Society Transactions

NEW YORK NEUROLOGICAL SOCIETY

*Three Hundred and Seventy-Third Regular Meeting, held at the
Academy of Medicine, May 6, 1919*

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PRESENTATION OF CLINICAL MATERIAL. By DR. I. ABRAHAMSON.

Dr. Abrahamson presented six cases recovered from epidemic polioencephalitis and showed several photographs of the patients taken during the active stage of the disease. They all gave a history of epidemic influenza a short time before the development of the polioencephalitis.

CASE 1.—Present illness dated back five weeks. Patient showed Parkinson face, attitude and gait, typical tremor of paralysis agitans and cogwheel phenomenon. The condition had recently decidedly improved.

CASE 2.—The status showed a typical Parkinson face, attitude and gait, tremor mainly on intention, cogwheel phenomenon, rigidity of the extremities and bilateral facial weakness. There had been marked and constant improvement.

CASE 3.—The patient had had epidemic polioencephalitis one month ago. There was a lack of facial mobility.

CASE 4.—Four weeks ago the patient had encephalitis. He left the hospital almost well, but recently his head commenced to move involuntarily, breathing felt hampered, head and neck felt rigid, head bent forward to the right, and there was a beginning masklike face and attitude of a Parkinson. The Wassermann test of blood and spinal fluid was negative.

CASE 5.—Six weeks ago the patient had influenza. Since that time he had the following symptoms: dizziness, tinnitus, altered speech diplopia, drowsiness, mental confusion, confabulation, spasmodic cough, and hoarseness. There was present an external ophthalmoplegia, partial drowsiness, deviation of tongue to the right, weakness of right face and tremors. He had grown very stout since the onset of the illness. There was marked bulimia, polyuria, polydipsia, loss of ejaculatory power and impairment of taste. There had been a slow improvement.

CASE 6.—Initial symptoms which appeared in January, 1919, were headache, vertigo, gastric distress, weakness of extremities, especially the left, herpes labialis, fever; at first he was languid, then somnolent, eyes staring and pains in the extremities. There developed in the left leg a loss of control, then a tremor and then control of the left arm was lost and tremor developed. Following this his face became masklike, shoulder swing in walking was lost, he perspired freely, lost weight, there was difficulty in turning around quickly, retropulsion, marked slowness of all voluntary movements and twitching of right toes. On examination he presented all the signs of a typical Parkinson syndrome: masklike face, attitude and gait, tremor, rigidity and lack of associated movements. The course was progressive at first, but recently there had been steady improvement.

DR. C. C. BELING, Newark, presented a recovered case of epidemic encephalitis which showed the following sequelae: a general Parkinsonian attitude without muscular rigidity; fibrillary tremors of the tongue, face and lips; a high-pitched voice; drooling of saliva; slowness and monotony of speech; paralysis of accommodation of ocular muscles; and double facial palsy, more marked on the right. The patient had suffered from epidemic influenza and pneumonia in October, 1918, from which he apparently recovered. On March 4 he again had influenzal symptoms, followed suddenly by diplopia two days later. On March 8 he developed a spontaneous nystagmus on both sides, more marked on looking toward the right. On March 10 he became somnolent and lethargic and went into a stuporous, semiconscious condition which continued for about three weeks. During this period several lumbar punctures showed normal cerebrospinal fluid but under increased pressure. On March 29 the outstanding symptoms were a cerebellar attitude; bilateral facial paralysis, more marked on the left; increased knee reflexes, the right more than the left; tendency to hyperextension of big toes on stimulation of the soles, more marked in the right; slight clonic movements in the left ankle and a well-marked Oppenheim reflex on the right; numerous irregular movements of the eyeballs without any definite isolated nerve palsy; slight ectopia of the pupils to the inner sides; abdominal reflexes absent except for a slight left epigastric response; marked retardation of speech; general motility and anterograde amnesia for events of the previous two weeks.

