

TWO CASES OF EPILEPSY, FOLLOWING  
FRACTURE OF THE SKULL, WITH  
AUTOPSY AND REMARKS.

BY THEODORE DEECKE.

CASE I. Reported by Dr. Herman Mynter, Buffalo, N. Y.

W. H., twenty-eight years of age, consulted me January 10, 1882, and gave the following history: Fourteen years before, and when a boy of fourteen, he fell down the stairs of the Tift House and struck the side of his head upon the sidewalk. He was picked up in an unconscious state and carried into a neighboring drug store where he was examined by Drs. Diehl and Tobie, who recognized a fracture of the left parietal bone, with a depression large enough to admit the end of a finger. The boy was sent to the General Hospital where he remained in an unconscious state for twenty-four hours, but was removed by his parents before an operation, which was decided upon, could be performed. He recovered rapidly and remained well for a period of seven years, during which he learned the trade of trunk-making, which he subsequently followed. He made no complaint of headache or dizziness, and had no trouble from the accident. Seven years ago while at work at his trade, he had the first epileptic attack. This came on suddenly and without any premonitions. The following year he had three more convulsions. The fits subsequently increased in frequency; occurring during the first half of the last year about twice a week, and for the past six months almost every day. For three years he has been unable to work at his trade and has

earned his living by peddling. He has a wife and one child, and has always been quiet and peaceable at home, though lately he has become feeble in mind and lost memory of recent events. He has a marked epileptic countenance, pallid and puffy, but is robust and fleshy. He stares vacantly, answers questions slowly, but the range of his mental operations is quite limited. He is anxious to be cured and expresses a desire to be operated upon, but always says, after the chances of success have been explained to him, that if he can be cured he will be operated upon. He does not seem to understand that it is impossible to give a positive promise of a favorable result. His friends and family are unanimous in their decision in favor of an operation, preferring the risk of an unfortunate termination to the present helpless and hopeless condition of the patient.

At the time of the examination the pupils were normal, pulse 72 and regular, lungs healthy, and there was no disturbance of physical functions. At the lower posterior angle of the left parietal bone a slight depression was felt, continued firm pressure over this produced pain and dizziness, but no convulsions.

Dr. Judson B. Andrews, Superintendent of the Buffalo State Asylum, saw the patient in consultation, and concurred in the propriety of the operation of trephining, as presenting the only hope of benefit. The tenderness and dizziness produced by pressure over the depressed portion of bone indicated, it was believed, the presence of a spiculum of bone penetrating the membrane and entering the cerebral mass. The operation was decided upon and performed on the 18th of January, 1882, Drs. Tobie, Diehl and Bartow being present. The patient was put under the influence of ether and a triangular incision three inches long was made through the scalp over the depressed portion of bone, a profuse

hæmorrhage followed, estimated at fifteen ounces. The periosteum was firmly adherent to the bone and could only be removed by force. A depression as large as a five cent piece was discovered, in the center of which was a minute opening filled with soft tissue from which serous fluid exuded. A small crown of bone was removed by the trephine, which included the opening spoken of above. The dura looked healthy but was depressed at the lower margin of the opening. The bone was thicker than at other places, measuring three-fourths of an inch. The trephining and the following examination brought on a short epileptic fit. Six small crowns were removed around the depression and through them all the dura was found pressed downward by the exostosis. Five fits occurred during the operation. The central portion was removed by strong forceps and found to consist of a wedge-shaped piece of bone three-fourths of an inch long and one-fourth of an inch wide, firmly united to the internal table. After the spiculum of bone was removed no further fits occurred. A small opening was seen in the dura mater through which the bone had penetrated into the brain substance.

The lower angle of the wound was left open, a few sutures were introduced into the rest of the wound, and a tepid solution of carbolized water applied to the wound. Fifteen grains of potassium bromide and thirty drops of fluid extract of ergot were ordered every four hours, and ice bladders were applied to the head.

January 19, 10 A. M. Pulse 116, and small from loss of blood. Temperature 101, pupils normal, considerable tenderness over wound. Answers questions slowly, somewhat stupid, complains of weakness and thirst, and requests to be let alone. At 3 P. M. patient was in a state of violent mania, raving, crying and fighting, in abject fear of an operation, calling for help and the

police. He jumped about his bed, kicked and threatened his father and wife, demanded pistols with which to defend himself. One-half grain morphine was given subcutaneously, and he soon became quiet. At 7 P. M. pulse 120, temperature 100, talks coherently, knows his friends, wants to be let alone and not be operated on. Has taken beef tea, milk and egg in considerable quantity.

