traction of the vitreous and hyaloid as noted by organization of the vitreous overlying the optic nerve presumably resulted in macular detachment and visual loss. Plasmin-assisted vitrectomy was successful in reestablishing the patient’s normal macular anatomy and restoring her baseline visual acuity. When present and confirmed by careful clinical examination, including adjunct methods such as optical coherence tomography, subclinical tractional retinal detachment in patients with adult retinopathy of prematurity with otherwise unexplained visual loss can be successfully treated by vitrectomy. The results from using optical coherence tomography in our case explain a circumstance that for many years had been observed yet was inadequately understood by physicians managing adult patients with retinopathy of prematurity.

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The authors have no relevant financial interest in this article.
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Transretinal Pigment Migration: An Optical Coherence Tomographic Study

Cells of the retinal pigment epithelium (RPE) play an important role in the formation of epiretinal membranes after retinal detachment. The RPE cells may access the inner retinal surface through the retinal break that caused the detachment. Subsequent proliferation of these cells on the retinal surface then contributes to the formation of the epiretinal membranes, which typically consists of a variety of different cell types.

A second mechanism by which the RPE cells might access the inner retinal surface is by migration through the retina. The ability of proliferating RPE cells to migrate is well documented and can be altered by the cells’ microenvironment. 2-3 Proliferation of RPE cells occurs not infrequently after trauma and after retinal detachment repair. 6,7 Experimental models of retinal detachment show that the RPE cell proliferation begins early in the course of the detachment and is confined to the region of the detachment. 8,9 Translocation of RPE pigment into the retina occurs in some diseases such as retinitis pigmentosa (“bone spicula”) as well as in experimental models of subretinal pigment clumping. 10,11

The advent of optical coherence tomography (OCT) has provided an opportunity to obtain high-resolution, cross-sectional images of the retina and RPE in a variety of disease states. Optical coherence tomography provides an indirect image of the retina and RPE based on the reflective properties of the various cellular layers. The varying intensities seen on the OCT scan correlate well with the different levels of the retina and RPE. 12 The RPE provides the most highly reflective surface, and usually appears as a bright orange-red layer on the OCT scan. In this article we report 2 cases of retinal detachment with subsequent migration of RPE cells into the retina. Optical coherence tomographic scans in both of these patients showed highly reflective material that was consistent with RPE proliferation and migration through the retina into the region of secondary epiretinal membranes. These findings suggest that the transretinal migration of proliferating RPE cells may have played a role in the formation of epiretinal membranes in these patients.

Report of Cases. Case 1. A 52-year-old man was initially seen with progressive loss of vision in the right eye over the previous 6 days. Ophthalmic examination was significant for visual acuity of counting fingers OD at 1 ft and 20/20 OS. Dilated fundus examination of the pseudophakic right eye showed a near-total retinal detachment with a single horseshoe retinal tear at the 12:30 o’clock position. The detachment was repaired with pars plana vitrectomy, retinotomy with internal drainage of subretinal fluid, endolaser photocoagulation, and a perfluoropropane fluid–air gas exchange (12%) followed by face-down positioning. At the 1-month postoperative visit, visual acuity was 20/200 OD and subretinal pigment clumping was evident in the macula. Three months after the retinal detachment repair, the visual acuity had improved to 20/40 OD. There was consolidation of the subretinal pigment clumps (Figure 1A). The OCT scan showed highly reflective spots emerging from the RPE and extending anteriorly into the retina (Figure 1B). These intraretinal spots had the same reflective intensity as the RPE and were found in the same location as the RPE pigment seen on the fundus photograph. Mild patches of glistening on the retinal surface suggested early epiretinal membrane formation.

Case 2. A 44-year-old man was initially seen in our clinic 6 weeks after primary repair of an open-globe injury with a nonclearing vitreous hemorrhage and retinal detachment. The patient underwent pars plana vitrectomy. During perfluoropropane fluid–air gas exchange, a large mobile pigment plaque was observed in the subretinal space in the superior midperiphery. Over the next 7 months, the patient developed an epiretinal membrane over the macula that extended well beyond the vascular ar-
cades. During subsequent membrane peeling, it was noted that the posterior surface of the epiretinal membrane was focally pigmented where it was peeled from over the pigment plaque. Postoperatively, OCT of the area of pigmentation showed a highly reflective plane emerging from the RPE toward the retinal surface and ending at the point where the epiretinal membrane was separated (Figure 2).

Comment. The RPE cell migration has been proposed as a contributing factor in the formation of epiretinal membranes and proliferative vitreoretinopathy. Access to the inner retinal surface by the RPE cells in rhegmatogenous retinal detachments usually occurs through the retinal break. The RPE cell migration through the retina has been postulated to contribute to this process. The patients described earlier had pigment migration suspected on clinical examination and confirmed on OCT imaging. The migration of RPE cells occurred in temporal association with the formation of epiretinal membranes. The second patient, in particular, had a proven communication between the epiretinal membrane and a pigment patch that originated in the subretinal space. In both cases there were other mechanisms for RPE cell access to the inner retinal surface. However, the presence of pigment both in the subretinal space and within the retina strongly suggests migration of RPE cells into and across the retina. To our knowledge, this is the first clinical study to confirm RPE pigment migration in vivo using OCT. Although not proved by our cases, we postulate that this type of transretinal migration of RPE cells may be a contributing factor in the formation of selected epiretinal membranes.

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The authors have no relevant financial interest in this article.

This study was supported in part by a Career Development Award from Research to Prevent Blindness Inc, New York, NY (Dr Zacks).

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Slowly Progressive Retinal Arteriovenous Malformation and Relative Amblyopia

Congenital retinal arteriovenous malformation is a rare, unilateral, nonhereditary disorder with variable visual impairment depending on the severity of the vascular anomaly. Most cases do not show any anatomical progression. Venous occlusion, intraretinal or vitreal hemorrhage, or optic atrophy are rare causes of sudden or gradual visual loss. We describe the case of a child with visual loss caused by slow progression of a foveal vascular loop and relative amblyopia.

Report of a Case. A 6-year-old boy had deteriorating vision 1 year after the incidental detection of a retinal arteriovenous malformation in his right eye (Figure 1). At the time of the initial detection, his visual acuity was 20/20 OU. One year later, his visual acuity was 20/60 OD and 20/20 OS. Multiple dilated and tortuous vessels emerged from the right optic disc (Figure 2) with 1 supertemporal loop reaching the fovea. No retinal thickening, exudates, bleeding, or relative afferent pupillary defects were present. Scanning laser ophthalmoscope–fundus perimeter showed an absolute scotoma overlying the fovea.


Figure 1. Fundus photograph taken in 1998. The central vascular loop was well separated from the fovea, and visual acuity reached 20/20 OU.

Figure 2. Fundus photograph taken in November 1999. The loop has reached the fovea. The overlay shows the retinal fixation areas when first seen in our clinic (March 1999; visual acuity of 20/60 OD), after successful occlusion therapy (November 1999; visual acuity of 20/30 OD), and at the final visit after therapy had been discontinued (October 2000; visual acuity 20/400 OD).