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SHORT COMMUNICATION

Evolution of retinal pigment epithelium detachment after photodynamic therapy for choroidal neovascularization in age-related macular degeneration

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PURPOSE. *To report a case of pigment epithelium detachment (PED) which appeared after photodynamic therapy (PDT) and was followed up for 50 months.*
METHODS. *Case report.*
RESULTS. *A 71-year-old woman with occult choroidal neovascular membrane due to age-related macular degeneration (ARMD) developed PED 48 hours after PDT. The patient was studied with fluorescein angiography (FA) and optical coherence tomography (OCT). Fluorescein angiographic evidence of PED remained essentially unchanged during the follow-up period of 50 months. Although OCT initially gave clear evidence of PED, in the last 12 months of follow-up the PED appears to have resolved.*
CONCLUSIONS. *Photodynamic treatment could be involved in the occurrence of PED in occult choroidal neovascular membrane due to ARMD. In this particular case OCT could be considered since it offers useful information in the pretreatment and the post-treatment follow-up period. (Eur J Ophthalmol 2006; 16: 491-4)*

KEY WORDS. *Age-related macular degeneration, Choroidal neovascularization, Pigment epithelium detachment, Photodynamic therapy, Fluorescein angiography, Optical coherence tomography*

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INTRODUCTION

Retinal pigment epithelium detachment (PED) is a well-recognized feature of choroidal neovascularization (CNV). It is characterized by a sharp elevation of the retinal pigment epithelium (RPE) that appears as persistent staining in fluorescein angiography (FA) caused by pooling of dye in the space under the RPE. Photodynamic therapy (PDT) is a treatment modality for predominantly classic and only occult subfoveal CNV, where the outcomes of argon and krypton laser treatments have been unsuccessful. However, the complications of this type of treatment have not been fully established. We report a case of PED after PDT for CNV in age-related macular degeneration (ARMD), which was followed up for 50 months.

Case report

A 71-year-old woman presented with a 2-week history of blurred vision in her right eye (RE). The vision was RE: 20/200, left eye (LE): 20/400. Ophthalmoscopic examina-

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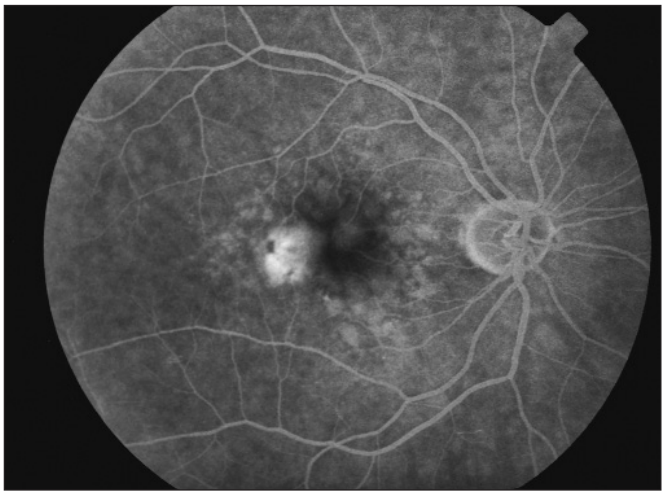

Fig. 1 - *Fluorescein angiography (middle-late) of the right eye before treatment. Occult choroidal neovascularization without preexisting retinal pigment epithelium detachment is shown.*