January 20, 11 A. M. Patient slept some hours during the night, but at 4 A. M., was again violent and maniacal, fought his nurses, called upon the police for help. By mistake, a neighboring physician hastily called, injected a grain of morphine instead of one-twentieth grain of hyoscyamia which had been ordered. At time of visit, pulse was 120, temperature normal, wound dressed and looking well. Patient recognized and addressed his friends, but was still impressed with the idea that some injury was intended and begs his relatives to be on their guard; 4 P. M., pulse 120, temperature 101, quiet, speaks in whisper as if afraid of talking aloud; 6 P. M., greatly excited and violent, one-twentieth hyoscyamia injected, and at 9 P. M. found him quiet but in loquacious delirium, pupils slightly dilated, skin hot and flushed, temperature in axilla, 103.

At 10 P. M., he had another attack of violent disturbance which lasted some three hours, until he fell back exhausted.

January 21, 2 A. M. I found him with stertorous respiration, and pulseless. The failure of vital power continued, and he died at 2.30 A. M. There was no epileptic convulsion after the completion of the operation. These ceased as soon as the pressure on the brain was relieved. In place of these, however, we find these several attacks of furious mania, an association and some

times a substitution not unfamiliar to those who are called upon to treat this form of disease. Post mortem examination made ten hours after death, Dr. Tobie of Buffalo and Dr. Granger from the State Asylum being present. Scalp œdematous and thickened, periosteum not adherent. The depressed portion of the skull when removed measured two by one and one-half inches. The exostosis, which extended through the membrane into the brain, was three-fourths of an inch from inner table of skull. Dura mater thickened and firmly adherent especially the depression, with small punctures where the bony development had penetrated, about one-half teaspoonful of healthy pus was spread over pia mater near opening. The membrane was thickened and highly congested, on surface were small hæmorrhages from the ruptured vessels.

Brain weighed fifty-two ounces. Left hemisphere slightly atrophied, marked flattening and depression in left ascending parietal convolution. Cut through depression reveals a deep cavity, extending nearly into the ventricle, partially filled with broken down cerebral matter, choroid plexus congested. No effusion or hæmorrhage in ventricles. Diffused congestion of pia mater at base of brain.

A microscopic examination of some of the parts involved was made in the laboratory of the New York State Lunatic Asylum, at Utica. The material delivered was unfortunately not so complete and well preserved as would have been desirable. The nature of the pathological process, however, could be ascertained with sufficient clearness to render the case of interest, especially when studied in connection with the one to be subsequently described.

The contents of the cavity, mentioned above by Dr. Mynter, were not of the character of broken down

cerebral tissue as, for example, in cases of cerebral abscess. There was found a loose and irregular texture composed of connective tissue elements, provided with blood vessels and containing in its meshes numerous smaller or larger patches, which consisted of pigmentary and fatty deposits, grumous masses and granulations. In the parts examined there were no evidences of recent pathological processes. The adjoining cerebral tissue in the white substance exhibited a kind of lining or cover of atrophied, contracted and shrivelled nerve fibres, here and there intermingled with hyperplastic proliferations of neuroglia tissue in the form of a loose felt-like growth, composed of very delicate fibrils, yet at points sending off bundles of greater density and thickness. The latter served as connections between this growth and the membranous cover or sac, which extended into the cavity and formed a sort of imperfect lining of the same. The upper part of this sac was in connection with the pia mater. Its lower portion, as well as the termination of the cavity and its relation to the ventricle, could not be ascertained for want of material. The layer of cerebral tissue showing the alteration just described was but thin, and the adjoining portions were of perfectly normal appearance, as regards the nerve elements and the circulatory arrangements. The grey cortical tissue of the convolutions involved did not extend downward into the cavity. It was well rounded off, but became extremely thin toward the commencement of the cleft. The nearer it approached, the more it presented an atrophied condition and absence of nerve cells. New formation of grey matter was nowhere observed.

CASE II. From the Records of the New York State Lunatic Asylum, Utica, N. Y.

