Reticular tapeto-retinal dystrophy

As a possible late stage of Sjögren's reticular dystrophy

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Two patients with a reticular dystrophy of the retina were noted to have fundus changes reminiscent of those reported in patients with Sjögren's reticular dystrophy. Our subjects were older than previously reported cases of Sjögren's dystrophy and manifested more extensive retinal abnormalities involving both the retinal pigment epithelium and photoreceptors. Similarities were noted both ophthalmoscopically and on fluorescein angiography. Reduced central visual acuity, abnormal findings on electroretinography, ophthalmoscopically evident hypopigmentation, and probable atrophy of the retinal pigment epithelium were specific to the more advanced condition.

Case reports

Case 1, a 72-year-old white man, had a 6-year history of bilateral decrease in central vision and a slowly progressive loss of night vision over the past 10 years. The patient could not recall having been examined by an ophthalmologist before the onset of these symptoms. His father allegedly had had similar difficulties with both central and night vision which had begun when he was in his forties, although further details of his eye disease were not available. Other family members, including seven children, were said to be not as yet affected. The patient was unaware of either Swedish or Dutch ancestors.

When he was seen in September 1974, the patient's best corrected vision was 3/200 in the right eye and 10/200 in the left, with correction +1D sph. in the right eye and +1.25D sph. in the left. His general health was good. External and motility examinations were normal, both pupils reacted normally to direct and consensual light stimuli, slit-lamp examination of the anterior segments was normal, as was the intraocular pressure of 14 mm Hg in the right eye and 12 in the left. There was no increase in cellularity of the vitreous. The patient had 1 to 2+ bilateral nuclear sclerotic and anterior cortical changes in both lenses. Fundus examination showed bilateral, midperipheral 360° reticular-appearing lesions (Fig. 1). Alternate areas of pigment epithelial hypopigmentation and hyperpigmentation

formed polygonal reticular units analogous to the meshes of a fishnet. Hyperpigmented 'knobs' were noted at the junction of individual polygonal units as in a net. Within each unit, extensive hypopigmentation of the retinal pigment epithelium and minimal atrophy of the choriocapillaris could be demonstrated by fluorescein angiography (Fig. 2). Fig. 2 also shows linear or sickle-shaped dark areas of hypofluorescence which correspond to zones of hyperpigmentation. Lesions in the posterior pole appeared more confluent and less hyperpigmented, no longer maintaining a reticular appearance as they approached the optic disc. Within the maculae were accumulations of moderately dense black clumps of retinal pigment epithelium (Fig. 3). The retinal vessels and optic discs were normal. Electroretinographic (ERG) responses were nondetectable in both eyes. Because of poor co-operation and a marked reduction in visual acuity, it was impossible to obtain reproducible visual fields, electro-oculogram (EOG), or dark-adaptation studies. The plasma ornithine level was normal (Simmell and Takki, 1973).

FIG. 2 Case 1. Late-stage fluorescein angiogram of peripheral lesions. Hypopigmentation of retinal pigment epithelium is demonstrated by hyperfluorescence within polygonal units (large arrows). Patchy choriocapillaris atrophy is demonstrated by retained visibility of large choroidal vessels within some polygonal units (arrows). Also seen are sickle-shaped areas of hypofluorescence

Case 2, a 63-year-old white woman, had a history of progressively failing central vision during the preceding decade and diminishing night vision of approximately 12 years' duration. Visual acuity, documented elsewhere in 1972, was 20/20 in the right eye and 20/30 in the left. At that time, the visual fields were noted to be constricted. Because of a fundus abnormality, her physicians considered the diagnosis of tapeto-retinal degeneration or gyrate atrophy of the choroid and retina.

The patient's father was alleged to have had extremely poor eyesight at the time of his death at the age of 85 years. His ocular problems began at about the age of 55 years with night blindness and decreasing central vision. He was told by an ophthalmologist that he had a 'pigment dispersal'. The patient's elder brother also had markedly reduced vision at the time of his death at the age of 78 years. However, he was a diabetic, and details of his eye disease were not available. Other members of the family, including six other siblings, were not similarly affected. Although her specific recollections were uncertain, the patient stated that she did have Dutch ancestors.