CLINICAL EXPERIENCES WITH EPIDEMIC CENTRAL OR BASILAR ENCEPHALITIS. Presented by DR. B. SACHS.

This paper was based on his experience with about thirty cases at Mount Sinai Hospital and fourteen cases seen in consultation. There were only three fatalities in the former group which was not a high percentage, but out of the fourteen cases, five died with symptoms of marked bulbar involvement which made the prognosis in these cases ominous.

The term lethargic encephalitis was ill advised; it was not the encephalitis but the patient who was lethargic, and if one considered the predominance of central or basilar symptoms, a more appropriate name was not far to seek. The clinical symptoms were very striking; broadly speaking, after a brief period of drowsiness, headache, vertigo and general malaise, the patient passed into a state of lethargy associated with symptoms pointing to involvement of the cranial nerves. Meningeal symptoms were not obtrusive. The ptosis, ophthalmoplegia externa of the nuclear type, abducens paralysis, facial palsies, which were often double, cerebellar attitude of the head, difficulties of phonation and deglutition, fibrillary tremors of the tongue, double spastic paraplegias, all suggested an encephalitis that might involve the brain stem from the larger ganglions to the pons and medulla oblongata. In addition to these symptoms, the forced attitudes, catatonic states, occasional impulsive laughter, masklike expression of countenance, even atrophies of the interossei muscles, led to the inference that the anatomic processes might involve the thalamus at one end and the cervical ganglionic cells at the other.

While awaiting definite proof of the nature of the virus, a study of which was being conducted by Strauss, Hirshfield and Loewe, one might lay stress on the fact that in many of the cases, and in the majority of those seen in consultation practice, there had been a distinct history of influenza preceding the onset of the lethargic disorder by several weeks. If this sequence was not a mere coincidence, this epidemic encephalitis bore a resemblance to the

postdiphtheritic palsies in its occurrence weeks after the initial infection. If this was a postinfluenzal infection, it was curious that previous epidemics of influenza had not been followed more frequently by similar disorders. The condition was so different from anything that had occurred before that it was impossible that it should not have been noted. The stupor was not the ordinary kind; the patient lay inert with closed eyes and expressionless face, but was apparently aware of what was going on about him and readily responded by nodding to questions that were put to him in a low tone of voice.

There was as yet no proof that the course of the disease was influenced by treatment, but it was a fact that the cases that recovered had received careful nursing and feeding. The treatment was eliminative and purely symptomatic in the absence of a specific remedy.

The prognosis of the disease was determined largely by the site of the lesion. All the fatal cases in this series had been bulbar forms. The patients had not succumbed to the toxicity of the disease but from the fact that the cardiac and respiratory centers had been the site of predilection.

Many authors had been inclined to note a resemblance between the poliomyelitis virus and the virus of epidemic encephalitis, but it was a point to remember that there was extreme toxicity and rapid development of the disease in fatal cases of poliomyelitis, while the fatal cases of epidemic encephalitis ran a course lasting from one to seven and eight weeks. The laboratory and experimental investigation would have to furnish conclusive evidence on this point.

REPORT OF THE COMMITTEE ON EPIDEMIC POLIOENCEPHALITIS (LETHARGIC ENCEPHALITIS).

