense of touch in these parts was present. There was a sanious or semi-purulent discharge from the right ear, slight in amount but offensive in character. The tissues over the right mastoid process were neither reddened, swollen, nor tender to pressure. Temperature  $101^{\circ}$ ; pulse  $110^{\circ}$ ; respiration 24. He could not be induced to hold his head still, so that I was unable to get the head temperatures. The tongue was coated and bowels constipated, and he would take nothing but a little milk. He had not slept much during the last two or three nights, and presented a depressed and anxious appearance.

I diagnosed abscess in the upper portion of the lower third of the post-central convolution (ascending parietal), stated that I thought the corresponding portion of the pre-central convolution and the centre for movements of the tongue were being involved, either from pressure or extending inflammation, and advised trephining at the earliest opportunity. For several reasons the operation was not performed until two days afterwards. I saw him the next day, but there was no apparent change in his symptoms. Just before the operation I again examined him. The left wrist and hand muscles appeared about the same as when I first saw him, two days before, but the muscles of the left angle of the mouth showed less weakness, and the tongue deviated but little, if at all, from the median line. T.  $101.5^{\circ}$ ; P., 110; R. 30.

Before giving an account of the operation and the subsequent progress of the case, it is important to state that the patient's surroundings were the most wretched and unfavorable imaginable for a delicate surgical operation. He was with acquaintances who kept a ranch boarding and lodging house just outside of town. The food was coarse, poor, and badly prepared. He had no regular attendant, and the attention he received was ignorant, irregular and

uncertain. The room was small, filthy and occupied by one or two other lodgers. It contained a small wood stove, and sometimes the temperature of the room was raised to 80° or 90°, and at other times allowed to cool down to 35° or 40°, the outside temperature at the time being considerably below zero. Under such circumstances it was impossible to secure ventilation. At noon of November 23d, the patient was etherized, the scalp shaved and disinfected with a solution of bichloride of mercury (1 to 2000). On account of the resistance offered by the patient, it was necessary to etherize before undertaking to shave the scalp. The surgeon was careful to cleanse and disinfect instruments, sponges, and the hands of all the assistants. I indicated the seat of the abscess, using the lines given by Seguin in "Pepper's System of Medicine," (vol. v., p. 93). The largest size trephine was used and a disc of bone was skillfully removed without injuring the the dura mater. The membrane was not abnormally adherent, and did not seem inflamed. It protruded into the opening as soon as the bone was removed. The protruding part gave a soft, semifluid sensation to the touch. After all oozing from the scalp wound had been stopped, the dura was opened, when a small quantity of serous fluid, but no pus, escaped. The outer cortical brain substance and the pia appeared nearly normal in color, but on palpation the sensation was like that given by a semifluid mass. On cutting into the brain substance, about one-eighth to one-quarter of an inch in depth, nearly an ounce of pus and detritus of broken down brain substance was evacuated. The abscess cavity was wiped, but not washed out, and was partially filled by means of a small piece of disinfected sponge, a drainage tube was inserted, a few stitches of fine silk were placed in the scalp, leaving a place for drainage through which a finger could be passed, the wound was covered with lint soaked in a solution of bichloride of mercury, and over this a bandage was placed.

I was informed by the attending physician that on the evening of the day of the operation, after the effects of the anæsthetic had passed off, that the patient was bright and

