European Journal of Ophthalmology / Vol. 18 no. 5, 2008 / pp. 841-844

Retinal pigment epithelial marginal retraction after photodynamic therapy for choroidal neovascularization in pathologic myopia

A. PECE, V. ISOLA

Department of Ophthalmology, Melegnano Hospital, Milano - Italy

PURPOSE. *To report the incidence of retinal pigment epithelial (RPE) marginal retraction after verteporfin photodynamic therapy (PDT) for subfoveal choroidal neovascularization (CNV) in pathologic myopia (PM).*
METHODS. *Retrospective review of 236 patients treated with PDT for subfoveal CNV due to PM.*
RESULTS. *RPE marginal retraction was found in 3 eyes (1.3%), and a decrease of a mean of five lines of vision was reported to occur 10–15 days after treatment. At the end of follow-up two eyes lost three lines and one six lines from baseline.*
CONCLUSIONS. *RPE marginal retraction as an early complication of PDT for subfoveal CNV secondary to PM is rare. The low incidence of this adverse event, however, should not preclude recommendations for PDT in myopic eyes that could benefit from this treatment modality. (Eur J Ophthalmol 2008; 18: 841-4)*

KEY WORDS. *Pathologic myopia, Choroidal neovascularization, Photodynamic therapy, Retinal pigment epithelial marginal retraction*

Accepted: April 2, 2008

INTRODUCTION

Verteporfin photodynamic therapy (PDT) can significantly reduce visual loss in eyes with subfoveal and juxtafoveal choroidal neovascularization (CNV) secondary to pathologic myopia (PM) and it is currently the standard on-label therapy for this disease (1-4).
PDT is generally considered safe, although it may be complicated, uncommonly, by retinal pigment epithelium (RPE) tears (5), fibrosis, or others (6).
This study evaluated the incidence of RPE retraction after PDT for myopic CNV and compared the change of visual acuity (VA) from baseline.

METHODS

A total of 236 consecutive PDT treatment records on PM eyes with subfoveal CNV were retrospectively reviewed. Patients' inclusion criteria were as follows: 1) highly myopic eyes with refractive error ≥– 6 diopters (D); 2) posterior pole myopic changes (lacquer cracks, chorioretinal atrophy, papillary crescent, posterior staphyloma); 3) fluorescein angiographic evidence of subfoveal CNV; 4) greatest linear dimension (GLD) of CNV ≤5400 m; 5) best-corrected VA (BCVA) ≥20/200 Snellen equivalent; 6) visual symptoms onset no more than 2 months prior to the baseline evaluation; 7) clear ocular media. Patients' exclusion criteria were 1) myopia associated with post-inflammatory macular changes such as multifocal choroiditis, punctate internal choroidopathy; 2) other macular disorders affecting visual acuity; 3) refractive media opacities; 4) no previous laser photocoagulation, or anti-vascular endothelial grow factor (anti-VEGF) drug; 5) any other ocular diseases or history of recent intraocular surgery that can interfere with the assessment of treatment results.
All patients were examined with ETDRS chart for best-corrected VA, with fundus biomicroscopy and fluorescein angiography (FA) before PDT, at 1 month, then every 3