Dr. I. Abrahamson, chairman of the committee, read this report which embodied the number of cases and seasonal incidence of all known epidemics of this disease up to the present time. An important difference between the epidemics in foreign countries and in the United States lay in the fact that the lymphocytosis so common here had been the exception abroad. Various names had been given to this disease: epidemic encephalitis, lethargic encephalitis, influenzal encephalitis, pontobulbar encephalitis, epidemic stupor, epidemic botulism, etc. The name polioencephalitis was preferable for three reasons: The brain was mainly affected in most cases, the nuclear involvement dominated the pathologic picture, and it was a companion disease to poliomyelitis. It was recommended that the term lethargic be dropped principally because lethargy characterized only a minority of the cases. It was pathologically and experimentally established that epidemic polioencephalitis was a distinct disease and one which until recently had escaped differentiation and recognition. Reasons were cited which would seem to indicate that there was no direct relationship between influenza and epidemic polioencephalitis. The differential diagnosis between epidemic poliomyelitis and epidemic polioencephalitis was equally demonstrable. As to the clinical manifestations of epidemic polioencephalitis, syndromes of all kinds could be established. This was an infectious encephalitis, the infection originating in the nasopharynx, proceeding by the lymph streams to the basilar cerebral vessels, and then spreading through the brain stem, ganglions and cortex and also involving the upper cord, the meninges and the nerves. Those portions of the brain immediately supplied by the cerebral and basilar arteries suffered first and most severely in the majority of cases.

DISCUSSION

DR. M. NEUSTAEDTER suggested that the best way to differentiate epidemic encephalitis from poliomyelitis would be to make the poliomyelitis neutralization test. A mixture of a 1:10 serum of a convalescent patient and true poliomyelitis virus injected into a monkey would certainly prove whether the condition were poliomyelitis or not. If the disease was poliomyelitis the serum ought to neutralize promptly the virus and the animal remain well. This suggestion was made in view of the report by the reader of the paper that encephalitis had been produced in monkeys by injecting them with a filtered suspension of the scrapings of the nasopharynx.

DR. SIMON ROTHENBERG thought that the most interesting phase of this disease was the variety of neurological syndromes that these cases presented. Although he had had eighteen or twenty cases, very few had shown identically the same picture. One simulated meningitis, another polioencephalitis with double facial palsy, a third was a cerebellar case, a fourth was of the dys-synergic cerebellar type of Hunt, a fifth was blind and showed marked coreiform movements, and finally, two other cases developed a picture of encephalitis during an attack of influenzal pneumonia. These last two cases were seen at the hospital where the first symptoms of the encephalitis were observed. In these cases the Pfeiffer bacilli were found in a culture from the throat, showing what was believed to be a connecting link between influenza and encephalitis.

DR. SMITH ELY JELLIFE recalled a family in which three patients were taken ill, apparently with influenza—one with influenzal pneumonia, who died, another with herpes and the third with a typical mesencephalitic affection. That incident had been duplicated three times in his experience and it would be interesting if it could be shown that another type of encephalitis had now been isolated which could be differentiated from an influenzal encephalitis. The first case of lethargic encephalitis he had seen was in 1890, and it would be fascinating if a new type of encephalitis might be differentiated from the others, pathologically differentiated, as this might enable still further the separation of types. From the year 1400 on, writers had accentuated the extreme variability of the different epidemic clinical manifestations which seemed to follow what were apparently clearly defined influenzal forms. It would be a great advance if one could get findings that would enable the separation of a new type producing mesencephalic manifestations.

DR. J. ARTHUR BOOTH said that during the influenza epidemic of 1889 he had seen two cases complicated by eye symptoms, in both of which there was an ophthalmoplegia externa, there being a bilateral ptosis and a paresis of the external recti muscles. There was an entire absence of undue somnolence and lethargy. In contrast with these he had seen three patients during the past winter in whom, with almost exactly the same eye conditions, there was the symptom of lethargy, and in one, a marked catatonic condition.

DR. WILLIAM M. LESZYNSKY referred to six patients that he had seen: One died at the end of two weeks; another was a physician whose particular symptom was twitching of the muscles in the extremities, but he made a complete recovery. Out of this small series only one died, all the others completely recovering. He had seen two or three cases which had been difficult to differentiate at first from the catatonic type of dementia praecox. In most of the cases gripe had occurred within a month previously.