less irritable, free from delirium and did not seem to have much increase of temperature above the normal. I saw him at 11 a. m., the day after the operation and noted marked improvement. The flexor muscles of the left wrist were stronger than before the operation, the extensors were still completely paralyzed, the tongue was protruded in the median line, the left angle of the mouth showed no perceptible difference from its fellow, the irritability of temper was greatly diminished, he showed no aversion to attendants or strangers, talked freely about his condition and answered questions intelligibly. He had slept well the night following the operation and said that he felt much better than he did before it was performed. The right ear had been kept cleansed. As there was no apparent discharge from the wound and no odor, the surgeon decided not to disturb the dressing that day. The patient's temperature had fallen from  $101.5^{\circ}$  to  $99^{\circ}$ ; pulse from 110 to 90; respirations from 30 to 24. At this stage of the case the weather became intensely cold and stormy, and as my lung trouble was more or less active, I did not dare to venture out to see him again until the fifth day after the operation. I learned that on the second day after the operation the patient seemed bright and cheerful, he had no delirium or delusions, ate and slept well, and his temperature and pulse was nearly normal. The wound was dressed, but the abscess cavity was not washed out. There was but little discharge, and this was not offensive. The discharge from the ear was odorless and had nearly ceased. After this the surgeon who had operated did not have an opportunity to see the patient again for two or three days. He was left in charge of the attending physician, who changed the dressings daily, but did not wash out the abscess cavity. On November 27th, five days after the operation, we were requested to see the patient again, as his fever had returned and he was again delirious. We found his temperature  $101^{\circ}$ ; pulse, 120; respiration, 32. He was semi-unconscious and seemed to be in a stupor. The discharge from the brain had increased and become very offensive. The abscess cavity was thoroughly washed out and kept as clean as possible, but complete cleanliness,

on account of the ignorance of the attendants and the distance at which the man lived from his physician, was not kept up. Fever increased to 102°, the patient gradually became deeply comatosed and died December 1st, nine days after the operation. I was not able to see him from the fifth day after the operation until after his death. I learned that the left side had become completely paralyzed and limp, and on the day before death the muscles of the right side of the chest and of the right leg kept up a more or less constant twitching. It was with difficulty that we obtained permission to make an autopsy, and this was not granted until the second day after death, while the friends were assembled to attend the funeral services.

The brain only was allowed to be examined. The odor of the discharge from the brain and ear was horribly sickening. The adhesions of the dura to the skull cap were slightly increased over nearly the entire convex surface and external aspect of the right hemisphere, and over the left hemisphere along its median or longitudinal surface. On removal of the dura, the inner side of which was covered with pus, the arachnoid, pia and brain substance of the right side seemed to be one mass of pus from the middle of the frontal lobe to the parieto-occipital fissure. Over this area the brain substance was softened to the depth of about one-quarter of an inch. A cavity, the seat of the abscess, was found corresponding to the opening in the skull, but owing to the great amount of softening it was impossible to positively determine what convolution it occupied. On comparing it with the post-central convolution on the left side it corresponded to about the junction of its middle and lower third. Over the convex surface of the left hemisphere the membranes and brain substance seemed nearly normal in appearance, except around the upper end of the fissure of Rolando, where the membranes were injected and inflamed. The affected portion of the membranes extended longitudinally from about one inch posterior to the upper end of the fissure of Rolando to an inch in front of it, and laterally from the longitudinal sinus to a distance of half or three-quarters of an inch. The brain substance

beneath this area was slightly softened. On separating the hemispheres at the longitudinal fissure, about half a teaspoonful of creamy pus was found, and the membranes on the median surfaces of the hemispheres were inflamed and the brain substance softened, but to a greater extent on the right than on the left side. The greatest amount of softening and inflammation of the median surface of the left hemisphere was over the paracentral lobule. At the base of the brain a small quantity of pus was found on the petrous portion of the right temporal bone, around which existed a small area of meningeal inflammation. The remainder of the base of the right hemisphere and the whole of the base of the left hemisphere presented a nearly normal appearance. No time was allowed to examine the condition of the internal portion of the right petrous bone or of the mastoid cells. Much of the softening of brain substance which had taken place was undoubtedly a post-mortem result.

In reviewing this case in the light of the present thorough antiseptic method of treating surgical abscesses of the brain, it seems to me that a brilliant result was sacrificed to ineffective after-treatment. Much of this was unavoidable, because of the poverty of the patient, his miserable surroundings, and the difficulty in getting proper medical care, owing, to some extent, to the inconvenience his physician was put to in visiting him.

Twitching of the muscles of the right leg and the right side of the chest the day before death and finding at the autopsy meningitis, on the left side, largely limited to the paracentral lobule and the extreme upper portions of the post and pre-central gyri are phenomena in harmony with the results of the experiments in cerebral localization made by Horsley, Schäfer and others.

Drs. Horsley and Beevor place the spot where they believe extension of the wrist is most represented in the anterior border of the upper limb region. The case I have reported would seem to point to the post central convolution as the seat of this function in the present instance.