

Extensive Macular Atrophy with Pseudodrusen-Like Appearance Resembling Atrophic Age-Related Macular Degeneration: A Fully Documented Eight-Year Clinical History

Carlos A. Moreira-Neto^{1*}, Carlos A. Moreira Jr.^{1,2} and Sergio Gianotti Pimentel³

¹Hospital de Olhos do Parana

²Federal University of Parana

³University of Sao Paulo

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Correspondence:

Carlos Moreira-Neto,

Department of Ophthalmology,
Federal University of Parana,
Coronel Dulcidio, 199 – 3o
andar, Brazil,

Tel: +55 41 32256193; Email:
camoreiraneo@gmail.com

ABSTRACT

Here, we describe an adult male with extensive drusen-like deposits in both eyes, rapidly progressing to extensive macular atrophy. A fully documented eight-year clinical history, with fundus images, has been reported, and although macular atrophy may resemble atrophic age-related macular degeneration, it can be distinguished by some striking features, including extensive drusen-like deposits in the posterior pole of both eyes, vertical macular atrophy, and rapid deterioration of visual acuity in patients under 50 years of age.

Introduction

Macular atrophy is a retinal complication that may lead to severe visual impairment and can have different causes, such as inflammation, intoxication, hereditary conditions, and predominantly, Age-Related Macular Degeneration (AMD). The course of macular atrophy in AMD has been well documented [1-4]. Following the appearance of drusen-like deposits, small areas of atrophy occur in the perifoveal region. Such areas tend to be confluent over the years and follow the disappearance or flattening of soft drusen [3-5]. Usually, macular atrophy does not extend beyond the perifoveal area; however, some patients may develop it in the late stages of the disease, becoming legally blind by the age of 70 years or older.

Here, we present a case of macular atrophy in a 50-year-old male who was followed up for 8 years because of drusen-like deposits in the posterior pole of both eyes. Although it may resemble atrophic AMD, macular atrophy has a distinct clinical appearance, and this was described by Hamel et al. [6] in 2009 as a new clinical entity. The prominent features include the early onset of bilateral, symmetric macular atrophy, typically before the age of 50 years, with a rapid involvement of the fovea and the entire posterior pole up to the temporal vascular arcades^o.

Case Report

In 2007, a 43-year-old white man sought ophthalmic care, for poor vision. There was a family medical history of AMD. Visual acuity (VA) was 20/20 OU with a correction of -7,00 diopters. The intraocular pressure was 13 mmHg, and a color fundus image revealed drusen-like deposits in the posterior pole

of both eyes. Fundus fluoresce in angiographies were performed, demonstrating drusen-like deposits in both eyes (Figure 1). The patient was prescribed oral antioxidants and vitamins, according to the Age-Related Eye Disease Study formulation.

In 2012, he was re-examined at another clinic, presenting with the same vision and complaints. Color fundus images taken during that visit were subsequently sent to us. In the beginning of 2014, he experienced a severe loss of his vision and came back for a new examination, which revealed VA as 20/200 OU and 20/60 OS. An area of atrophy was observed in the foveal and perifoveal regions along with areas of paving-stone degeneration in the far periphery of both eyes. Color fundus image, fundus auto fluorescence, and fluoresce in angiography were performed, demonstrating a definite area of macular atrophy in both eyes with a larger vertical diameter (Figure 2). Multifocal Electroretinography (ERG) showed a severe decrease in the cone function of both eyes (Figure 3). Full-field ERG was normal. Optical coherence tomography (OCT) showed a macular thinning in the atrophic area with foveal central thickness measuring less than 200 μ m.

At this time, the patient's chief complaint was related to his distance vision. He claimed that he could still read without glasses because of the high myopic error, and he needed a bright light to accomplish near-distance tasks. He had no problems concerning light adaptation and did not complain of photophobia. However, the color vision was severely affected. A central scotoma was present in the visual fields of both eyes.

In the following months, his vision rapidly deteriorated, and in October 2014, VA was 20/200 OU. Reading could be achieved only with low vision aids.

Color fundus images of both eyes during the follow up are shown in Figure 4. OCT images of both eyes taken over the past year are shown in Figures 5 and 6.

Discussion

As the technology advances and our knowledge about AMD increases, we will be able to identify different

forms of macular diseases occurring in adulthood. Recently, Hamel et al. [6] described a form of macular atrophy that occurs earlier than AMD. Although macular atrophy resembles AMD, they described it as a new clinical entity with features that are different from those of AMD. The main features include extensive macular atrophy, with a larger vertical diameter, occurring around the age of 50 years along with pseudodrusen deposits affecting the entire posterior pole and paving-stone degeneration in the retinal periphery.

