degeneration of retinal ganglion cells from brain lesion in our patient because there was no correlation between RNFL defect and brain lesion. The unilateral abnormality in the visual-evoked potential was attributable to the retrochiasmal lesion rather than an optic nerve lesion because of the absence of an RAPD. This RNFL defect detected by OCT image and red-free photo may be the result of optic atrophy seen in mitochondrial disease, although the shape of optic nerve head was normal in fundus examination. The pattern of RNFL defect of our patient was not the typical pattern of Leber hereditary optic neuropathy with preferential involvement of the papilla-macular bundle with central scotoma and initial temporal pallor. In our patient, combination of blurry vision, mildly elevated serum lactic acid levels, and MRI findings raised the suspicion of MELAS syndrome.

The findings in our patient make it the first case, to our knowledge, in which RNFL defect was noted in the MELAS phenotype. We could detect abnormal RNFL using OCT image and red-free photograph. The important point of this case report is that such a finding cannot yet be considered an established feature of MELAS or mitochondrial disorders but should be looked for to determine whether it appears more often than hitherto detected. In addition, OCT image could be a useful tool to detect optic atrophy in patients who have mitochondrial disease and normal shape of optic nerve head.

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References

1. Pavlakis SG, Phillips PC, DiMauro S, De Vivo DC, Rowland LP. Mitochondrial myopathy, encephalopathy, lactic acidosis, and stroke-like episodes: a distinctive clinical syndrome. *Ann Neurol*. 1984;16:481-8.
2. Kobayashi Y, Momoi MY, Tominaga K, et al. A point mutation in the mitochondrial tRNA(Leu)(UUR) gene in MELAS (mitochondrial myopathy, encephalopathy, lactic acidosis and stroke-like episodes). *Biochem Biophys Res Commun*. 1990;173:816-22.
3. Al-Enezi M, Al-Saleh H, Nasser M. Mitochondrial disorders with significant ophthalmic manifestations. *Middle East Afr J Ophthalmol*. 2008;15:81-6.
4. Choi SY, Kim Y, Oh SW, Jeong SH, Kim JS. Pursuit-paretic and epileptic nystagmus in MELAS. *J Neuroophthalmol*. 2012;32:135-8.
5. Daruich A, Matet A, Borruat FX. Macular dystrophy associated with the mitochondrial DNA A3243G mutation: pericentral pigment deposits or atrophy? Report of two cases and review of the literature *BMC Ophthalmol*. 2014;14:77.
6. Huang CN, Jee SH, Hwang JJ, Kuo YF, Chuang LM. Autoimmune IDDM in a sporadic MELAS patient with mitochondrial tRNA(Leu (UUR)) mutation. *Clin Endocrinol (Oxf)*. 1998;49:265-70.
7. DiMauro S, Schon EA. Mitochondrial respiratory-chain diseases. *N Engl J Med*. 2003;348:2656-68.
8. Steele A. Pediatric Ophthalmology and Strabismus: David Taylor, F.R.C.S., F.R.C.P., F.R.C.Ophth., D.Sc. and Creig S. Hoyt, M.D., Editors Elsevier Ltd., Third edition, 2005, 1300 pages, 1050 illustrations, CD-ROM, $399.00. *Am Orthopt J*. 2005;55:167.

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Sustained and expedited resolution of diabetic papillopathy with combined PRP and bevacizumab

Diabetic papillopathy (DP) is a rare condition that occurs in 1.4% of patients with type I and II diabetes.[1] It is unilateral in 50% of cases and associated with diabetic retinopathy progression.[1] Although it is traditionally a self-limited disease with spontaneous resolution within 3 to 4 months,[2,3] it may precede the development of non-arteritic anterior ischemic optic neuropathy, which can result in permanent vision loss. It is controversial whether DP is actually a mild reversible form of nonarteritic anterior ischemic optic neuropathy.[4] The cause of DP is poorly understood and there is no validated treatment. Success with intravitreal or periocular corticosteroids[5,6] and anti–vascular endothelial growth factors[7–9] have been reported. We report a case of DP that was treated with combination panretinal photocoagulation (PRP) laser and intravitreal bevacizumab, which provided sustained and rapid resolution of DP.