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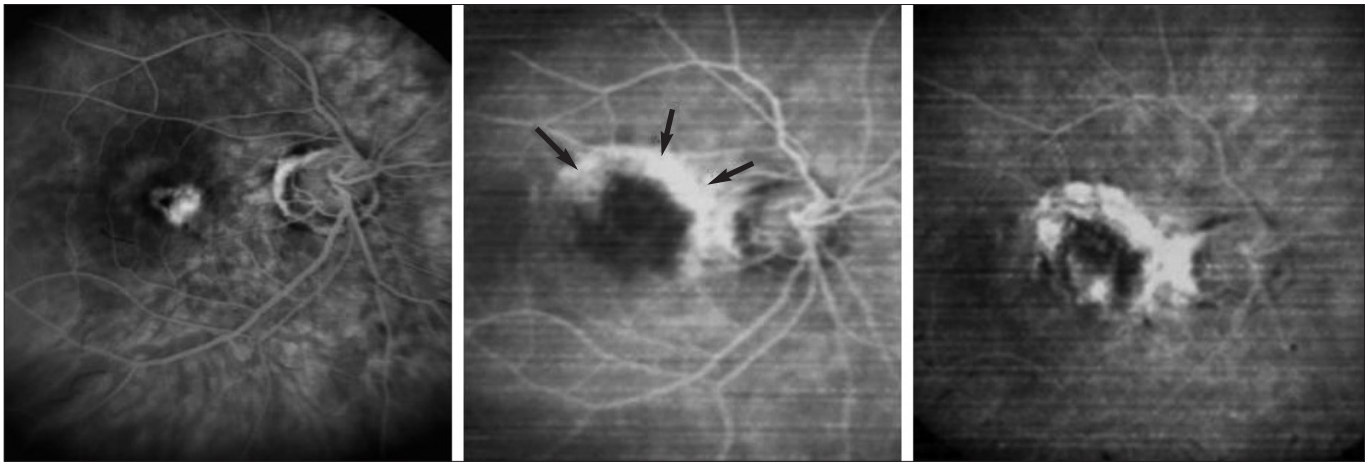

Fig. 1 - *Case 1.* (Left*) Pretreatment fluorescein angiography (FA) shows a subfoveal choroidal neovascularization due to pathologic myopia.* (Center) *One month after photodynamic therapy (PDT), FA shows a complete hyperfluorescence caused by staining of the choriocapillaris where the retinal pigment epithelium (RPE) is broken along the upper edge of treatment (arrows).* (Right) *Three months later, there is slight remodelling of the RPE abnormalities surrounding the PDT area.*

months after treatment. PDT using verteporfin was carried out according to a standard procedure.
Patients were asked to return promptly for further examination if they noted any deterioration in vision or worsening in metamorphopsia after PDT.

RESULTS

RPE retraction was found in 3 of the 236 eyes (1.3%) treated with PDT for CNV due to PM. This occurred in two eyes between 10 and 15 days after the first exposure to PDT, and in one case after 1-month visit.
All patients lost a mean of five lines of vision equivalent to at least 25 ETDRS letters (two eyes lost six lines and one three lines). At the end of the follow-up two eyes lost three lines and the other six lines from baseline.

Case reports

Case 1. A 61-year-old man presented with visual loss and metamorphopsia in his right eye. VA was 20/100 with a refractive error of –9 diopters in the right eye and 20/50 with –17 diopters in the left eye. Fundus biomicroscopy showed a subretinal hemorrhage with serous fluid beneath the central macula in the right eye. FA of the right eye showed subfoveal CNV that filled slowly and leaked minimally during the late-phase frame.
One month later, VA had fallen to 20/400 (equivalent to –6 ETDRS lines). Retinal biomicroscopy showed a presumed CNV that had been covered by dark pigment mottling, and a crescent of RPE abnormalities along the upper edge of the treatment spot, with good visibility of choroidal vessels. FA showed uniformly bright hyperfluorescence of the choriocapillaris corresponding to the RPE retraction.
At the end of the follow-up (53 months) VA was 20/200 (equivalent to –3 ETDRS lines). FA indicated slight remodeling of the RPE abnormality in the area of the atrophy and the CNV remained stable (Fig. 1). No retreatment was done.

Case 2. A 36-year-old man with PM presented with blurring of vision in the right eye of 1 week's duration. VA was 20/50 with a refractive error of –11 diopters in the right eye and 20/32 with –7 diopters in the left eye. Fundus examination showed subretinal fluid in the center of the right macula. On FA hyperfluorescent subfoveal CNV was seen, with an adjacent serous detachment of the neurosensory retina (Fig. 2).
Ten days after PDT, the patient came back complaining of reduction of vision in his right eye. VA was 20/200 and there was a loss of six ETDRS lines. Fundus biomicroscopy showed pigment mottling and atrophy of the RPE around the fovea. FA showed hyperfluorescence within the area of CNV, surrounded by a ring of uniformly bright hyperfluorescence of the choriocapillaris related to