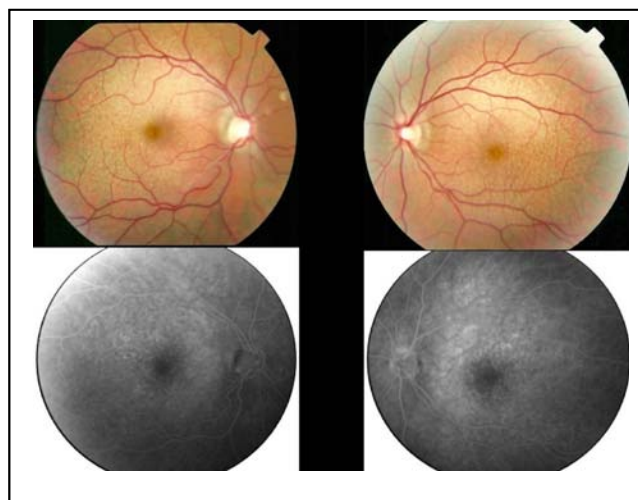


Figure 1: Color fundus images and fundus fluorescein angiogram of both eyes of the patient, in 2007, at age of 43.

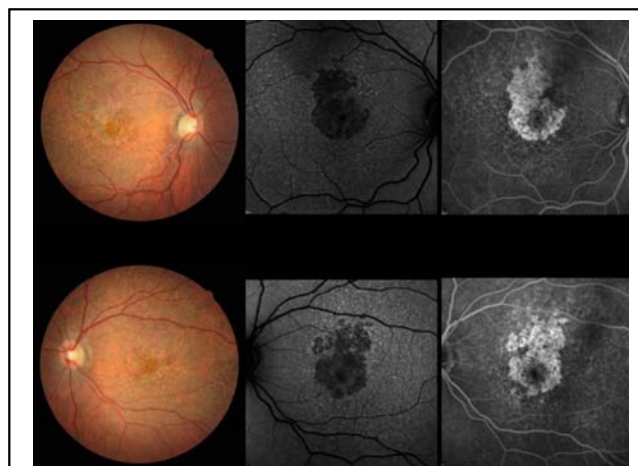


Figure 2: Color fundus images, fundus autofluorescence and fundus fluorescein angiogram of both eyes in March 2014.

Hamel et al. have described 18 patients with complaints of rapid visual loss, night blindness, and central scotoma in a group of patients around 50 years of age. The rapid onset of visual loss and macular atrophy were striking characteristics. Probably, many of these patients

were previously diagnosed with a precocious type of AMD. The work of Hamel et al. [6] has led us to consider such a retinal disease as a new clinical entity, and its specific features and clinical course should be identified in order to appropriately manage such patients. Other extensive macular atrophy with pseudodrusen-like appearance (EMAP) case series were later reported by Querques et al. [7] and Kamami-Levy et al. [8].

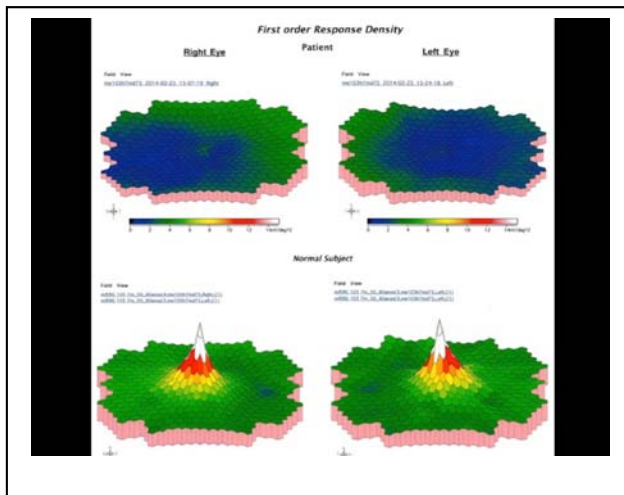


Figure 3: Multifocal electroretinography showing a severe decrease in the cone function of both eyes.

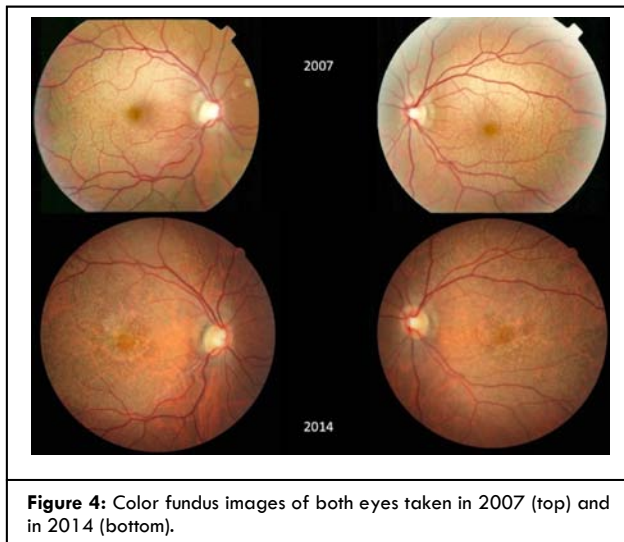


Figure 4: Color fundus images of both eyes taken in 2007 (top) and in 2014 (bottom).