The patient was a farmer, and at the time of admission thirty-five years of age. As far as could be ascertained, he was healthy and bright when a child. At the age of twelve or fourteen, he began to suffer at intervals of about a month from epileptic seizures. During the years following, his intellectual faculties seemed to lose strength, and he was not considered as bright as others of the family. He was nevertheless taken as a soldier in the late war, where he served acceptably two years, receiving several wounds. For some time he was sick and in hospital, after which his epileptic attacks occurred more frequently and his memory commenced to fail rapidly. He was discharged as unfit for duty and came home too feeble in mind to give an intelligent account of his service. His convulsions increased in frequency and severity, to such an extent that he was unable to perform ordinary labor. One year before admission he began to have hallucinations of sight, seeing imaginary persons about the house, or in the fields. He often mistook the identity of persons. Once he caused considerable commotion in the neighborhood where he lived, by reporting that he saw a number of boys and girls swimming together in the creek. A week before admission he became acutely maniacal, soon after a convulsion, and in this condition was brought to the asylum, in restraint, very much exhausted, but struggling to get away, and calling out at the top of his voice. He had not eaten or slept for three days and nights. This maniacal condition lasted one week, after which he became quiet and improved physically, but remained feeble-minded. This condition continued for about seven weeks occasionally interrupted by epileptic fits when, at the end of July, after a convulsion, he became greatly disturbed and was violent toward another patient. During the following month he was

again in a more comfortable condition, while the fits and convulsions continued. In November the attacks increased in number. During that month he had five fits, in December eight, in January six, in February eleven. Towards the last week of March, he became very noisy, abusive and maniacal. On the twenty-seventh he had a number of fits in rapid succession, was restless until the twenty-ninth on the morning of which day he had seven fits. After rousing sufficiently in the afternoon to take a little nourishment, he had another severe convulsion in the evening, which left him quiet but partially paralyzed on the left side. He soon became unconscious and, failing rapidly, died on the following day.

Subsequently, and after the autopsy was made, it was learned that, at the age of ten or twelve, while playing in an unfinished house, a door fell on him, the latch of which fractured his skull. He was sick in bed some time, then seemed to recover. A year afterwards he began to have epileptic seizures at intervals of about one month.

*Autopsy, Sixteen Hours after Death.*—Body in good physical condition. The skull-cap showed a slight elevation on the left parietal bone. The calvaria was not adherent to the dura mater. Opposite the elevation there was found a circular hole in the dura mater with thickened edges and one-eighth of an inch in diameter. By touching the spot with the finger, a hard pointed body was felt projecting through the hole. After dissecting the dura mater, which was not adherent to the arachnoid membrane by abnormal connections, a small defect was noticed in the upper portion of the left ascending parietal convolution surrounding the pointed body just referred to. The latter proved to be a fine



spiculum, three-fourths of an inch in length, pointed at both ends, and measuring one-tenth of an inch in diameter at the middle. By dissecting the brain there was found a large cavity occupying almost the whole of the inner part of the ascending parietal convolution, the adjoining postero-parietal lobule and a part of the posterior central convolution. The destruction of cerebral tissue extended downward as far as the lateral ventricle, and immediately bordered upon the apex of the nucleus lenticularis and a portion of the corpus callosum. In the cavity there was a second and smaller splinter of bone detected, one-tenth of an inch in length, flat and in the center about one-sixteenth of an inch in diameter. It formed an angle of about seventy degrees with the vertical position of the other.

The more minute and microscopical examination was directed especially to the nature of the tissue formation which filled out the cavity, and to the condition of the surrounding brain tissue. The texture of the growth, in the center of which the two spicula were suspended, consisted of a more or less dense framework of connective tissue fibres or bundles of fibres. In some portions they were arranged longitudinally, in others radiating from a center in all directions, and in others arranged in waving curves. The structure in the whole was a direct continuation or elongation of the pia mater. The connective tissue bundles exhibited the same anatomical characters as those of the pia mater, although they were considerably broader and denser. The formation in general was more compact, tough and somewhat elastic to the touch. It was amply provided with blood vessels, of the same kind as those found in the pia mater, from which they originated. They were frequently observed in a varicose condition. At no place did branches enter the surrounding cerebral

tissue, with which no direct circulatory communication existed. The meshes between the framework were frequently the seat of fatty and pigmentary deposits of accumulation of nuclei, and here and there the formation presented the appearance of granulation or cicatricial tissue.

