CRANIAL NERVE PALSIES AS A MANIFESTATION OF PERIPHERAL NEURITIS IN ALCOHOLIC INSANITY.

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In the literature on neurological complications of alcoholism but scant reference has been made to the occurrence of cranial nerve palsies in alcoholic peripheral neuritis. Although Russell Brain (1) states that there is no form of polyneuritis in which the cranial nerves may not suffer, he refers to the rarity with which they are affected in the alcoholic form, and mentions only the vagus and the facial nerves as being occasionally involved. Collier and Adie (2) in Price's *Text-book of Medicine* state that facial palsies, ptosis, nystagmus and weakness of the extra-ocular muscles have been observed, whilst Feiling (3) writes in the *Oxford Medicine* that with the exception of nystagmus, involvement of the cranial nerves is very rare in alcoholic neuritis.

By a curious coincidence three medical men were recently admitted to St. Andrew's Hospital in confusional attacks which proved to have an alcoholic ætiology. Two of these patients had, in addition to signs of peripheral neuritis in the limbs, demonstrable ocular palsies; whilst the third, on recovering from his confusion, gave a history of frequent diplopia prior to his mental illness and unassociated with drunkenness. In view of the apparent rarity of such cases, it seemed to us worth while to record these three, especially as one of them raised certain points in differential diagnosis.

We were able to trace only one recent case which was exactly comparable with our own. This was the case presented by McAlpine (4) at a clinical meeting of the Neurological Section of the Royal Society of Medicine in 1926. His patient was a woman, æt. 32, who had been consuming large quantities of whisky. One month before admission to hospital she had complained of cramp-like pains in the legs. The day after a fall in the street she complained of double vision, and three days later she showed definite paresis of both sixth nerves, absent deep reflexes in the legs, though with very little loss of power, and such obvious mental symptoms as loss of memory, especially for recent events, loss of emotional control and hallucinations. There was no facial weakness. The usual type of glove-and-stocking anæsthesia was present in the limbs. The paresis of the sixth nerves gradually disappeared, but paralysis

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of the legs progressed until no movement of the toes or feet was possible. It was not until two months later that power began to return to the toes and feet, by which time the mental condition had much improved.

Other published cases in which an ocular palsy was present in Korsakov's syndrome due to alcohol were those of Carmichael and Stern (5). In one of their cases a slight external rectus palsy and nystagmus were recorded, whilst in another the patient was said to have had a divergent squint and nystagmus. Both these cases came to autopsy, but the cranial nerves were not examined.

Spangenberg and Belgrano (6) have recently published a case of alcoholic peripheral neuritis in which many cranial nerves were affected. Their case was that of a man, æt. 47, a heavy drinker, in whom the manifestations of peripheral neuritis were wholly cranial. No signs of neuritis could be elicited in the limbs. With the exception of the first, second, third, sixth and eighth, all the cranial nerves were involved, the most severely affected being the fifth and the seventh. There was a homonymous diplopia due to paresis of the trochlear nerve. The differential diagnosis in this case was carefully considered on account of the peculiar distribution of the lesions, but amelioration of the symptoms on abstention from alcohol and subsequent partial recovery of the functions of the affected nerves supported the diagnosis of alcoholic neuritis, there being no evidence of syphilitic or other infection. This rare case was interesting from our point of view on account of the diplopia and ocular palsy due to involvement of the fourth nerve.

The following is an account of the cases at St. Andrew's Hospital:

CASE 1.—Dr. B—, a married man, æt. 42, was admitted on August 6, 1933, in a state of acute confusional insanity. The attack was ushered in by visual and auditory hallucinations, and, according to the certificates, disorientation in time and place had been complete before admission. There was a history of chronic alcoholism dating from 1918, and for the past few months the patient's consumption of whisky had been greatly increased. Three fits had occurred since March, 1933, but no accurate information regarding their nature could be obtained.

On admission the patient was found to be poorly nourished. His temperature was 99°. He showed clouding of consciousness, with complete disorientation and gross memory defect.

