JUVENILE AMAUROTIC IDIOCY:
A CASE REPORT

By

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THE first clinical histories of this condition were reported in Norway by Stengel (1826). Batten (1903) described changes in the macula in two members of a family who had undergone progressive mental deterioration with loss of visual and motor functions. Vogt (1906) published similar cases and attempted to delimit them as a juvenile form of Tay Sachs disease. It differed from the infantile form in that it occurred in childhood after a period of normal development; the rate of progression was slower; it was not limited to Jewish children and the ophthalmological appearances were those of optic atrophy. The following year Spielmeyer described the pathological changes in juvenile Tay Sachs disease as essentially similar to the infantile form. Further detailed pathological studies were made by Greenfield and Holmes (1925).

Sjögren (1931) collected 59 cases from a "Swedish rural population". He found the natural history of the condition uniform and highly characteristic. Blindness occurred between five to eight years, the ophthalmological appearances being those of retinitis pigmentosa with optic atrophy and dense pigmentation around the macula. Between eight and twelve years behaviour disorders, intellectual deterioration and epileptiform fits occurred. In the final stage profound dementia with pyramidal and extra-pyramidal syndromes developed. Death ensued at about 18 years of age.

Sjögren considered the condition dependent on a recessive hereditary factor. Like other rare recessive traits in man it is extremely irregularly distributed (Penrose, 1961). It has been most commonly reported in Sweden.

Juvenile amaurotic idiocy implies a psychological picture of severe subnormality. Clinical descriptions stress a progressive intellectual decline occurring in previously normal children. The term dementia would be more accurate and Mott (1907) suggested the condition be called "amaurotic dementia".

The following case report has a typical clinical history; it is of special interest from the genetic, haematological, and electrophysiological aspects.

CASE HISTORY

Ian, aged 16 years, was referred to Dr. Denis Hill from the Royal School for the Blind at Leatherhead, for investigation of epileptiform fits.

Family History. The parents are not Jewish and not consanguinous. Mother, aged 51 years, is a placid, intelligent woman of pyknic physique. Father, aged 49 years, is healthy and works as a builder.

Siblings. (*i*) David—aged 25 years, is married and is an industrial chemist. He became "short-sighted" at 12 years: when examined ophthalmoscopically no abnormality was found other than a refractive error. (*ii*) Leonard—aged 22 years, single, in good health, works as a sales representative. (*iii*) John—aged 9 years, is a high-grade mongol child who is able to wash, dress and attend to his own toilet.

There is no previous family history of epilepsy, blindness or subnormality.

Personal History. The patient was born in 1944; pregnancy and delivery were normal. He sat unsupported at 7 months, stood at 12 months and was continent of urine and faeces

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at two years. His early development was normal and he attended school from 4½ to 9½ becoming competent at reading, writing and arithmetic. School reports described him as "above average" up to the age of 8 years. He had mild attacks of measles and chicken pox between 4 and 5 years.

Present Illness. Poor vision was suspected at 8½ years when he began to misjudge the distance of objects and to have difficulty in reading. After failure of refractive methods to improve his vision he was referred to Moorfields Eye Hospital where a diagnosis of Batten's disease was made. He attended a school for "partially sighted" children from 5–10 years, but throughout his adjustment was poor. He was unable to read Braille and made no progress at arithmetic. The parents felt that he deteriorated intellectually and became unable to undertake simple arithmetical problems he had been capable of at 9 years. More recent attempts at academic training have had to be abandoned and he can now do only simple basket making.

The first epileptiform fit, consisting of a generalized tonic-clonic convulsion, occurred at 12 years. No history of aura or prodromata could be obtained. Attacks recurred three to four times per year. Minor attacks consisting of transient lapses of consciousness were observed to occur with the same frequency.

His speech became progressively more indistinct from 14 years due to marked pressure of talk and a tendency to "run" words together with perseveration of syllables.

Physical Examination. He was of asthenic physique and walked in a stiff, stooping manner with short steps. This gait is characteristic of blind people and not specific to this condition as Sjögren considered.