A 22-year-old female with poorly controlled diabetes mellitus type I since the age of 2 years presented with blurry vision and transient visual obscurations in both eyes. Her hemoglobin A_{1C} was 12.2%, and she was recently an inpatient for diabetic ketoacidosis. She denied any headaches, her baseline weight was around 130 pounds, and she had no other systemic diseases. Her vision at presentation was 20/100 OD and 20/25 OS. Intraocular pressure was normal OU. Slit-lamp examination was unremarkable OU. Dilated examination revealed profound disc edema OD and mild disc edema OS (Fig. 1A, 1B). The patient had severe nonproliferative diabetic retinopathy (NPDR) OU. There was no clinically significant diabetic macular edema OU. Fluorescein angiography revealed profound hyperfluorescence at the optic nerve OD > OS, with multiple patchy areas of intraretinal microvascular abnormalities and peripheral capillary nonperfusion (Fig. 2). Optical coherence tomography (OCT) of the optic nerve quantified the degree of retinal nerve fibre layer thickening (OD 359 μm, OS 157 μm). OCT of the macula showed a sliver of subfoveal fluid and marked fluid emanating from the nerve to within a disc diameter of the fovea centre OD. There was optic nerve edema OS, but no subfoveal fluid or cystoid macular edema.

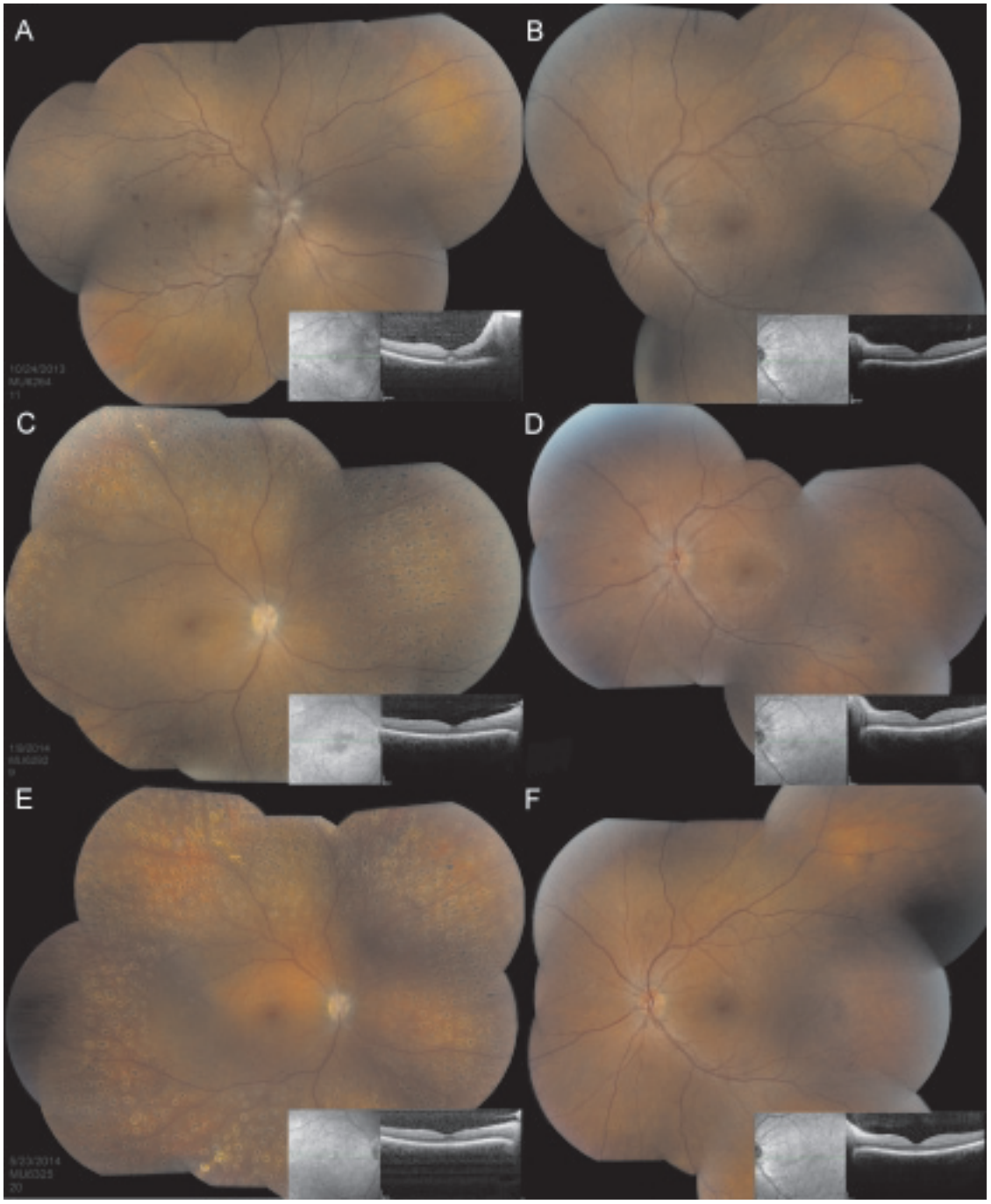

Fig. 1—Montage colour fundus photograph of both eyes, demonstrating diabetic papillopathy (DP) OD > OS, severe nonproliferative diabetic retinopathy (NPDR) OU (A, B). At 2-month follow-up, there was rapid resolution of the disc swelling and intraretinal microvascular abnormalities OD after 2 intravitreal bevacizumab injections and staged panretinal photocoagulation (C). The left eye had high-risk severe NPDR with persistent but mild disc edema as compared with 2 months prior (D). At 6-month follow-up, there was sustained regression of the DP and NPDR OD, and persistent trace disc edema OS that was confirmed with OCT of the nerve (not shown) (E, F).

The patient was treated with combined intravitreal bevacizumab and staged PRP OD. At 1-month follow-up, her vision improved to 20/25 OD with complete resolution of her disc edema and subretinal fluid between the fovea and optic nerve. She received another injection of bevacizumab and fill-in PRP OD. At 2-month follow-up, there was no recurrence of her disc edema and the telangiectatic leaking papillary vessels were extinguished (Fig. 1C, 1D). Meanwhile, the left eye continued to have mild disc edema and severe NPDR. The patient elected for observation at that time. At 6-month follow-up, the patient's vision remained excellent with no signs of recurrent DP or proliferative disease (Fig. 1E, 1F). The OCT of the