DR. ELBERT M. SOMERS, Brooklyn, referred to the reports of forty cases called central neuritis in the 1908 and 1909 issues of the New York State Hospital's Bulletin. These cases had presented various stuporous states, muscular tension, jactitations and focal and mental symptoms. They appeared following grip, cancer, tuberculosis and infective exhaustive conditions. Thereafter, central neuritis was accepted as a cause of death by the health department of the state.

OBSERVATIONS ON GUNSHOT INJURIES OF THE HEAD. MAJOR KARL WINFIELD NEY, M. C., U. S. Army, who was senior officer of the Neurosurgical Unit No. 1, A. E. F. in France, read this paper.

He emphasized the value of several procedures which experience in military cranial surgery had shown to be the cause of the immense reduction of mortality statistics. The necessity for early surgical intervention had been as pronounced in the cranial field as in others, and primary suture was the ideal treatment of all wounds. It had been found possible to effect this if all devitalized tissue could be excised before infection became established, and not only this, but certain wounds could be closed even when it was not possible to practice complete excision, and it was in this class that gunshot wounds of the brain had been placed. The surprising absence of sequelae—meningitis, brain abscess, hernia cerebri, brain fungus, etc., in these cases was most significant.

The two surgical principles of profound importance in this war, early and complete excision, gradually having found their places in the treatment of cranial injuries in so far as scalp and skull were concerned, the problem that then presented itself related to the removal of devitalized brain tissue. It was solved by Col. Harvey Cushing who combined the two principles just mentioned, and removed the disorganized brain substance by catheter suction and irrigation, completing the operation by primary closure of the dura and scalp.

In the endeavor to do a speedy operation, in the early part of the war, the procedure was often incomplete and frequently subdural adhesions were torn and the subarachnoid space opened to infection. The necessity for speed was due to the profound effects of general anesthesia on these septic patients, and realizing this the speaker became convinced that the same operative procedures were possible under local anesthesia. With the use of the same he succeeded in avoiding the shock associated with general anesthesia and was able to pursue a more deliberate operative technic without pain to, or interference from the patient, thereby insuring greater gentleness in manipulation, as well as a more careful toilet of the wound.

A 1 per cent. procain solution with a few drops of epinephrin chlorid was used and complete anesthesia was produced in less than ten minutes, which was a saving in time over general anesthesia. The infiltration of the scalp so reduced the bleeding that when the excision was made much time was saved in that only the larger vessels required clamping, and very often the field was bloodless. The hemostatic effect of the infiltration lasted always through the operation, or sufficiently long for clotting to take place in the constricted vessels, and in no case in this series did later hemorrhage occur. So satisfactory was local anesthesia in head operations that when there was a complication of other wounds the head operations were done under local anesthesia, and a general anesthesia given later for the debridement of other wounds. This applied not only to work at the front where complete operations

were done, but it proved to be just as successful at the base hospitals where operative procedures were done for brain abscess and other infective conditions associated with retained foreign bodies, cerebral hernia, fungus, etc. Another great advantage in the use of local anesthesia was the possibility of cooperation by the patient in asking him to blow his breath or cough; by thus increasing intracranial pressure it was possible to quickly remove the disorganized brain tissue, blood clots and often foreign bodies. In brain abscess it had proved most valuable, not only as to location but as to the area through which it might be approached.

Local anesthesia was *par excellence* the method of choice in cranial surgery. There was no pain in the bone, the dura was insensible to cutting though it would not stand traction or rough handling, and the manipulations of the brain itself never reached the threshold of consciousness. The operative technic, however, was of the greatest importance. After shaving the head and making as complete a neurological examination as possible, the following procedure was adhered to by Neurological Unit No. 1; complete excision of the scalp wound, avoiding contact with the lacerated edges; removal of the bone injury *en bloc*; evacuation of disorganized brain substance by having the patient blow against his closed lips or by coughing and also by catheter suction and irrigation; the detection of foreign bodies and bone fragments by catheter palpation and, after their removal, the instillation of dichloramin-T; and primary suture of dura and scalp. If the scalp defect was too large to permit suture without tension, the defect was covered by some plastic procedure. This was in many essentials the technic advocated and used by Colonel Cushing. In ventricular penetrations it was found possible, after removing the disorganized brain substance, to remove foreign bodies from the ventricles by direct inspection, using small retractors.