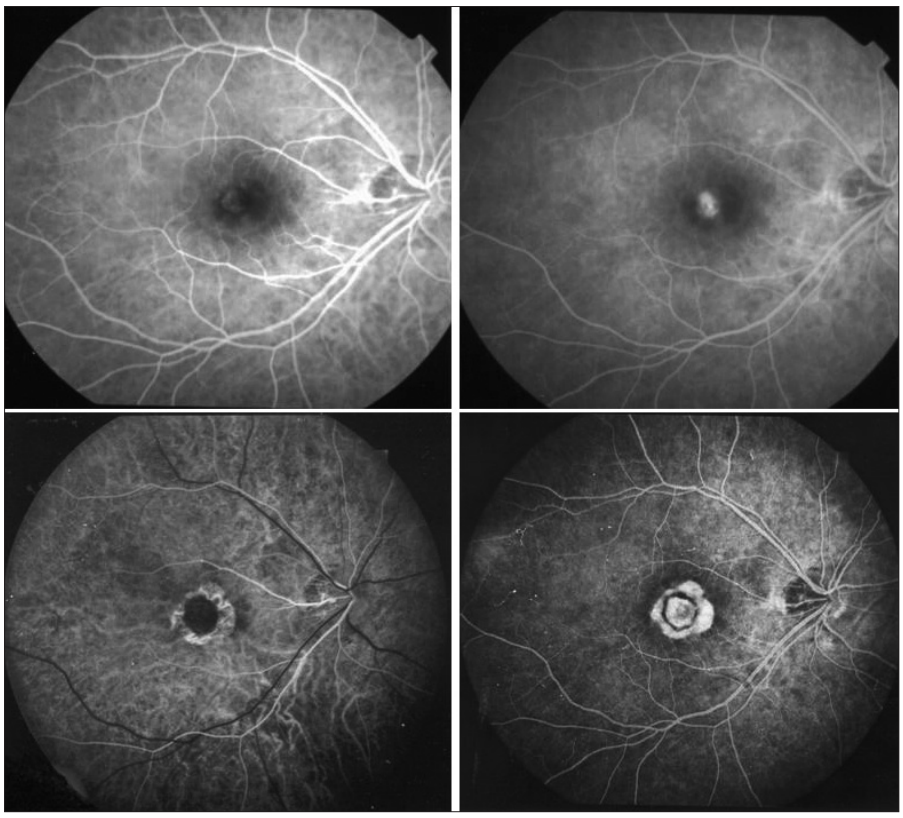

Fig. 2 - *Case 2.* (Top) *Pretreatment fluorescein angiography (FA) of the right eye shows a subfoveal choroidal neovascularization (CNV) that is smaller than one Macular Photocoagulation Study disc area.* (Bottom) *Post-treatment FA obtained 10 days after photodynamic therapy shows a complete ring of hyperfluorescence of the choriocapillaris where the retinal pigment epithelium is absent. FA shows a slight increase in size of the subfoveal CNV.*

