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Vitreopapillary Traction Confirmed by Optical Coherence Tomography

The interface between the vitreous and optic nerve head is difficult to evaluate clinically. While vitreomacular traction has been well described, less attention has focused on the clinical effects of persistent at-tachment of contracting vitreous to the optic nerve head, especially as an isolated phenomenon. Both vitreomacular and vitreopapillary traction occur as manifestations of anomalous posterior vitreous detachment. Evaluation of the posterior vitreous cortex has been recently enhanced by optical coherence tomography (OCT). We describe 2 patients referred for neuro-ophthalmic evaluation of papilledema in whom optic nerve head elevation was shown by OCT to be caused by vitreopapillary traction in the absence of diabetic vitreoretinopathy or central retinal vein occlusion.

Report of Cases. Case 1. An 87-year-old woman was referred for evaluation of apparent optic nerve head swelling in her right eye. She had undergone phacoemulsification with intraocular lens placement in her left eye 3 months prior to evaluation. She was pleased with the vision in the left eye and noted blurring with glare in the right eye.

Best-corrected Snellen visual acuity was 20/30 OD and 20/30 OS. The pupils were equally reactive, with no relative afferent pupillary defect. Color vision was normal, and visual fields (Humphrey 30-2; Allergan, Inc, Irvine, Calif) contained minimal, nonspecific changes. Slit-lamp examination showed a moderate nuclear sclerotic cataract in the right eye and a posterior chamber intraocular lens in the left eye. Funduscopic examination revealed a few macular drusen in each eye. The right optic disc margins were blurred 360°, with the margins appearing elevated (Figure 1A). The posterior vitreous cortex was visibly attached at the optic nerve head, but it was separated from the adjacent retina. The left optic disc was elevated superiorly. Magnetic resonance imaging and computed tomographic examination results of the head and orbit were unremarkable.

Optical coherence tomography demonstrated elevation of the borders of the right optic nerve with linear densities extending from the areas of maximal elevation of the nerve head into the vitreous cavity (Figure 2A). Optical coherence to-mography of the left optic nerve showed relatively normal optic disc curvature with a small, curled pre-papillary membrane and a preretinal membrane elevating the temporal papillary retina slightly. Both maculas appeared normal on initial examination. Four months later, the patient underwent right cataract extraction. Two months after that, she developed vitreomacular traction with macular edema in the right eye as well as a partial separation of the vitreopapillary membrane in the left eye. When last seen (15 months after we first saw her), the vitreopapillary traction was still present, the macula was slightly thickened (Figure 1B and Figure 2B), and visual acuity was 20/30 OD and 20/30 OS.

Case 2. An 83-year-old woman was referred for evaluation of apparent optic nerve head edema in the right eye. She had undergone cataract extraction and Yag capsulotomy in both eyes 5 years prior to evaluation. Postoperatively, an optic disc hemorrhage was noted in the right eye; 10 months prior to referral, a disc hemorrhage was noted in the left eye. The patient had noted some blurring of vision in her right eye for the last few months.

Best-corrected Snellen visual acuity was 20/70 OD and 20/20 OS. There was a trace relative afferent pupillary defect in the right eye. Slit-lamp examination showed posterior chamber intraocular lenses in both eyes. Fundus examination revealed macular drusen and peripapillary atrophy in each eye. The right optic nerve head was elevated nasally with disc hemorrhages temporally (Figure 1C), and there was elevation of the posterior vitreous cortex temporally, visible as a straight edge anterior to the disc. Nasally, vitreous bands were seen adherent to the nerve head. There was also cystoid macular edema in the right eye. The left fundus appeared normal.

Optical coherence tomography of the right eye showed elevation of the nasal margin of the disc by a linear density as well as a less distinct density temporally (Figure 2C). The right macula was elevated and contained cystoid edema with linear densities extending from the macular surface into the vitreous cavity.
Figure 1. Red-free fundus photographs showing blurred right optic disc margins in case 1 (A), the same eye after cataract extraction in case 1 (B), the right eye before vitrectomy in case 2 (C), and the right eye after vitrectomy in case 2 (D).

Figure 2. Optical coherence tomographic images of composite macular and optic disc scans showing vitreous bands apparently pulling the optic disc margins anteriorly in case 1 (A), the same eye after cataract extraction with persistent vitreous bands pulling up on the optic disc and mild thickening of the macular region in case 1 (B), vitreous bands pulling the optic disc margins and the macula anteriorly in case 2 (C), and the same eye after vitrectomy with restoration of the normal optic disc and macular anatomy in case 2 (D).
peripapillary hemorrhages. Wisotsky served that vitreopapillary traction in a series of 8 patients, ob-
lamp biomicroscopy and ultraso-
tes mellitus or other forms of reti-
nerve head in the absence of diabe-
the posterior hyaloid on the optic

disc. Katz and Hoyt,4 using slit-
reous detachment from the optic
edema with incomplete posterior vit-
ated traction on the optic nerve. Re-
was noted superotemporally (lo-
RPE tear following blunt trauma to

(Figure 2C). Results of OCT of the
left eye appeared normal.