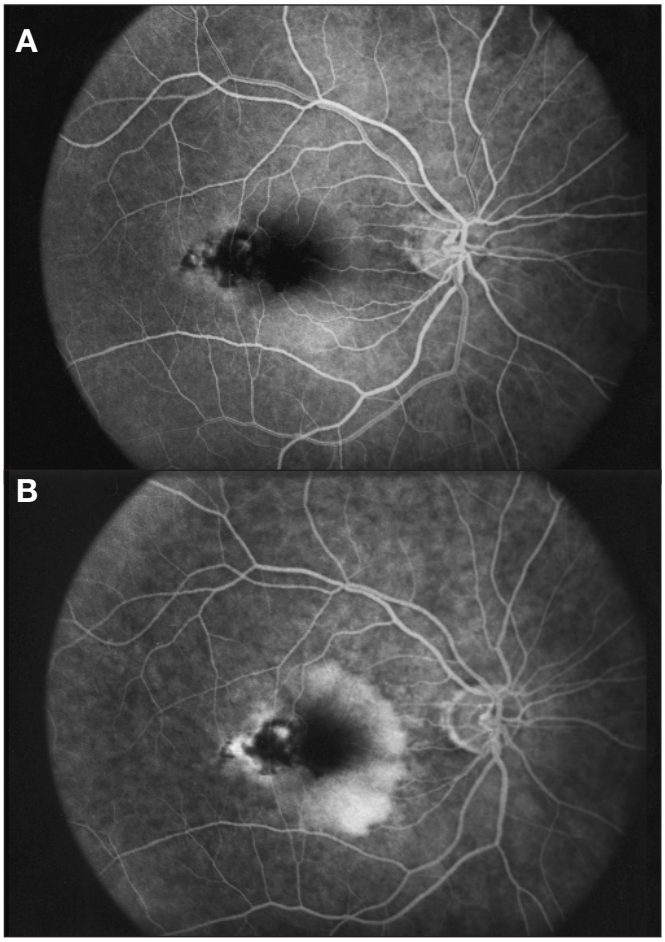

Fig. 2 - *Fluorescein angiography of the right eye 4 days after treatment. (**A**) Early phase. (**B**) Late phase. Both show the pigment epithelium detachment which increases in intensity in the late phases. A small amount of leakage is also evident at the temporal side of the photodynamic therapy application.*

tion of the RE showed scattered soft and hard drusen in the macular area. In the fovea a small elevation of the retina was observed. The underlying lesion was distinguishable but not particularly elevated. In the left eye where she had previous PDT, a macular scar was covering the fovea secondary to ARMD. Fluorescein angiography of the RE showed early bright hyperfluorescence and leakage that increased at the late stages, affecting the temporal part of the fovea (Fig. 1). There was also relative hypofluorescence nasally to the fovea due to the presence of subretinal fluid. Coexisting PED was not found. The findings were consistent with the presence of an occult CNV.

PDT with verteporfin was applied to the RE according to the standard treatment protocol (1). Forty-eight hours after treatment the patient noticed an arc-like scotoma located at the temporal side of the central vision of the RE, although her vision remained unchanged. Biomicroscopic examination of the fundus revealed an area of elevated retina nasally to the fovea. Fluorescein angiography, which was performed 4 days after PDT treatment, showed a half-moon-shaped pooling of dye nasally to the fovea, extending from 12 o'clock to 6 o'clock position, that corresponded to a PED (Fig. 2). The leakage became evident in the early phases and intensified in the late. There was also a degree of leakage temporal to the site where PDT was applied. During the 50 months of follow-up period the patient was being examined at regular intervals of 3-6 months. Red-free photo, FA and optical coherence tomography (OCT) with the OCT-3 (Zeiss, Humphrey Instruments, Dublin CA) were performed on each examination. Although the visual acuity remained unchanged, the PED kept its shape but increased in size. Moreover, the fovea became atrophic without angiographic evidence of active leaking (Fig. 3A). Due to the coexisting PED no further PDT was applied. Optical coherence tomography also revealed the PED nasally to the fovea as an area of low reflectivity under the RPE (Fig. 3B). The low reflectivity area was evident in all OCT examinations until the 40th month. In the last 12 months' period while fluorescein angiography still showed hyperfluorescence in the area of the previously existing PED (Fig. 4A), OCT demonstrated a total resolution of the PED (Fig. 4B).