When first examined by us in May 1973 the patient's visual acuity was hand movements at 1 m with correction +3 D sph. in both eyes. External and motility examinations were unremarkable. Both pupils reacted briskly to direct and consensual light stimuli. Slit-lamp biomicroscopy of the anterior segments was normal. Early cortical and nuclear sclerotic changes were seen in both lenses. The vitreous was normal bilaterally. Ophthalmoscopic examination showed that the appearance of both eyes was virtually identical (Fig. 4). Both discs were normal, with a cup-disc ratio of 0.4. The retinal vessels appeared to be normal in calibre and course. There was a scattered mottling of the retinal pigment epithelium within the macular region, especially in the right eye (Fig. 5). The sensory retinal tissue in this region appeared thin on biomicroscopic examination. Approximately 4 disc diameters temporal to the fovea and 1 disc diameter nasal to the disc, discrete reticular pigmentary changes began which extended anteriorly to the equator for 360°. This pattern became confluent and therefore indistinct at the posterior pole. As in Case 1, the reticular changes were formed by alternate areas of decreased and increased density of the retinal pigment epithelium. Areas of increased pigment density circumscribed zones of hypopigmentation creating a polygonal mosaic pattern. These areas were approximately one-half disc diameter in size (Fig. 6). Occasional scattered clumps of pigment were seen in the sensory retina. Fluorescein angiography demonstrated that choriocapillaris vessels were present in areas of clinically evident retinal pigment epithelial hypopigmentation (Fig. 7). Even within the posterior pole, where the reticular pattern was clinically less evident, dark areas of hypofluorescence were apparent where increased pigment density was still present (Fig. 8). No leakage of dye was noted from either the large retinal vessels or the foveal capillaries. Within discrete polygonal lesions, late fluorescein staining of the choroid and sclera both accentuated the reticular pattern of hypopigmentation and emphasized the presence of choriocapillaris vessels (Fig. 9). Visual

fields measured on a Goldmann perimeter revealed a 15° relative central scotoma bilaterally. Peripheral fields were irregularly constricted within 30° to 2 isoptres (II-4e and IV-4e). An ERG revealed markedly subnormal photopic and scotopic responses in both eyes. The scotopic b-wave amplitude was only 50 µV in the right eye and 75 µV in the left after 20 min of dark adaptation. (Scotopic b-wave values for her age would normally be greater than 275 to 300 µV in our laboratory.) An EOG showed light-peak to dark-trough ratios of 1.50 bilaterally. These ratios are significantly below 1.70, the lowest limit of normal for the patient's age group. Dark-adaptation studies were unsuccessful because of the patient's marked loss of central vision. A quantitative urine-analysis and plasma determination for amino-acids revealed a normal electrophoretic pattern with no increase in ornithine.

The patient's only child, a 41-year-old son, was examined ophthalmoscopically and found to be normal. Findings on ERG, EOG, and fluorescein angiography were also normal.

Discussion

Previously reported diseases with reticular pigmentary changes of the retina include Sjögren's reticular dystrophy, Mesker's macroreticular dys-

FIG. 1 Case 1. Reticular-appearing lesions in midperiphery of right eye. Numerous polygonal units are formed by alternate areas of pigment epithelial hypopigmentation and hyperpigmentation. Note knob-like formations at polygonal interfaces (arrows)

FIG. 3 Case 1. Posterior pole of right eye. Moderately dense clumps of retinal pigment are seen within macula. Also demonstrated are areas of retinal pigment epithelial hypopigmentation. Disc and retinal vessels are normal

FIG. 4 Case 2. Montage from right eye depicting mosaic of polygonal units formed by areas of retinal pigment epithelial hypopigmentation

FIG. 5 Case 2. Pigment mottling within right macula. Optic disc and retinal vessels were normal for patient's age. Note areas of retinal pigment epithelial hypopigmentation in perimacular regions (arrows)

FIG. 6 Case 2. Reticular changes in midperiphery. As in Case 1, both areas of pigment epithelial hypopigmentation (larger arrows) and hyperpigmentation (smaller arrows) are seen. Although less evident than in Case 1, knob-like formations at intersection of polygonal units are seen