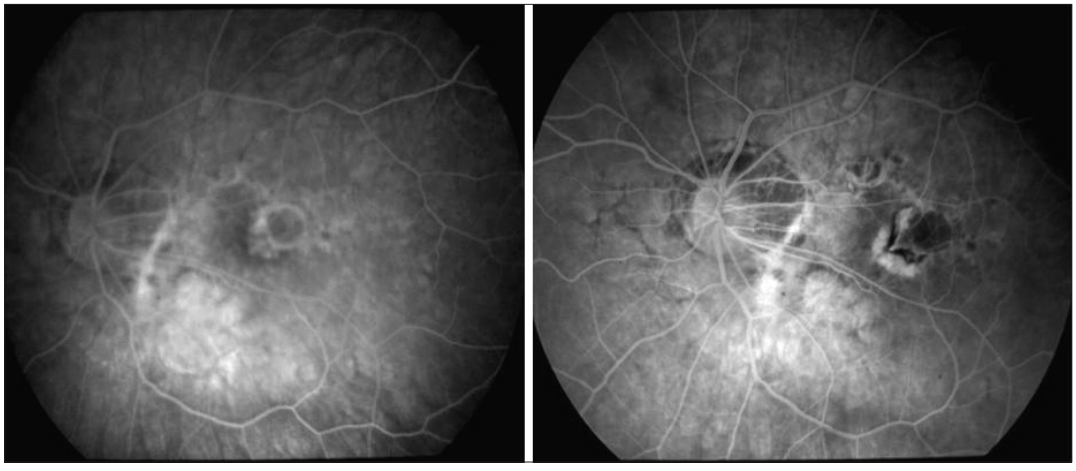

Fig. 3 - *Case 3.* (Left) *Baseline fluorescein angiography (FA) shows a subfoveal choroidal neovascularization near the edge of an area of chorioretinal atrophy.* (Right) *Fifteen days after photodynamic therapy, FA shows a crescent of retinal pigment epithelium (RPE) changes along the lower edge of treatment consisting of complete hyperfluorescence caused by staining of the choriocapillaris where the RPE is retracted.*

the window defect in the circular area of the RPE atrophy (Fig. 2). VA remained stable the whole time (73 months).

Case 3. A 51-year-old patient with PM had decreased vision and metamorphopsia in her myopic left eye. VA in the left eye was 20/200 with a spherical equivalent of –9.50 diopters. The biomicroscopic examination and FA showed CNV originating from the border of a chorioretinal atrophy (Fig. 3, left). Fifteen days after PDT, VA decreased to 20/400 (equivalent to –3 ETDRS lines). FA showed RPE abnormalities along the lower edge of treatment area consisting of complete hyperfluorescence caused by staining of the choriocapillaris where the RPE was retracted (Fig. 3, right). No additional treatment was recommended. VA remained unchanged in the follow-up (48 months).

DISCUSSION

RPE tear in eyes with PM and CNV is rare (5). The current literature does not offer any clinical reports providing clues to the incidence of RPE tears or atrophic changes or fibrosis after PDT for myopic CNV (1, 6).

However, RPE tears have been reported in PDT-treated patients with AMD as an intraocular adverse effect associated with fibrovascular RPE detachments and their frequency may vary from 12% to 33% (6-8). This difference could be a consequence of increased sub-RPE exudation or hemorrhage in patients who already have large amounts of liquid behind the RPE, something not usually seen in high-myopic eyes.

In our small series the incidence of RPE retraction after PDT was 1.3% and all three cases had a loss of VA. We called this alteration marginal retraction of RPE. In fact it is suspicious whether a real RPE tear truly occurred.

The mechanism of this complication in myopic eyes is still not completely elucidated. First, immediately after PDT mechanical forces may act on the RPE-Bruch membrane complex, presumably due to shrinkage of the CNV after the photodynamic shutdown. Secondly, an overdosage of PDT light irradiation could have amplified the photodynamic effect in an attenuated myopic RPE consequently predisposed to the event.

The pattern of the RPE retraction was different in our three cases. The first case had a very large retraction, the second a peculiar round one, and in the third one the lesion was limited to the lower part of the lesion. We can speculate that this might be explained by the different type and by the age at onset of myopic CNV that sometimes has a fibrotic component, or a pigment accumulation that may stimulate shrinkage of the RPE around the lesion.

In conclusion, though marginal retraction of RPE is a rare complication after PDT in pathologic myopic eyes, it must be evaluated carefully because of the risk of a reduction of VA in patients who are often young. However, the low incidence of this complication after PDT does not preclude recommendations for PDT in eyes that could benefit from this therapy.

ACKNOWLEDGEMENTS

Supported by the Fondazione Retina 3000-Milano.

The authors have no financial or proprietary interest in any product mentioned in this article.

Reprint requests to:
Alfredo Pece, MD
Department of Ophthalmology
Melegnano Hospital
Via Pandina, 1
20077 Vizzolo Predabissi
Milano, Italy
pece.retina@mclink.it

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