Physical examination revealed a complete bilateral external rectus palsy. (Diplopia had developed two days prior to admission.) A coarse horizontal nystagmus was present on looking to the right or left. The optic discs and other cranial nerves appeared normal. In the arms, power was good; pin-prick and touch were normally appreciated, and the reflexes were present and equal, although sluggish. In the legs, power was poor in all muscle groups; the gait was ataxic with a tendency to fall backwards; the calves were tender to pressure, although sensation to pain and touch was normal; the knee- and ankle-jerks were absent and the plantar response was flexor.

No abnormal physical signs were elicited in the lungs or in the cardio-vascular system. The blood-pressure was 118/90. The liver was slightly enlarged, 1½ in. below the costal margin.

Laboratory reports.—Blood: Kahn reaction negative; Van den Bergh reaction, direct negative, indirect positive; serum cholesterol 116 mgrm. %; plasma cholesterol 100 mgrm. %. Cerebro-spinal fluid clear, faintly yellow, no coagulum; cells 7 per c.mm., small mononuclears; total protein 0·15 %; Nonne-Apelt and

Pandy reactions positive; Kahn reaction negative; bi-coloured guaiac reaction 2100000000.

Within a week of admission the acute confusion had subsided, leaving the patient depressed, with a defective memory for recent events and much blunting of his critical faculty. By August 18 the external rectus palsy had disappeared and the patient no longer complained of diplopia. Coarse horizontal nystagmus could still, however, be elicited. Physical improvement continued, though the gait remained unsteady up to the time of discharge from hospital. Complete orientation was present by August 30, although at this date recent memory was somewhat defective. By September 26 the mental condition had so far improved that the patient's memory could be considered trustworthy, and he was by this time able to view his illness in its true perspective. Treatment consisted in gradual withdrawal of alcohol and hypodermic injection of atropine and strychnine sulphate. Alcohol had been completely withdrawn by September 26, and the patient refusing to remain in hospital as a voluntary patient, he was discharged on this date.

Summary.—A medical man, æt. 42, with a history of excessive alcohol consumption for fifteen years, was admitted in an acute attack of confusional insanity. On physical examination a complete bilateral external rectus palsy was discovered, accompanied by signs of a fully developed peripheral neuritis in the legs and enlargement of the liver. Relevant laboratory findings were the high protein content of the cerebro-spinal fluid (0·15%); the Kahn reaction was negative in the cerebro-spinal fluid and the blood; the blood cholesterol was very low (serum 116 mgrm.%), and the Van den Bergh test gave an indirect positive reaction. The ocular palsy cleared up entirely in less than a fortnight, although the signs of neuritis in the legs were unchanged on discharge from hospital seven weeks after admission, the patient having then completely recovered from his acute mental illness.

CASE 2.—Dr. J—, a married man, æt. 42, was admitted to hospital on July 28, 1933, in a state of acute confusion. Nine days previously he had developed a squint, and about the same time he had had several attacks of vomiting. For about a week he had been restless and tremulous, and had had visual hallucinations. On the day before admission he had made a homicidal attack on a fellow practitioner. There was a history of two epileptiform fits, one six months, the other three months previously, which had been attributed to alcoholism. The patient had been a heavy spirits drinker, averaging a bottle of whisky a day for the past two years, and his father was also said to have drunk excessively.

On admission his general condition was poor. He looked much older than his years and had a sallow, toxic appearance. The temperature was 101·2°. His mental condition was one of complete confusion. He was wholly unaware of his surroundings and was actively hallucinated. On physical examination a bilateral ptosis was first noticed. The optic discs were normal. The pupils were small, regular in outline, and reacted to light and on accommodation. There was a complete bilateral external rectus palsy and some drooping of the left side of the mouth. The functions of the other cranial nerves appeared normal. In the arms, power was good; sensibility to pin-prick was unimpaired, whilst the arm reflexes were sluggish, but equal on the two sides. In the legs, despite obvious wasting of the thigh and calf muscles, power was fairly good. It was difficult to test sensation accurately at this time owing to the mental state, but the response to pin-prick was definitely slower and less vehement in the lower limbs than in the arms. The knee-jerks and ankle-jerks were absent and the plantar responses could not be elicited. The heart-sounds were feeble and suggested some myocardial

degeneration. The blood-pressure was 148/84. No abnormal signs could be detected in the lungs, and nothing abnormal was felt on abdominal palpation.