Central vision was absent but he was able to appreciate large, moving objects in the lower visual fields. Examination of the optic fundi showed patchy pigmentation throughout the retina of both eyes with dense areas around the macula. The optic disc was "waxy" in colour and the retinal vessels were small. A tremor of the left hand and arm was present but there was no alteration of tone. Plantar reflexes were flexor. Liver and spleen were not palpable.

Mental State. He was a pleasant, cheerful youth who would frequently attempt to perform tasks beyond his visual capacity. He became irritable if restrained or frustrated. He confabulated when asked to describe objects and persons in his vicinity. Orientation was correct, and memory for remote events was good. Retention and recall of recent events was poor. He was only able to carry out simple addition and subtraction; spelling was inaccurate beyond three letter words. There were no delusions or hallucinations.

Investigations. Hb. 90 per cent., E.S.R. 3 mm. Liver function tests were normal. Wassermann reaction in blood negative. X-ray of skull was normal apart from some thickening of the left squamous temporal bone. Examination of peripheral blood smears (Jenner-Giemsa) showed vacuolation in 50 per cent. of lymphocytes (Fig. 1).

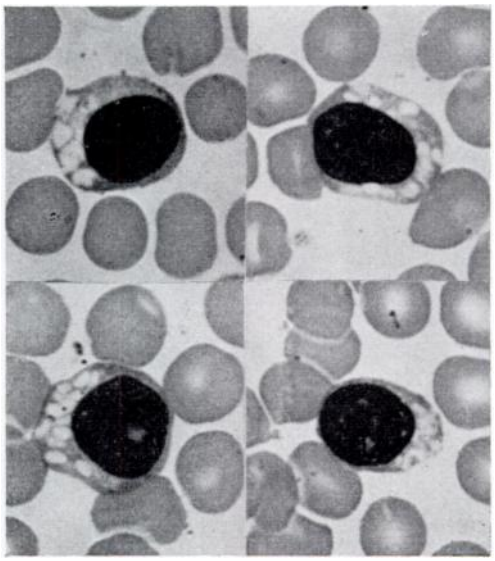


FIG. 1.

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EEG (Fig. 2). Two scalp recordings and a sphenoidal EEG (with wire electrodes) were carried out.

Prominent 8 cycle per second activity was seen but showed anti-phase further forward than is usual with normal alpha. Eye opening and closure had little effect. There was a diffuse excess of 4–7 cycle per second activity which from time to time showed sudden fluctuations in voltage.

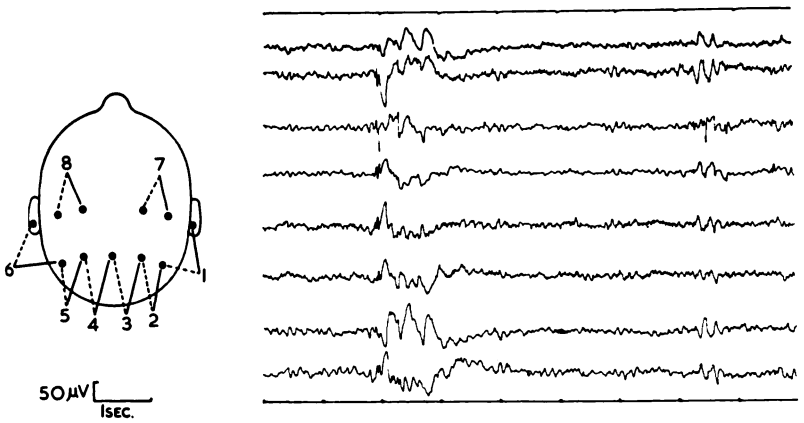


FIG. 2.

On this background more clearly defined paroxysmal discharges occurred. They varied in shape and frequency from sinusoidal frontal delta at 3 cycles per second to complexes of mixed slow, intermediate slow, sharp waves and spikes whose location was more variable. They appeared to arise "out of" 8 cycle per second activity. There was a suggestion of pseudo-periodicity. The paroxysmal discharges were considered to be of subcortical origin; their occurrence rate was not affected either by hyperventilation or photic stimulation.