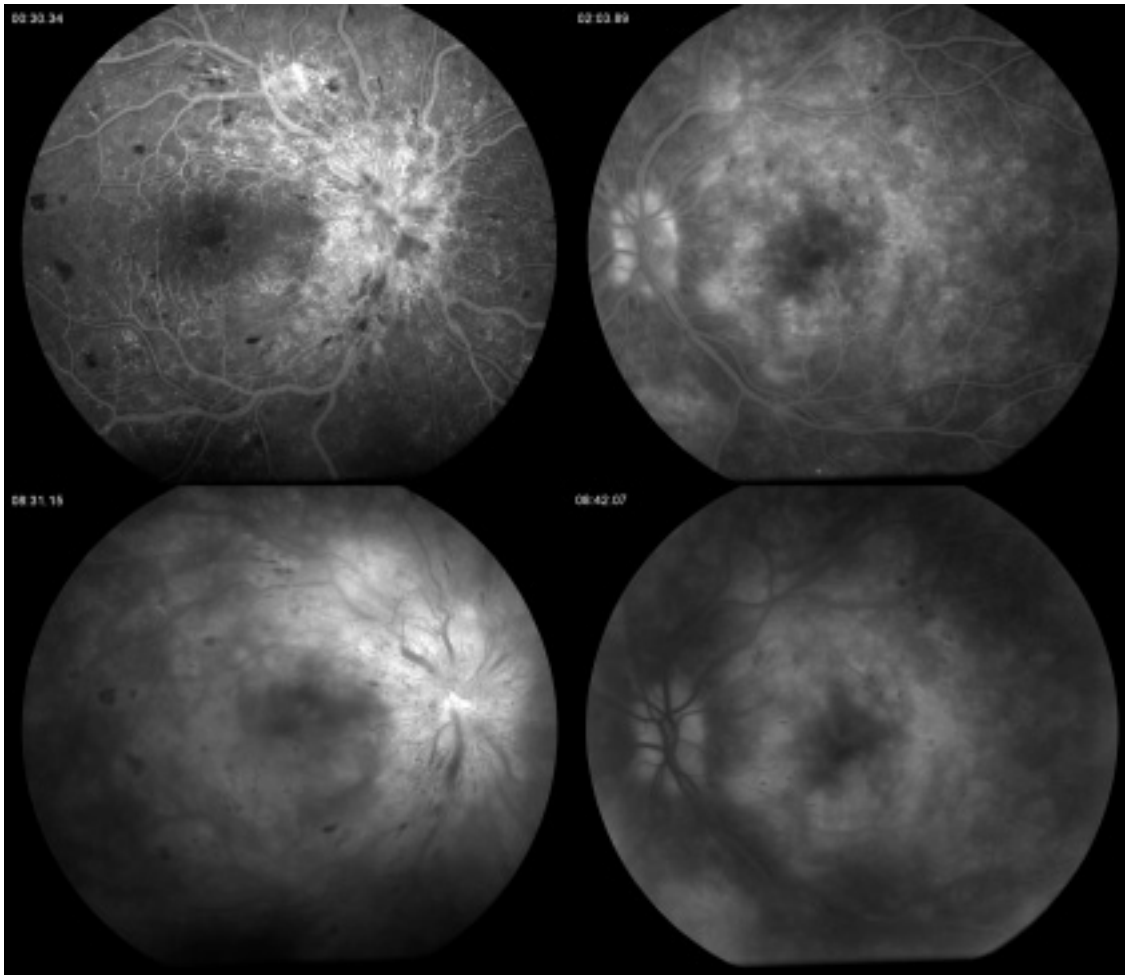

Fig. 2—Fluorescein angiography in early and late frames demonstrating profound disc leakage OD > OS and scattered hyperfluorescence throughout the peripapillary and macular region at initial presentation. There were scattered areas of peripheral capillary nonperfusion OU.

optic nerve showed an average retinal nerve fibre layer thickness of OD 98 μm and OS 133 μm.

The patient's DP regressed very rapidly with combined treatment using scatter PRP and intravitreal bevacizumab. Although visual prognosis without treatment is often favourable in these cases, it generally takes a prolonged period to improve.[10] PRP has never been described as a treatment option for DP, and it may also have utility in preventing the complications arising from severe NPDR such as vitreous hemorrhage, subsequent vitrectomy, and visual impairment.[11] The mechanism of action of bevacizumab in DP is not well understood; however, the accelerated response to bevacizumab combined with scattered laser suggests that vascular endothelial growth factors play an important role in the pathogenesis of this condition. Prior reports of accelerating improvement of DP with intravitreal and periocular corticosteroids suggest that an inflammatory component could also be involved in the pathogenesis of this disorder.[5,6] The patient's untreated left eye serves as a surrogate control for persistent papillopathy and high-risk retinopathy; however, additional studies are needed to determine the exact efficacy and safety of this combined treatment.

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References