In summary, EMAP was diagnosed by the following characteristics: [6-8] 1. bilateral and symmetric macular atrophy with a larger vertical diameter; 2. rapid involvement of the posterior pole and the fovea; 3. early onset (age <55 years);

1. numerous pseudodrusen-like deposits in the posterior pole and at the equator;

2. paving-stone degeneration, predominantly in the inferior or temporal peripheral retina. The case reported herein comprises all those characteristics.

Previous studies had described pseudodrusen-like appearance in multimodal images. Boon et al described pseudodrusen-like as "numerous yellowish, poorly contrasted, flat spots at the posterior pole, which look like drusen." [9]. Optical coherence tomography demonstrated no nodular thickening of the pigment epithelium-Bruch membrane complex. These spots were hypo fluorescent on auto fluorescence images and were not visible by fundus fluorescein angiography [6]. Kamami-Levy et al. [8] found that choroidal neovascularization may be present in almost 10% EMAP eyes (4 out of 38 eyes) [8].

Recently, Douillard et al. identified, with a case-control study, several risk factors for EMAP. According to them, women are more affected than men; EMAP is associated with inflammatory anomalies; and family history of glaucoma or AMD could be linked to EMAP. However, there is no association with major known AMD risk factors [10]. In the case reported herein, the patient presented a family history of both AMD and glaucoma, suggesting the diagnosis of EMAP.

The main differential diagnosis is advanced Age-Related Macular Degeneration (AMD) with Geography Atrophy (GA). GA appears after 50 years, with slow progression of small foci, usually after drusen regression, a larger horizontal diameter, and is related to environmental and genetic risk factors [11]. Ferrara et al recently described the phenotypic presentation associated with complement factor H R1210C mutation, a rare variant, strongly associated with soft drusen accumulation in the macula, as well as with rapid advanced AMD with GA [12]. However, in EMAP, patients are younger than 50 years and exhibit a faster progression of atrophy with a larger vertical diameter and without drusen formation [6,7].

EMAP have features that differ from similar retinal dystrophies [6,9]. Absence of pigment deposits in the macula, equator, or in the periphery, normal retinal vessels, ERG responses are only moderately

decreased, no peripheral visual loss, no evidence of a familial heredity, and characteristic retinal lesions differentiate EMAP from cone dystrophies and cone-rod dystrophies [13]. These features also differentiate EMAP from autosomal dominant macular dystrophies, such as Sorsby's fundus dystrophy,[14] North Carolina macular dystrophy [15], and central areolar choroidal dystrophy [16], and from late-onset macular retinal degeneration [17].

Therefore, adult patients with pseudodrusen-like deposits in the posterior pole of both eyes may have a clinical course different from those with regular drusen deposits in the macular area. According to our observations, these patients rapidly progress to central visual loss, becoming legally blind by the age of 50 years.