FIG. 10 Posterior pole from a patient with Sjögren's reticular dystrophy. Polygonal units formed by mesh of hyperpigmentation. Note knob-like formations at polygonal unit interfaces. Also seen is localized clump of dark retinal pigment within fovea (courtesy of Dr August Deutman)

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FIG. 7 Case 2. Fluorescein angiogram from right eye. Hyperfluorescence (arrows) demonstrates anatomical integrity of choriocapillaris vessels within areas of clinically apparent retinal pigment epithelial hypopigmentation

FIG. 8 Case 2. Late stage angiogram from right eye showing dark patches of hypofluorescence from areas of hyperpigmentation

trophy, and gyrate atrophy of the choroid and retina. Sjögren (1950) first described a reticular dystrophy of the retinal pigment epithelium in eight of 13 children from a Swedish family. Bilateral fundus lesions consisted of a reticular network of black hyperpigmented lines covering most of the posterior pole. Pigmented knobs at the inter-

FIG. 9 Case 2. Late stage fluorescein angiogram from left eye demonstrating staining of choroid and sclera. Staining emphasizes presence of choriocapillaris vessels from which fluorescein dye diffuses

section of the dark lines gave the fundus a fishnet appearance. The areas of irregularly-shaped open meshwork, between the hyperpigmented lesions, were approximately one-quarter to one-half disc diameter in size. These areas were not ophthalmoscopically atrophic. Pigmentary changes in the fovea began with a central black spot, surrounded by concentric rings of hyperpigmentation. A foveal light reflex was, however, present. The pigmentary changes were progressive, as the concentric rings of pigment expanded into an initially albinotic-appearing periphery. Visual acuities, peripheral fields, and colour vision were normal. Five of the children had deaf-mutism, and two had spherophakia (Holmgren, 1950).

Similarly affected patients were reported in the Netherlands by Ten Doesschate (1965) and by Deutman and Rümke (1969) (Fig. 10). Visual acuity, peripheral fields, colour vision, ERG, and EOG were normal. Fluorescein angiography heightened the characteristic mosaic pattern and demonstrated a normal choriocapillaris and larger choroidal vessels (Fig. 11). Deutman and Rümke concluded from fluorescein studies that the retinal pigment epithelium between the areas of obvious hyperpigmentation was defectively pigmented. In a later publication, Deutman (1971) emphasized that the areas of hyperpigmentation were deep to the sensory retina, involving the retinal pigment epithelial layer. He also noted that the pigment accumulation tended to fade in later years after spreading peripherally. Apparently, visual acuity diminished only slightly. Deutman concluded that

FIG. 11 Fluorescein angiogram of left eye from patient with Sjögren's reticular dystrophy. Regions of hyperfluorescence result from hypopigmentation of retinal pigment cells (courtesy of Dr August Deutman)

the fundus abnormality was inherited as an autosomal recessive trait.

Mesker, Oosterhuis, and Delleman (1970) described similar-appearing fundus and fluorescein findings in three patients. A coarse reticular network of pigment bands was described in and around the macula of a 21-year-old woman. Areas of retinal pigment epithelium between the pigmented reticular bands were thought to show an abnormally intense fluorescence on angiography. The choroidal vessels appeared to be normal. The macular area contained some foveal pigmentation while the periphery appeared albinotic. Visual acuity was reduced in two cases and an ERG was subnormal in one patient. Primarily because of a slight difference in pigmentary changes, subnormal ERG and a decrease in visual acuity, these authors felt that their patients represented a different disease from that reported by Sjögren. They applied the term 'dystrophia macroreticularis laminae pigmentosae retinae' to describe the disease in their patients.

We feel that the similarities between Sjögren's (1950) dystrophy and that of Mesker and others (1970) strongly suggest they are the same genetic disease. The latter reported older patients who may have been manifesting more advanced changes as noted by subnormal ERG amplitudes and diminished vision. Two patients (B and C) of Mesker and others (1970) were in their forties, while the oldest patient of Deutman and Rümke (1969) was only 14 years old. Those reported by Sjögren ranged in age from 8 to 33 years (mean 22).