The confusion subsided during the week after admission and the temperature fell to normal within a few days. On August 8 it was possible to secure the patient's co-operation in a neurological examination. Bilateral ptosis was still present, but was now greater on the right side than on the left. The pupils were small, circular, and reacted to light and accommodation. Upward and downward movements of the eyes were fair, but convergence was poor. A few nystagmoid jerks were present when the patient looked upwards. There was still a complete bilateral external rectus palsy, and the patient, now co-operative, complained of diplopia. No asymmetry of the face could now be observed, either at rest or on voluntary movement. The functions of the other cranial nerves were normal. In the arms, strength was good for all movements. The tone of the muscles was fair. There was slight wasting of all muscle groups. Co-ordination tests were poorly performed. There was doubtful diminution of sensation to pin-prick over the hands and forearms, but the patient was not a very reliable witness. The supinator jerks were feeble but equal; the biceps jerk was moderate on the right side, but feeble on the left; the triceps jerk was equally feeble on the two sides. There was gross wasting of the thigh and calf muscles, but power was surprisingly good in all groups. There was hypotonia, and much blunting of sensation to pin-prick below the knees. The calves were not tender. There was no position loss or failure of co-ordination in the legs. The gait was not tested owing to the feeble state of the patient. The knee and ankle-jerks were absent. The plantar response was flexor on the left side, but could not be elicited on the right.

On this date the patient's memory for recent events was defective, and he was disorientated for time and in place.

Laboratory findings.—Cerebro-spinal fluid clear, colourless; cells 2 per c.mm.; total protein 0·065%; Nonne-Apelt and Pandy negative. Kahn reaction negative in fluid and blood. Blood Van den Bergh negative. Blood cholesterol 64 mgrm. % in serum and plasma.

During the following week the ptosis and external rectus palsy became less marked, though diplopia was still complained of. Convergence was still poor. On the mental side disorientation for time and place persisted, and gross loss of memory for recent events with consequent confabulation for almost all his actions since admission was evident.

By September 5 the ptosis and the external rectus palsy had completely disappeared, although there was no change in the other physical signs of peripheral neuritis. Coarse nystagmoid jerks were more obvious than before on lateral and upward movement of the eyes. The mental state had by now undergone a change. Auditory hallucinations with associated delusions of unworthiness and of consequent persecution and impending punishment had developed, and the patient, who had been quite co-operative since his confusion cleared up, became restless and agitated.

During the next fortnight the physical signs remained unchanged. Failure of memory for recent events and confabulation became more pronounced, whilst the delusions persisted. The condition therefore established itself as one of Korsakov's psychosis, and up to the time this note was written no change in the symptoms had occurred which might compel us to revise this diagnosis.

Summary.—A medical man who looked much older than his age of 42 years was admitted in a state of complete confusion, following a homicidal attack on another medical man. There was a history of chronic alcoholism, to which two recent epileptiform fits had been attributed. Physical examination on admission revealed a complete bilateral sixth nerve palsy, a partial bilateral third nerve palsy and slight drooping of the mouth on the left side, in addition

to signs of peripheral neuritis in the arms and legs. Relevant laboratory findings were the negative Kahn reactions in the blood and cerebro-spinal fluid, the slightly raised protein content of the cerebro-spinal fluid (0·065%) and the very low blood cholesterol (64 mgrm.%). The blood Van den Bergh reaction was negative. Within six weeks the ocular palsies had completely recovered and drooping of the mouth was no longer noticeable, although the signs of peripheral neuritis in the limbs persisted unchanged. The mental state at the end of this period was that of Korsakov's psychosis.

CASE 3.—Dr. R—, a retired physician, æt. 63, was admitted on an urgency order on July 31, 1933, in a state of extreme confusion, in which he was extremely noisy under the influence of visual and auditory hallucinations. Disorientation was complete and there was considerable clouding of consciousness. A history of alcoholism and morphinism was later obtained. The patient had been a heavy whisky drinker for three years, and for the three months before admission his average consumption of this beverage had been four bottles a week. Since 1913, when morphia had been prescribed for him during an attack of septicæmia, Dr. R— had taken this drug in increasing doses up to 6 gr. per day. (It may here be noted that morphia injections were stopped a week after admission, and after two restless nights Dr. R— began to sleep well, and seemed to have lost the desire for the drug.)