1. Bayraktar Z, Alacali N, Bayraktar S. Diabetic papillopathy in type II diabetic patients. *Retina*. 2002;22:752-8.
2. Ostri C, Lund-Andersen H, Sander B, Hvidt-Nielsen D, Larsen M. Bilateral diabetic papillopathy and metabolic control. *Ophthalmology*. 2010;117:2214-7.
3. Vaphiades MS. The disk edema dilemma. *Surv Ophthalmol*. 2002;47:183-8.

4. Hayreh SS, Zimmerman B. Nonarteritic anterior ischemic optic neuropathy: clinical characteristics in diabetic patients versus non-diabetic patients. *Ophthalmology*. 2008;115:1818-25.
5. Mansour AM, El-Dairi MA, Shehab MA, Shahin HK, Shaaban JA, Antonios SR. Periocular corticosteroids in diabetic papillopathy. *Eye (Lond)*. 2005;19:45-51.
6. Al-Haddad CE, Jurdi FA, Bashshur ZF. Intravitreal triamcinolone acetonide for the management of diabetic papillopathy. *Am J Ophthalmol*. 2004;137:1151-3.
7. Ornek K, Oğurel T. Intravitreal bevacizumab for diabetic papillopathy. *J Ocul Pharmacol Ther*. 2010;26:217-8.
8. Al-Dhibi H, Khan AO. Response of diabetic papillopathy to intravitreal bevacizumab. *Middle East Afr J Ophthalmol*. 2011;18:243-5.
9. Feng J, Qu JF, Jiang YR. Resolution of diabetic papillopathy with a single intravitreal injection of bevacizumab combined with triamcinolone acetonide. *Graefes Arch Clin Exp Ophthalmol*. 2013;251:2651-2.
10. Regillo CD, Brown GC, Savino PJ, et al. Diabetic papillopathy: patient characteristics and fundus findings. *Arch Ophthalmol*. 1995;113:889-95.
11. Lövestam-Adrian M, Agardh CD, Torffvit O, Agardh E. Type 1 diabetes patients with severe non-proliferative retinopathy may benefit from panretinal photocoagulation. *Acta Ophthalmol Scand*. 2003;81:221-5.

