# RECESSIVE FAMILIAL SPASTIC PARAPLEGIA WITH RETINAL DEGENERATION*

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*A family is described in which spastic paraplegia and retinal degeneration were observed in 5 out of 11 sibs in one generation. All affected members of this family had the onset of bilateral ocular symptoms during the fourth to fifth decade. Visual impairment was slowly progressive and ranged from 20/25 to 20/100.*

*There was a macular and perimacular speckling with small, irregular, discrete spots and central pigment proliferation, at the level of the pigment epithelium. Fluorescein angiography revealed patches of proliferating retinal pigment epithelium blocking transmission of fluorescein, surrounded by a larger area of disruption of the retinal pigment epithelium giving a " window-effect " choroidal pattern. The right macula showed a nonspecific, nonfluorescent, reticular pattern.*

*The most likely explanation of the ocular findings was a retinal degeneration involving the retinal pigment epithelium and/or the chorio-capillaries. Extensive laboratory work was negative.*

In 1968 Mahloudji and Chuke described a family of spastic paraplegia associated with a retinal degeneration. A similar association had been reported in 1959, by Kjellin. The rarity of the observations motivated us to update the pedigree of the family previously described by Mahloudji and Chuke adding two new affected members; to chart the evolution of the disease after six years, and to summarize the results of laboratory investigations.

## CASE PRESENTATION

The pedigree of this family illustrates a recessive pattern of inheritance. All affected members belong to the same sibship. Ten out of 11 sibs were examined and 5 have been found similarly affected. Examination of the parents and of the descendants revealed no evidence of spastic paraplegia or retinal degeneration. The description of the course of the disease is based on six years' surveillance of the family. The duration of symptoms within the sibship was from 2 to 16 years.

The neurological features of affected members appeared in the third to fourth decade. Intellectual performance was duller in affected than in unaffected members since early childhood. Full-scale intelligence quotients were in the seventies for the affected members. Cranial nerve function, except for sight, was normal. The main signs were distal motor weakness of the lower extremities and spasticity. There were milder changes in the arms.

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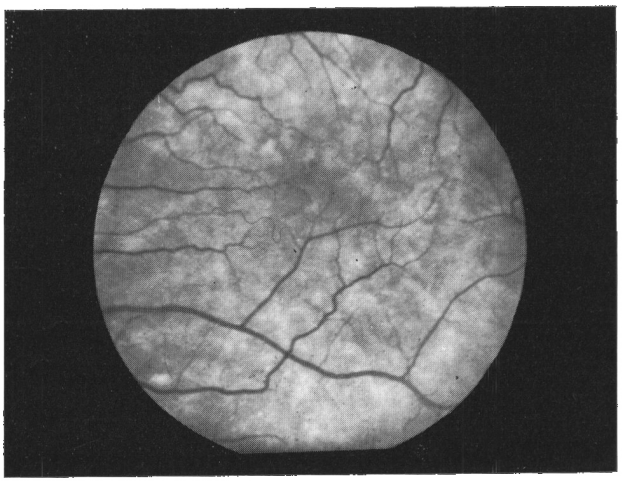

Fig. 1. Fundus photograph in case S.S. showing a macular and perimacular speckling with small irregular yellowish-white spots, the size of a druzen.

In long-standing cases there was generalized wasting of legs. One patient was confined to a wheel chair. In cases of longer duration, there was clumsiness of fine finger movements and of gross motor movements in the legs. This was felt to represent sensory motor dysfunction rather than true cerebellar involvement, because tremor, dysmetria, and adiadochokinesia, were absent. There were no fasciculations or fibrillations. In more advanced cases there was loss of joint position and vibratory sense in the toes. Sensory changes were never present in the arms. Deep tendon reflexes were increased, abdominal reflexes were present and cutaneous plantar reflexes were extensor. Urinary urgency and frequency and bowel weakness with constipation were present but not incapacitating. Equinovarus deformity of the feet and variable kyphoscoliosis correlated with the severity of neurological involvement.