An important limitation in the description of EMAP as a

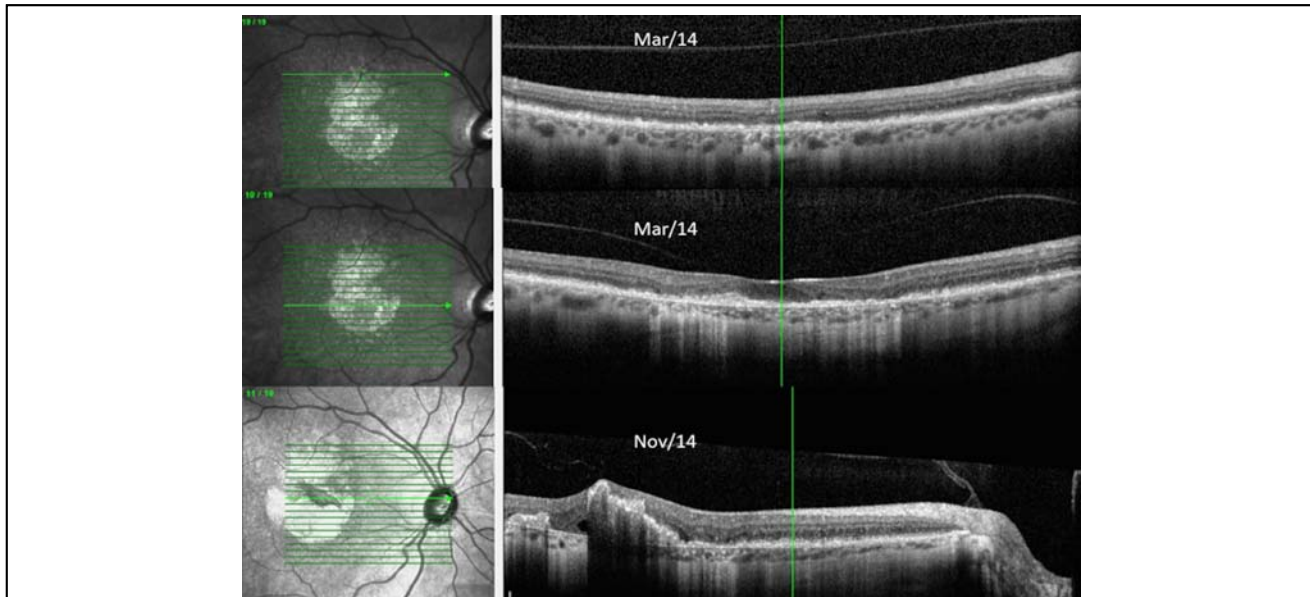


Figure 5: Optical coherence tomography images of the right eye showing pseudodrusen (top) and progressive destruction of the retinal layers (second row) from March 2014 to November 2014 (bottom).

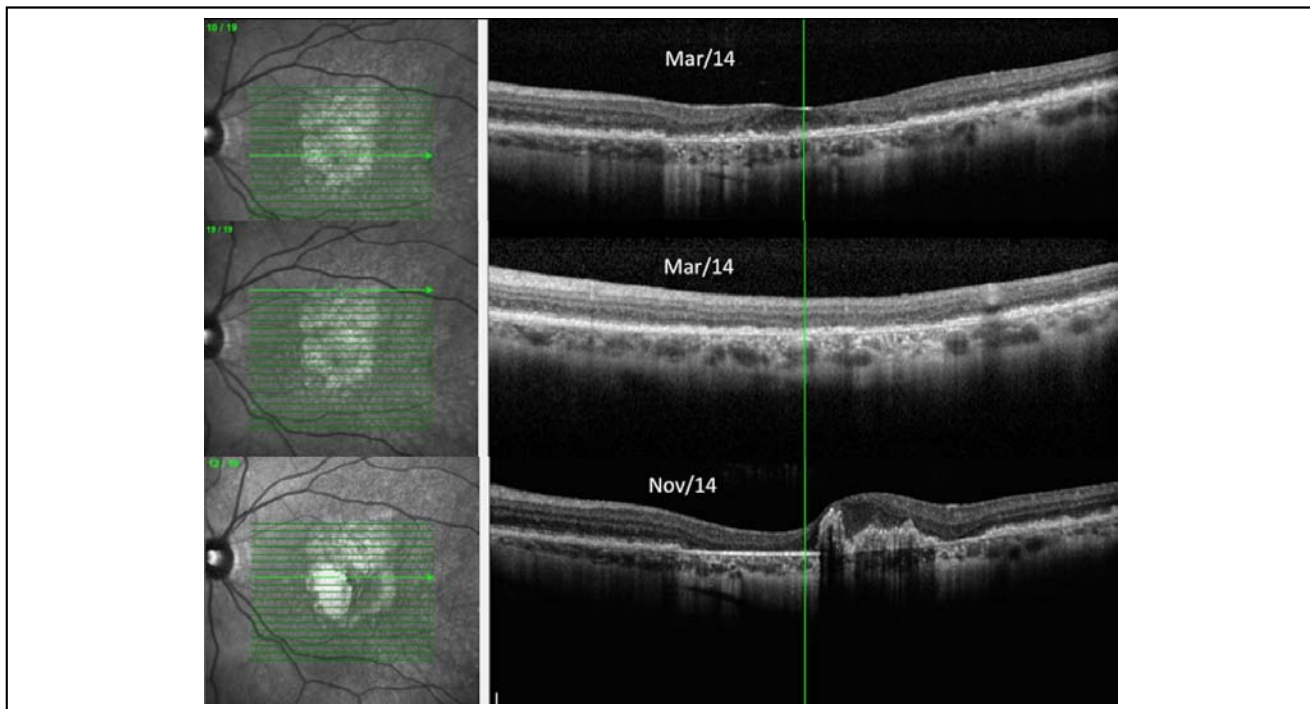


Figure 6: Optical coherence tomography images of the left eye showing pseudodrusen (second row) and progressive destruction of the retinal layers (top) from March 2014 to November 2014 (bottom).

clinical entity is the lack of genetic screening [9]. A better characterization of genetic profiles in EMAP patients will provide a better understanding of its pathogenesis and possible future treatments of this vision-threatening condition.

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