Physical examination did not disclose any gross abnormality in the nervous system. The left optic disc was normal; the right could not be seen owing to the presence of cataract. The pupils were equal, regular, and reacted to light and on convergence. The ocular movements were at this time full and equal, but during a subsequent conversation Dr. R— volunteered the statement—which is our justification for including his case in this report—that before the onset of the confusional state he had frequently seen double, not when under the immediate influence of alcohol. It is difficult to avoid the conjecture that this diplopia was, in fact, due to a slight ocular palsy similar to, though less severe, than those of Dr. B— and Dr. J—. Motor power was poor in both arms, but there was no diminution of sensation to pain or touch, and the arm-jerks, though sluggish, were equal on the two sides. The gait was ataxic, and for the first week in hospital the patient was unable to walk without support. Power was poor in all groups of muscles in the legs, but sensory stimuli were normally appreciated and the right knee-jerk and both ankle-jerks were present. (The left knee-joint was ankylosed consequent upon an operation for a pyæmic abscess of the joint.) The plantar responses were flexor. The area of liver dullness was decreased. The heart-sounds were feeble and distant. Blood-pressure 132/75.

Relevant laboratory findings.—The Kahn reaction was negative in the blood and cerebro-spinal fluid. The protein content of the cerebro-spinal fluid was normal (0·035%). The blood Van den Bergh reaction gave a negative direct, but a positive delayed direct and indirect reading. The blood cholesterol was very low (92·3 mgrm. % in serum, 82·7 mgrm. % in plasma).

Under the routine treatment with strychnine and atropine sulphate the mental condition rapidly improved, and by August 28 Dr. R— was able to realize that his erroneous beliefs were the result of hallucinations, and that his mental illness was due to his excesses. He had a complete amnesia for the onset of his illness. He left hospital on September 11, having made a complete recovery from his acute confusional attack.

Summary.—A case of acute confusion with visual and auditory hallucinations and a history of alcoholism and morphinism. No evidence of peripheral neuritis was forthcoming from physical examination. The patient later gave

an account of previous diplopia ; this was accepted as an indication that he had had a transient ocular palsy, slighter in degree than in our other two cases.

Recovery from the confusional attack was rapid.

Discussion.

In Cases 1 and 3 the ætiological factor responsible for the illness was at once obvious. Case 2 presented some difficulty. The fever, involvement of the third, sixth and seventh nerves, the severe degree of neuritis in the legs without any pain, though with some anæsthesia, suggested at first either an acute infective polyneuritis or the syndrome described by Wernicke (7) as " alcoholic ophthalmoplegia ", which is due to a hæmorrhagic encephalitis of the mid-brain in the region of the oculo-motor nuclei. The transient nature of the ocular palsies made the diagnosis of Wernicke's syndrome untenable, since the original description of the syndrome was " an acute disease of the nuclei of the eye muscles, generally accompanied by optic neuritis and an alcoholic gait, and leading to death within ten days to a fortnight ".

The differential diagnosis from acute infective polyneuritis was not easily made. Involvement of the cranial nerves, particularly of the facial, weakness of the limbs with absence of pain are characteristic of the form of neuritis first described by Pierson in 1869, and subsequently during the Great War by Holmes (8) and by Bradford, Bashford and Wilson (9). The chief point against this diagnosis was the prominence of the mental symptoms, which are exceedingly rare in acute infective polyneuritis, although a few cases have been recorded in which a confusional psychosis somewhat resembling Korsakov's psychosis has occurred. The gross wasting of the thigh and calf muscles with retention of fair power of movement was another point against the diagnosis of acute infective polyneuritis, as in this disorder there is little muscular atrophy, even in a long-standing case, but great weakness of muscle groups, especially in the proximal segments of the limbs. In our case any weakness was in the distal segments. Examination of the cerebro-spinal fluid was of assistance in the differential diagnosis by disclosing a protein content only slightly raised above the normal, whereas in infective polyneuritis, as Collier (10) emphasized in his Morison Lectures, the protein content of the fluid is almost invariably very high. The converse, however, did not hold true in our cases, for in Case 1, in which alcohol was known from the first to have been the cause of the neuritis, the protein content of the fluid was 0·15%—an unusually high figure for a neuritis of known ætiology.