DISCUSSION

Photodynamic therapy-related ocular complications include retinal and choroidal haemorrhage with or without

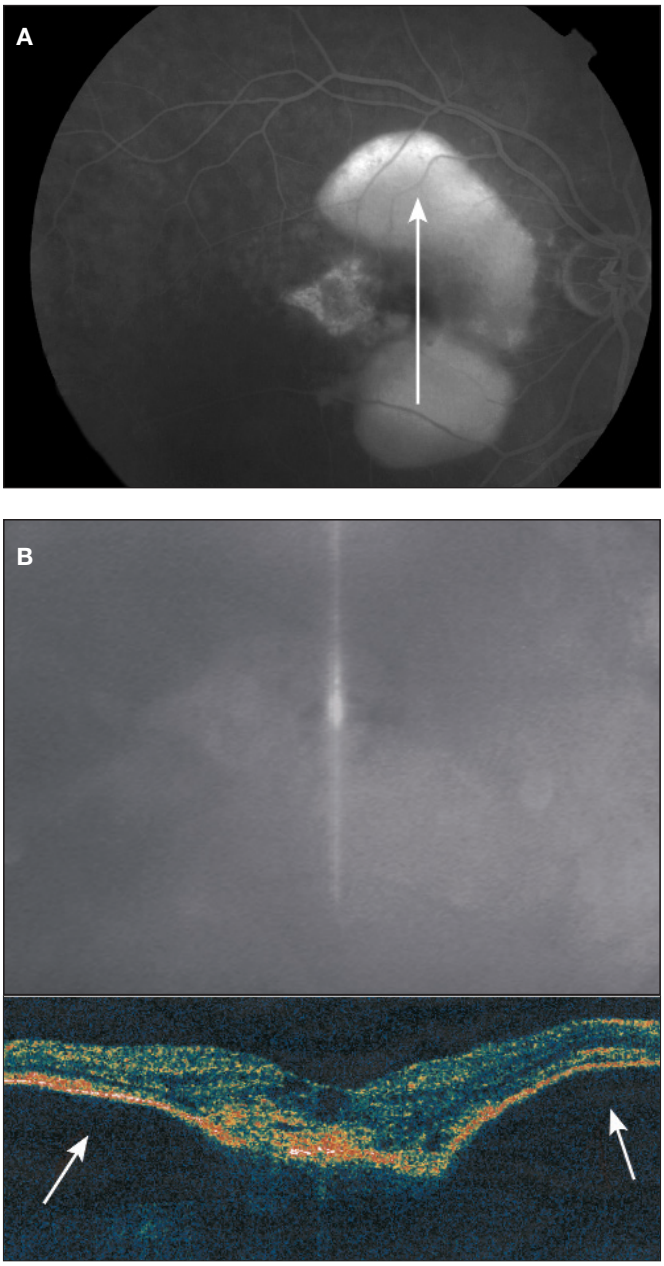

Fig. 3 - *(**A**) Fluorescein angiography, late phase, of the right eye 28 months after treatment. The pigment epithelium detachment is still present. It keeps its shape but increases in size. The long arrow shows the direction of the optical coherence tomography scan. (**B**) Optical coherence tomography of the right eye at the same time. The arrows show low reflectivity areas which correspond to the pigment epithelium detachment.*