Although one patient (A) of Mesker and others (1970) was first examined when aged 21 years, subnormal ERG values were not reported until the fifth decade. Patient B had vision and ERG recordings which we interpret as normal, although Mesker and others (1970) were not definitive in their statement of ERG findings having been 'in accordance with degenerative lesions in the posterior pole'.

Patients with gyrate atrophy of the choroid and retina present with a distinct fundus appearance (Kirstjens, 1965). Within the retina are sharply defined atrophic areas involving the retinal pigment epithelium, sensory retina, choriocapillaris, and larger choroidal vessels. Beginning in the midperiphery, these atrophic areas progress centrally, initially sparing the macular region. The disc and retinal vessels generally remain normal. Sporadic clumping of retinal pigment epithelium can also be noted. Most of these patients complain of night blindness, generally when they are in their 'teens or twenties, antedating any deterioration of central vision. Eventually, central acuity can be severely limited, accompanied by constricted peripheral fields or annular scotomas. The ERG and EOG are frequently subnormal. Many affected patients have associated complicated cataracts at an early age (60 per cent) or high myopia (88 per cent) or both. The absence of both choriocapillaris and larger choroidal vessels within atrophic areas, in addition to the earlier onset of symptoms, distinguishes patients with gyrate atrophy of the choroid and retina from our two cases. Additionally, plasma ornithine determinations were normal (Simmell and Takki, 1973).

The history and ophthalmoscopic appearance of our patients show some similarities to those with the diagnosis of primary diffuse choroidal atrophy (Archer, Krill, and Newell, 1971). Generally, when they are in their thirties, these patients present with either a decrease in visual acuity or, more frequently, poor night vision. In time, there is a relentless, bilateral loss of central vision and a progressive decrease in dark-adaptation function. The ophthalmoscopic appearance includes a diffuse atrophy of both the retinal pigment epithelium and choriocapillaris, rendering the larger choroidal vessels more prominent. The retinal vessels and optic disc are generally normal. Fluorescein angiography of a 49-year-old patient (Fig. 12) with primary choroidal atrophy showed the larger choroidal vessels to be more prominent in the regions of choriocapillaris atrophy. Late connective tissue staining of both the choroid and sclera is absent in those areas in which the choriocapillaris is atrophic. Other areas in which the choriocapillaris is still present appear remarkably

FIG. 12 Fluorescein angiogram of right eye from patient with primary diffuse choroidal atrophy. Note areas of prominent larger choroidal vessels where choriocapillaris vessels are atrophic (smaller arrows). Normal choriocapillaris vessels are seen as regions of hyperfluorescence (larger arrows)

similar to the fluorescein pattern noted in our patients. However, we feel that it is unlikely that our patients represent an early stage of choroidal atrophy in which the choriocapillaris is not yet atrophic. In our patients, the markedly abnormal ERG and visual acuity, and their ages attest to the advanced nature of the disease. Even at this advanced stage, choriocapillaris vessels were demonstrable on fluorescein angiography. This feature facilitates the distinction between our patients and those with primary choroidal atrophy.

The fundus abnormalities in our cases show

remarkable similarities to those reported in Sjögren's reticular dystrophy. Common to both groups are hyperpigmented interlacing polygonal lines which circumscribe areas of hypopigmented retinal pigment epithelium and show knob-like processes at points of intersection. Neither markedly diminished vision nor diminished ERG amplitude was previously considered to occur in Sjögren's reticular dystrophy. Our cases suggest that patients with this disease may eventually manifest secondary diffuse photoreceptor abnormalities. The retinal changes may therefore not be as benign as initially considered.

Since we were unable to document the presence or absence of typical early lesions of Sjögren's dystrophy in either of our patients, we must accept the possibility that the reticular tapeto-retinal dystrophy described in this report is simply a phenocopy of Sjögren's dystrophy. Until this uncertainty is resolved, we suggest a note of caution regarding the ultimate visual prognosis in Sjögren's reticular dystrophy.

Summary

Findings from two patients with a reticular tapeto-retinal dystrophy strongly suggested advanced stages of Sjögren's reticular dystrophy. These observations emphasize that, although initially a benign disease, advanced stages of Sjögren's dystrophy may eventually manifest diffuse photoreceptor and retinal pigment epithelial disease.

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