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Chorioretinitis with exudative retinal detachment secondary to varicella zoster virus

We report 2 atypical cases of acute retinal necrosis (ARN) associated with varicella zoster virus (VZV). The first case is a 50-year-old healthy male who presented with left iritis despite treatment with topical prednisolone. He reported worsening vision, photophobia, and left-sided headache. Review of systems was unremarkable, including unknown chicken pox exposure. His visual acuity was 20/40 OD and counting fingers OS. The right eye was normal. In the left eye, there was conjunctival injection and diffuse small keratic precipitates with the occasional stellate keratic precipitates below the midline, associated with 3+ cells in the anterior chamber and 1+ cells in the anterior vitreous. There was disc edema, with occlusive retinal vasculitis involving the retinal arterioles more than the venules. There was a localized exudative retinal detachment (RD) involving the macula extending out to the midperiphery with pockets of subretinal fluid extending around the optic nerve (Fig. 1A). Within the RD were patches of confluent white inflammatory retinal infiltrates with underlying choroiditis.

Intravenous fluorescein angiography (IVFA) revealed optic nerve hyperfluorescence with optic disc staining in the late frames. There were multifocal areas of blocked fluorescence early that became hyperfluorescent with staining in the late frames (Fig. 1B, 1C). These same areas were discretely hypofluorescent on indocyanine green (ICG) angiography consistent with active choroiditis (Fig. 1D, 1E).

A presumptive diagnosis of ARN was made and given the progressive presentation, empiric treatment with intravitreal foscarnet (2.4 mg/0.1 mL), oral valacyclovir 1 g 3 times daily, topical hourly prednisolone acetate 1%, and homatropine 5% 4 times daily were initiated.

Systemic work-up including chest radiograph and blood work for syphilis serology, toxoplasmosis immunoglobulin G, HIV antigen, and serum angiotensin-converting enzyme were negative. Polymerase chain reaction (PCR) testing of aqueous fluid was positive for VZV and negative for herpes simplex and cytomegalovirus. Oral prednisone 50 mg daily was added a week later and subsequently tapered over a 5-week period. Intravitreal foscarnet injections every 3 to 4 days were performed during the first 2 weeks, then weekly while the chorioretinitis was active. After the fifth intravitreal foscarnet, the patient's vision improved from hand motion to counting fingers. The retinitis and choroiditis had significantly improved with only a few patches of remaining active inflammation. He presented at week 7 with a rhegmatogenous RD, which was treated with vitrectomy surgery and silicone oil endotamponade. His vision remained poor from optic atrophy. The patient developed a dense cataract and underwent lens extraction with silicone oil removal at 1 year after the initial presentation. At 2-year follow-up, the vision remained at counting fingers and the retina remained attached with no recurrence of chorioretinitis.

The second case is a 58-year old immunocompetent male with unknown chicken pox history who presented with a 2-week history of vision loss and photosensitivity in the left eye. On initial examination, the visual acuity was 20/70 (due to amblyopia) OD and hand motion OS. He had a left relative afferent pupillary defect. Intraocular pressures were normal. He had 2+ cells in his anterior chamber with medium-sized keratic precipitates. Dilated fundus examination of the left eye showed vasculitis involving the peripheral retina associated with broad confluent areas of retinitis. There was also a significant exudative RD involving the macula with diffuse chorioretinal infiltrates. The right eye was normal. On IVFA, the multifocal chorioretinal infiltrates seen on funduscopy showed early hypofluorescence with late hyperfluorescence consistent with active choroiditis. Systemic work-up including chest radiograph and blood work for syphilis serology, toxoplasmosis immunoglobulin G and total antibody, HIV 1 and 2 antigen, serum angiotensin-converting enzyme, and antinuclear antibody were negative. VZV was detected on PCR analysis of aqueous humour. Because of the patient's history of poor compliance, he was admitted to hospital for intravenous acyclovir 700 mg 3 times daily for 14 days. He also received biweekly intravitreal foscarnet injections. The patient was discharged home after the