Psychological Tests. A Wechsler Verbal Scale administered in 1956 gave an I.Q. of 86: repeat of this test in 1960 was 73. The Williams' Intelligence Test for children with defective vision gave an I.Q. of 78. Both Wechsler and Williams' tests are heavily loaded with verbal material and thus assess intelligence in a narrow sense. On the basis that the patient was described as a "bright" child and his previous Wechsler score was 86, the results support the clinical evidence of general intellectual deterioration.

DISCUSSION

The first systematic study of the EEG in neuronal lipidosis was made by Cobb, Martin and Pampiglione (1952). A common pattern was recognized in twelve cases. The background activity consisted of irregular, slow and intermediate slow activity of high voltage. On this background irregularly recurring bilaterally synchronous high voltage triphasic waves of less than 0·2 second duration were seen. The authors suggested there was some degree of specificity for the EEG in cerebral lipidosis.

Crawley (1957) made serial EEG studies in three cases of juvenile amaurotic idiocy and showed increasing abnormality in the EEG with progression of the clinical state. This represented the electrical response to progressive destruction of cerebral neurones and no specific diagnostic value could be attached to the EEG. Similar conclusions were reached by Morrell and Torres (1960) in serial EEG studies on a case of infantile Tay Sachs disease.

The EEG in Ian's case was similar to that described by Crawley. There was a suggestion of pseudoperiodicity in the occurrence of the paroxysmal discharges but it did not reach the level seen in inclusion body encephalitis. It seems unlikely that EEG specificity can be claimed in cerebral lipidosis.

The occurrence of juvenile amaurotic idiocy and mongolism in consecutive siblings is of genetic interest. Abnormalities in chromosomal karyotype have

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been confirmed in mongols (Lejeune *et al.*, 1959; Ford *et al.*, 1959) whilst cases of "familial mongolism" can be due to translocation mechanisms (Polani, 1960). In view of the occurrence of a mongol sibling it seemed possible that the patient might have an abnormal karyotype. A skin biopsy, culture and examination of the chromosomes constitution was carried out by Professor Penrose. The karyotype however was that of a normal male.

Vacuolation in the lymphocytes of cases of juvenile amaurotic idiocy was first described by van Bagh and Hortling (1948). The findings were confirmed by Nissen (1954) and Teglbjaerg (1955) who also found vacuolation in the lymphocytes of other normal members of the families. Mittwoch (1959) has reported cytoplasmic inclusions in the lymphocytes of six cases of gargoylism In two cases vacuolation similar to that described in juvenile amaurotic idiocy occurred. Two types of vacuoles were observed by Jelgersma (1960) in the lymphocytes of a brother and sister with juvenile amaurotic idiocy. The first type had large, circular, sharp-edged vacuoles; the second type were smaller with a more irregular edge. The blood of all the normal relatives, except the mother, showed vacuoles of the second type in the lymphocytes. This could be a manifestation of the gene for juvenile amaurotic idiocy in heterozygotes. Rayner (1952) has suggested the possibility of detecting the heterozygotes by this simple method.

Abnormal vacuolation was easily seen in 50 per cent. of the lymphocytes of peripheral blood of our case. Blood films were made from a finger prick using the coverslip technique and stained with Jenner-Giemsa. Blood films of all members of the family including the mongol sibling were examined by Professor Davidson, but no convincing abnormal vacuolation was present in the lymphocytes.

Vacuolation in the lymphocytes of cases of juvenile amaurotic idiocy is possibly due to deposition of lipid and claims to have detected abnormal neutral fats by cytochemical methods have been made (Teglbjaerg, 1955). This phenomenon is not restricted to cases of juvenile amaurotic idiocy since it has been noted in gargoylism, infantile Tay Sachs disease (Spiegel-Adolf, 1959) and Niemann-Pick's disease (Crocker, 1958). However vacuolation may have some specific diagnostic value in neuronal lipidosis and be useful for the detection of cases in large clinical populations. Full reporting of this phenomenon in cases of neuronal lipidosis would help to establish its degree of specificity.

Summary

A case of juvenile amaurotic idiocy is described; a younger sibling is a mongol. Vacuolation of lymphocytes was seen in peripheral blood smears; no abnormality was seen in the lymphocytes of other members of the family. This observation may have some diagnostic value in neuronal lipidosis.

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