Observations had been made on a series of seventy-nine cases, thirteen of which were fractures with intact dura, the remaining cases representing all degrees of brain injury associated with lesions of venous sinuses, ventricular penetrations, and combined lesions with frontal sinus or mastoid complications. Nine of the thirteen fractures with intact dura were complicated with either extradural or intradural hemorrhage, producing compression symptoms of varying degree. The total mortality was represented by five deaths. Judging from reports on hand and from many cases personally examined by Major Ney, he did not believe that the late complications would be many. In the examination of about 200 cases not a single one of abscess or cerebral hernia had been observed in any having had the complete early operation.

DISCUSSION

DR. ALFRED S. TAYLOR expressed his appreciation of the privilege of listening to Dr. Ney's splendid paper in which there were two things that impressed him particularly: the very great interest of the intrinsic material of the article, and the complete lucidity of the presentation of a complicated and difficult subject. The application of cranial surgery as performed in the army to civil life was plain, and it was also clear that one should apply local anesthesia more than one had been accustomed to do.

DR. HAROLD NEUHOF said that Major Ney had presented the best results that had been obtained in gunshot wounds of the brain of the American Expeditionary Forces. The earlier mortality figures in dural penetration were about 50 per cent. With the improvement in technic, as advocated chiefly by Cushing, this was reduced to about 30 per cent. and most of the surgeons

were satisfied to have it at that low figure. Major Ney's was therefore a remarkable achievement. The technic he described was one that was followed, with a few variations, by all the teams under Cushing's command with parallel results. The principle had been to permit dural defects, even if large, to remain as such. Dr. Neuhof himself believed that some form of dural repair was indicated and, when the tear was too large, he employed transplantation of fascia. Fascia lata was employed and entered into the dural defects. The results were satisfactory, both immediately and as later reported. Dr. Neuhof stated his belief that local anesthesia for operations on the head not only proved the method of choice for war wounds but would similarly prove the anesthesia of choice in head operations in civil life. Since his return he had done several operations on the head under local anesthesia, among them a bilateral suboccipital craniotomy, as well as an osteoplastic flap in the parietal region, with results that encouraged its further use in head surgery.

COL. EDWIN BEER added a few words from his personal observations confirming Major Ney's statements. He declared that there was no doubt that these results were the best attained, but whether credit was due to Major Ney's own skill than to the use of local anesthesia there was some question. Dr. DuMartell of Paris told the speaker that he did all his civil skull and brain surgery under local anesthesia and had even removed a cerebellar pontine tumor, which was a difficult procedure. The most remarkable thing, proved by Ney and others, was the discovery that the brain was able to stand so much contamination without disastrous effect. One could not possibly get absolute sterility in these war wounds, and yet the dura could be closed as well as one could close up the knee joint, showing that the vital processes could be trusted to cope with the residue of infectious material which could not be removed.

DR. SACHS considered that the two most impressive points about this address were: First, the observation that local anesthesia acted as a hemostatic of the scalp; he had often thought that the large number of deaths in children following cranial surgery was due to loss of blood. Secondly, he was interested to learn that the surgeon's finger was not in future to be brought in contact with the brain substance and hereafter only the catheter would penetrate the depths of the brain. It would also be a great aid to the recognition of the presence of abscess on the operating table if the patient himself under local anesthesia could assist by exerting intracranial pressure through blowing out his cheeks, indicating the exact site and thus doing away with so much of the indiscriminative puncturing of the brain tissue that had been necessary in times gone by. It had been a delightful privilege to listen to this clear exposition of such valuable experiences and remarkable results as Major Ney had attained.