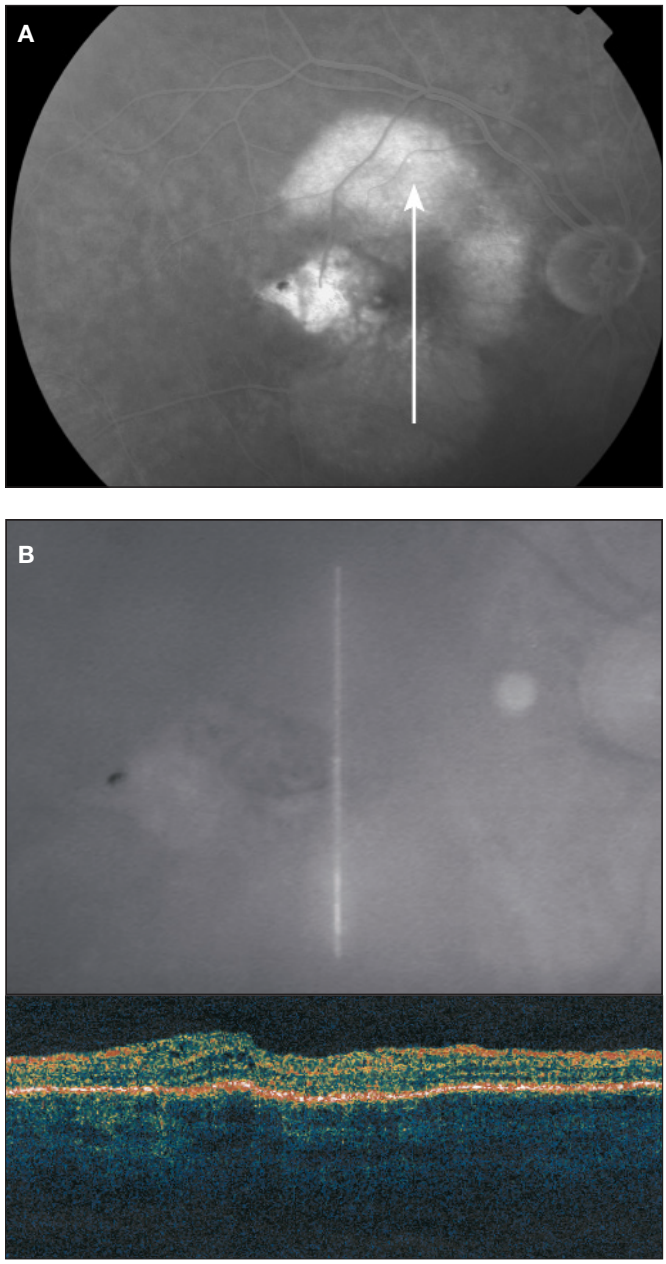

Fig. 4 - *(**A**) Fluorescein angiography, late phase, of the right eye 50 months after treatment. The hyperfluorescence in the area of the previously detached retinal pigment epithelium keeps its shape but appears to be less homogeneous than in the previous angiogram. The long arrow shows the direction of the optical coherence tomography scan. (**B**) Optical coherence tomography scan through the macula of the right eye at the same time shows the complete resolution of the pigment epithelium detachment.*

secondary retinal detachment and vitreous haemorrhage (2). Retinal pigment epithelium tears after PDT for CNV have also been reported recently (3, 4). The pathogenesis of those tears is unclear. It is possible that chronic pigment epithelium detachments undermined the connections between RPE cells, thus facilitating the formation of tears (4). Leakage was also observed at PDT site 1 week post-treatment (5).This was also found at the temporal

side of the PDT application in our patient.

However, we could not find previous reports of RPE detachment after PDT for CNV secondary to ARMD. Although PED can coexist or evolve with CNV, the absence of angiographic evidence before PDT and its appearance immediately after it in our patient could be considered a consequence of the treatment.

Moreover, something that could be taken into consideration is the overlapping margins of PDT application upper and temporally with the margins of the PED in its inner superior part (Fig. 2, A and B). The cause of PED formation remains unknown. PDT has been shown to cause damage to the RPE. It has also been described that the RPE cells repopulate with an arrangement in multiple layers after treatment (6). The pigment cells' anomaly may weaken the connections between them and could explain the PED formation after PDT.

The PED is likely to remain stable or even increase in size and vision can be affected if the fovea is involved (7). The chronic detachment of the RPE cells leads to their atrophy, which influences the functional result. PED may sometimes spontaneously resolve; however, the absorption of the sub-RPE fluid is not always distinguishable on biomicroscopy and occasionally on FA.

In these cases optical coherence tomography (OCT) may be useful in establishing the resolution of PED. In our case although FA gave evidence of PED, OCT showed a complete resolution during the last period of follow-up (Fig. 4B). Thus the hyperfluorescence observed in the last FA could be attributed to window defect caused by RPE atrophy. In such cases, where the fluorescein angiographic findings are difficult to interpret because of the concomitant atrophy, OCT may prove to be a valuable tool in the detection of the persistence or the resolution of the PED.

No author has proprietary interest in any aspect of this study.

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