All affected members of this family developed bilateral ocular signs during the fourth to fifth decade, 10 to 20 years later than the appearance of neurological abnormalities. Visual impairment progressed slowly and was often subjectively unapparent. The visual acuity was between 20/25 and 20/200. There was a macular and perimacular speckling with small, irregular, discrete, yellowish-white spots the size of a druzen (Fig. 1). The center of the spots showed pigment proliferation. Fluorescein angiography showed patches of proliferation of the retinal pigment epithelium blocking transmission of fluorescein, each surrounded by a larger area of disruptions of the pigment epithelium giving a " window effect " in the choroidal pattern (Fig. 2). The right macula in one patient showed a non-

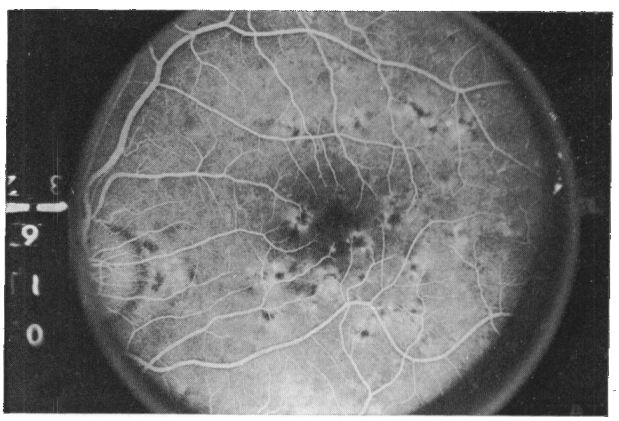

Fig. 2. Fluorescein angiography in case J.C.

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specific, nonfluorescent reticular pattern. Photographs of the fundus from one patient in 1967 and in 1973 showed no evidence of progression of the structural abnormality in the retina. There was no increase in functional impairment over the same 6-year period. In one case retinal examination was normal in 1966 and showed typical lesions in 1973.

There were no consistent abnormal laboratory findings. Serum levels of lactodehydrogenase and creatinphosphokinase were normal. Levels of protein and glucose in the spinal fluid were normal. No specific aminoacid defect was uncovered in the urines or in the blood. Mild hyperlipoproteinemia type IV was present in one affected, and one unaffected, sib. Ceruloplasmin, magnesium, and dopamine beta hydroxylase activity were normal. There were no measles or rubeola antibodies in the cerebro-spinal fluid. The Sabin dye test for toxoplasmosis was positive at 1/128. Electromyography gave no evidence of lower motor neuron involvement.

## DISCUSSION

The family described in the present paper was affected by a recessive disorder, characterized by a spastic paraplegia and retinal degeneration.

The spastic paraplegia began in the early thirties and showed a clinical picture and evolution as usually observed in other hereditary spino-cerebellar degenerations. The intellectual deficit was noticed from childhood and apparently not progressive.

The most likely explanation of the ocular findings was a dystrophy of the pigment epithelium only. The absence of severe functional impairment was against a primary defect in the neuroepithelium, such as the tapetoretinal dystrophies. The lack of fluorescein leakage and the normal appearing vessels suggests that Bruch's membrane was intact. In the differential diagnosis of the ocular lesions the "flecked retina syndrome", triad of fundus flavimaculatus, fundus albipunctatus, and druzen of Bruch's membrane shoud be mentioned. Retinitis pigmentosa albescens may also be considered but is distinguished by the unmistakable progression in involvement of the photoreceptor, typical of the tapetoretinal dystrophies.

Ocular involvement is rarely reported in hereditary spastic paraplegia, in contrast to other spino-cerebellar degenerations such as the Pierre Marie hereditary cerebellar ataxia. In families with spastic paraplegia most frequently optic atrophy has been described (Van Bogaert 1952, Wilson 1963, Bruyn and Went 1964, Nyberg-Hansen and Refsum 1972). Retrobulbar neuritis (Bickerstaff 1950), tapetoretinal degeneration (Jéquier et al. 1945, Van Bogaert 1952), and macular degeneration (Louis-Bar and Perot 1945) have occasionally been associated with spastic paraplegia.

Kjellin (1959) described 2 pairs of brothers who had spastic paraplegia, congenital mental deficiency, distal amyotrophy of limbs, and retinal degeneration. The retinal degeneration was in the central retina with small atrophic foci and displacement of pigment through the macula and its immediate vicinity. The disease started in the thirties and the course was insidious.

We think that the family described in the present paper is similar to the families described by Kjellin in the clinical features, genetical pattern, associate findings, and natural history of the disease. The particularity of the association of a spastic paraplegia and retinal degeneration seems to us specific enough to constitute an entity, separable from the other forms of hereditary spastic paraplegia. [1]

[1] In the discussion that followed the presentation of this paper, the following remarks were made: Dr. J. François (Ghent, Belgium) thought that the ocular lesions were typical of fundus flavimaculatus; Dr. C. Raitta (Helsinki, Finland) suggested the diagnosis of placoid pigment epitheliopathy, as have been described by Donald Gass in his treatise on fluorescein angiogphy; Dr. H. Skre (Bergen, Norway) mentioned the existence of a similarly affected family in Norway.

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