The patient underwent vitre-
tomy on the right eye to relieve the
vitreous traction on the macula.
Postoperatively, visual acuity was 20/
40. The macula was flat, and the opt-
ic disc was less elevated (Figure 1D).

The apparent vitreous bands were no
longer seen by OCT, except for a thin
band extending upward from the tem-
poral disc edge (Figure 2D).

Comment. Vitreomacular traction
syndrome has been well described
in the literature. Vitreopapillary trac-
sion syndrome has also been de-
scribed, but usually in conjunction
with other manifestations of anom-
alous posterior vitreous detach-
ment, which also includes rheg-
matogenous retinal detachment, macu-
lar pucker, macular holes, and prolif-
erative diabetic vitreoretinopa-
thy.3 Vitreopapillary traction can oc-
cur in the absence of other forms of
anomalous posterior vitreous de-
tachment in diabetic vitreoretinopa-
thy,2 but there are few articles de-
scribing tractional forces exerted
by the posterior hyaloid on the optic
nerve head in the absence of diabe-
tes mellitus or other forms of reti-
novascular disease. Scheops5 de-
scribed the histopathology of what
he referred to as pseudopapill-
edema with incomplete posterior vit-
reous detachment from the optic
disc. Katz and Hoyt,4 using slit-
lamp biomicroscopy and ultraso-
nography in a series of 8 patients, ob-
served that vitreopapillary traction
could produce intrapapillary and peripapillary hemorrhages. Wisotsky et al32 also described 2 patients with vitreopapillary traction causing op-
tic nerve head elevation demonstr-
ated by ultrasonography.

Optical coherence tomography is a
valuable tool for illustrating vitre-
ous traction on the optic nerve. Re-
cently, Rumelt et al36 described OCT
findings in 3 patients with optic disc
traction as well as macular traction
associated with central retinal vein
occlusion. Our cases were referred
for apparently isolated optic nerve
head elevation, and OCT con-
ﬁrmed the presence of idiopathic vit-
reopapillary traction. One patient
(case 1) subsequently developed vit-
reomacular traction, and the other

case (2) had concurrent vitreomacu-
lar traction. Evaluating patients with
OCT in the setting of optic nerve
head elevation may show vitreopap-
illary traction and can obviate the
need for more extensive proce-
dures, such as neuroimaging, or
vasive procedures, such as lumbar
puncture.

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Ultra-High Resolution
Optical Coherence
Tomography of Retinal
Pigment Epithelial Tear
Following Blunt Trauma

Tears of the retinal pigment epithe-
lium (RPE) were first described in
1981 by Hoskin et al3 as a complica-
tion of detached pigment epithe-
lium in patients with age-related
macular degeneration. Since then,
RPE tears have also been described
in patients with chorioretinal scar-
ing in retinal detachments, with sub-
retinal neovascular membranes, fol-
lowing glaucoma surgery, and after
laser photocoagulation of pigment
epithelium detachments.24 We de-
scribe a patient who developed an
RPE tear following blunt trauma to
the eye. Ultra-high resolution opti-
cal coherence tomography was per-
formed, and it provided unprece-
dented visualization.

Report of a Case. A 43-year-old
woman reported falling and hitting
her head and left eye on a wooden
rail 1 week prior to her initial visit.
After the swelling in her left eye sub-
sided, she noticed decreased vision
in that eye. At the time, the best-
corrected visual acuities were 20/
100 OD and 20/70 OS. Ocular his-
tory was signiﬁcant for amblyopia
in the right eye. Amsler grid testing
of the left eye revealed areas of wavi-
ness and a scotoma in the center of
the grid. Intraocular pressures were
15 mm Hg OU. Dilated fundus ex-
amination results of the right eye
were normal whereas the left eye
showed a well-demarcated area of
RPE loss in the macula that was el-
evated with fluid. A scroll of pig-
mented RPE was noted in nasally
(Figure 1A), and a horseshoe tear
with surrounding subretinal fluid
was noted superotemporally (lo-
cated outside of the photographic
field). Fluorescein angiography
showed an early window defect from
the lost RPE measuring several disc
areas in size and involving the en-
tire temporal and superior macula.
A band of blocked ﬂuorescence on
the nasal margin was consistent
with the scroll of RPE (arrow in
Figure 1B). Ultra-high resolution opti-
cal coherence tomography was per-
formed using a standard protocol.
The horizontal temporonal scan
revealed a large area of subretinal
fluid in the fovea. The area of RPE
distortion in the nasal region (ar-
row in Figure 2) corresponds to the
clinical finding of scrolled RPE as a
result of retraction and folding of
the RPE following the tear.

Given the presence of the horse-
show tear with localized retinal de-
tachment, the patient underwent
laser treatment without any compli-
cations. She was informed that no
successful therapy for RPE tears was
available. Several options were dis-
cussed, including surgery to unroll
the RPE and autologous iris pig-
ment epithelial cell transplant.
Surgery to drain the subretinal fluid
was also considered.

Although the subretinal fluid had
already completely resolved sponta-

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