The border line between the cavity and the adjoining brain tissue, was not so distinctly marked as described in the previous case. The presence of a membranous lining of the cavity was nowhere ascertained. At two or three places the growth, following the direction of the fibres of the white substance in the central portion of the convolution was seen to project with its framework into the same. At other places the brain substance exhibited near the border line hyperplastic proliferations of neuroglia tissue, or showed a thickened condition resembling cicatricial tissue.

The grey matter of the convolutions principally affected, was reduced to but a thin layer, containing, aside from the neuroglia tissue, the remnants of nerve cells, which consisted of chains of granules, radiating in an irregular manner from a circular or oval space in the center, of the size of the ganglionic cell nuclei. The nervous elements of the convolutions in the immediate neighborhood of the defect, presented nothing abnormal. The portion of the growth adjoining and projecting into the ependyma of the lateral ventricle showed patches of infiltration with white cells, and the ependyma was found traversed by fibrous growth which, at points, by raising and penetrating its epithelium lining formed small tumor-like eruptions into the ventricular space. Some of these showed an ulcerating surface. The ventricle was much enlarged and contained a bloody and purulent serum. The portion of the corpus callosum adjoining the growth was less

numerous in fibres than on the opposite side, but the fibres were normal, and so also the apex of the nucleus lenticularis, into which the growth projected about one-sixteenth of an inch with a distinct line of demarkation.

*Remarks.*—Both cases present, anatomically and clinically, some interesting points of resemblance. The direct cause and the seat of the lesions are almost identical. In both cases there was an interval between the recovery from the injury to the skull and the first epileptic seizure, in the former case of seven, in the latter as far as was ascertained, of at least two years. I shall not dwell here on the theory of the so-called epileptic zone in the grey cortex of the cerebrum, advanced some time ago by Italian authors, although the seat of the lesion was about in the same region. In both cases, however, it was apparently not the direct injury to the grey cortical substance which was the cause of the epileptic attacks since, if this had been so, these would have set in from the beginning. It is, on the contrary, more probable that at first a speedy reparation, and perhaps regeneration of grey matter took place, until, later on, with the descending of the bony splinters into the white layers of the convolutions and by its gradual destruction, the irritation and disconnections thereby produced gave rise to the epileptic symptoms.

There is also in both cases a close resemblance in the development and the nature of the psychical symptoms. They are marked by a more or less entire loss of memory, and gradual mental enfeeblement or progressive dementia. In the first case, these symptoms came on slowly during a period of seven years, in the latter more rapidly, and soon associated with hallucinations of sight. This feature in the course of the affection may

be perhaps explained likewise by the fact that in consequence of the interruptions, produced in the white tracts, which in course of time became quite extended, the ganglionic layers in the corresponding convolutions, thus gradually cut off from their general and special connections, underwent atrophy and degeneration. This was more pronounced in the second case in which the whole process was at a more advanced stage, but would have taken the same course probably in the first case, if the patient had not died just at the time when there were indications that his condition was becoming more critical.

The anatomical appearance, in both cases in the main of the same nature, are of interest, because they show so plainly the evidences of a continuous struggle between reparative and morbid processes, the latter maintained by the action of a factor which could not be removed by nature itself. The operation performed in the first case was therefore justified in every respect.

From the conditions observed we must draw the inference that more or less limited exudations, small hæmorrhages, etc., in the tissue occupying the cavity probably occurred quite frequently, but that their products were readily absorbed, so that the formation of true abscesses was prevented. In these processes the free communication of the cavity with the pia mater and subarachnoid spaces evidently played an important rôle. In the second case in the portion adjoining the ventricle, there were traces of recent pathological processes which must be considered as the cause of the finally rapid increase of the morbid symptoms and the death of the patient.

The anatomical conditions in general resemble those described by several authors under the term "pore-encephalia," or pore-encephalic defects from intra- or

extra-uterine injuries, if it is not perhaps more desirable to reserve this term for the former only. In all cases, however, thus far known, there is no essential difference in the processes and their results. In those occurring during intra-uterine life the reparation, it is true, will probably be more complete and the defect less liable to be associated with motor or psychical disturbances.