The blood cholesterol was remarkably low in all our cases—a fact which has already been observed in alcoholics in America, where there has been much speculation on the relationship of this low blood cholesterol in alcoholics to the immunity from arterio-sclerosis and gall-stones which they appear to enjoy. It was suggested by Leary (11) that since alcohol is a solvent of cholesterol, it

becomes difficult for cholesterol to precipitate in a body permeated by alcohol. Work on this subject might repay study.

Reference has already been made to the rapid onset and transient nature of the ocular palsies in the cases we have described. There were several features of this cranial neuritis which attracted our attention. We were struck by the fact that despite the rapid disappearance of the ocular palsies on withdrawal of alcohol, the signs of peripheral neuritis in the limbs persisted unchanged. The probable explanation for this was that the neuritis in the limbs was of long standing and practically irrecoverable, whilst the cranial neuritis was due to an acute process which coincided with an acute alcoholic poisoning of the cortical nerve-cells and was therefore recoverable. It must be stressed, however, that in Case 2 there was no relationship between the recovery of the cranial nerve palsies and amelioration of the mental symptoms; the acute confusional attack passed into the characteristic Korsakov's psychosis of chronic alcoholism after but a short lucid interval. Recovery from the ocular palsies was ushered in by gross horizontal nystagmus, which we regarded as an ataxia due to weakness of the respective muscles. This nystagmus persisted until perfect movement of the extra-ocular muscles returned.

In view of the opinions which are sometimes expressed about the physical basis of delusions, it may not be out of place to record that although our patients had visual hallucinations on which they based many fantastic delusions, they did not use their symptom of diplopia as a basis on which to found these delusions. As soon as they became capable of coherent expression, but while yet hallucinated, they volunteered the statement that they suffered from diplopia. We regard this as the chief point of psychological interest in our report.

It has already been mentioned that the mental disorder which gave us the opportunity of studying these patients was, in all three cases, an attack of acute confusion, in which hallucinations, in two cases visual and auditory and in the third visual only, were a prominent feature. Clouding of consciousness and disorientation were complete during the initial stages of the attack, although in two cases these symptoms rapidly disappeared under treatment. We have referred to the development of a Korsakov's psychosis with typical confabulation in the third case after the acute phase had subsided. Attacks of acute confusion with visual and auditory hallucinations not of the delirium tremens type are relatively common in alcoholism, but their association with a peripheral neuritis showing cranial manifestations would appear to be very rare.

Summary.

1. Three cases of ocular palsies associated with acute confusional attacks due to alcohol are presented, of which two were accompanied by a typical peripheral neuritis in the limbs.

2. The differential diagnosis in one case is discussed and the laboratory findings are evaluated. Reference is made to the low blood-cholesterol in alcoholism and its significance.

3. The nature of the ocular palsies, their relation to the peripheral neuritis in the limbs and their dissociation from the mental phenomena are briefly described.

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References.—(1) Russell Brain, W., *Diseases of the Nervous System*, London, 1933, p. 607.—(2) Collier, J. S., and Adie, W. J., in *Price's Textbook of Medicine*, fourth edition, London, 1933, p. 1762.—(3) Feiling, A., in *The Oxford Medicine*, Oxford University Press, London and New York, p. 660.—(4) McAlpine, D., *Proc. Roy. Soc. Med.* (Section of Neurology), 1926, xix, p. 12; *Brain*, 1926, xlix, p. 132.—(5) Carmichael, B. A., and Stern, R. O., *ibid.*, 1931, liv, p. 189.—(6) Spangenberg, J. J., and Belgrano, C. R., *Prensa Méd. Argent.*, 1933, xx, p. 24.—(7) Wernicke, *Wernicke's Lehrbuch*, 1881.—(8) Holmes, G., *Brit. Med. Journ.*, 1917, ii, p. 37.—(9) Bradford, R., Bashford, L. F., and Wilson, J. A., *Quart. Journ. Med.*, 1918, xii, p. 88.—(10) Collier, J. S., "Morrison Lectures, 1932", *Edin. Med. Journ.*, 1932, xxxix, pp. 601, 672, 697.—(11) Leary, T., *New England Med. Journ.*, 1931, ccv, p. 231.