Serous Macular Detachment Due to Diabetic Papillopathy Detected Using Optical Coherence Tomography

Diabetic papillopathy (DP) is a syndrome characterized by self-limited unilateral or bilateral optic disc swelling associated with minimal or no permanent loss of visual function.1-3 Diabetic papillopathy may occur in patients with type 1 diabetes mellitus (DM)1 and type 2 DM,2,3 with approximately a 0.5% incidence1 irrespective of metabolic control and severity of diabetic retinopathy. Reportedly, DP often (in approximately 70% of cases) accompanies macular edema, which is a major cause of vision loss in patients with DP even without retinal capillary leakage and is presumed to be an extension of disc edema in some cases of DP.1-3 However, its precise features have not been fully investigated.

This study analyzes the macular lesions in 3 patients with DP using optical coherence tomography (OCT) (Carl Zeiss Meditec, Inc, Dublin, California).

Report of Cases. Case 1. A 57-year-old woman had a history of DM for 10 years with infrequent medical checkups. In May 2006, she was hospitalized for amputation of the first to fourth toes in her left foot, which were damaged by gangrene. During the hospitalization, she received intensive insulin therapy, which reduced her glycated hemoglobin level from 13.0% to 5.4% (to convert to a proportion of total hemoglobin, multiply by 0.01) within 2 months, and in June she reported blurred vision in both eyes. A hospital ophthalmologist found bilateral optic disc swelling, with best-corrected visual acuity of 20/20. She had marked optic disc swelling but no retinal hemorrhages or exudates in either eye. Fluorescein angiography showed dye leakage only from the optic discs (Figure 1). Visual field testing showed enlarged blind spots and relative cecocentral scotomas in both eyes. Radiographic assessment found no intracranial or intraorbital pathologic conditions. Her erythrocyte sedimentation rate was within normal limits. Blood pressure was 128/76 mm Hg. Stratus OCT revealed hyporeflectivity of the subretinal space in both eyes and the hyporeflective space spontaneously disappeared along with resolution of the optic disc swelling in
2 months. Final visual acuity was 20/20 OD and 20/50 OS on May 16, 2008.

Case 2. A 62-year-old man visited our institute on February 16, 2007, because of a 10-day history of visual disturbance in his left eye. He had had DM for 15 years and was taking oral hypoglycemic agents. At the initial visit, his best-corrected visual acuity was 20/20 OD and 20/200 OS. The right eye had an enlarged blind spot, and the left eye showed an inferior arcuate visual field defect. The anterior segment and media were unremarkable. Isochoric pupils showed a relative afferent pupillary defect in the left eye. There was background diabetic retinopathy with drusen and marked optic disc swelling in both fundi. Fluorescein angiography demonstrated dye leakage from the optic discs but no retinal capillary occlusion or leakage (Figure 3). His blood pressure was 145/88 mm Hg. Blood tests revealed a glycated hemoglobin level of 10.2%, triglycerides level of 238 mg/dL (to convert triglycerides level to millimoles per liter, multiply by 0.0113), and total cholesterol concentration of 251 mg/dL (to convert cholesterol concentration to millimoles per liter, multiply by 0.0259). His erythrocyte sedimentation rate was within normal limits. Optical coherence tomography showed subfoveal hyporeflectivity in addition to increased retinal thickness between the optic disc and macula regions (Figure 2). Unfortunately, the disease course could not be monitored because of his discontinuation of visits.

Case 3. A 44-year-old man visited our institute on April 14, 2008, because of blurred vision in the right eye. He had never received a medical checkup, although his father and sisters had DM. He had normal anterior segments and media, with best-corrected visual acuity of 20/50 OD and 20/30 OS. There was no relative afferent pupillary defect. The optic disc was swollen markedly in the right eye and mildly in the left eye, with fluorescein leakage only from the optic discs (Figure 4). Blood pressure was 128/88 mm Hg, blood glucose level was 265 mg/dL (to convert glucose level to millimoles per liter, multiply by 0.0555), and glycated hemoglobin level was 10.7%. On OCT, hyporeflective subfoveal space was observed in the right eye (Figure 2). Two months later on June 25, 2008, optic disc swelling and subfoveal fluid spontaneously resolved, with marginal recovery of visual acuity to 20/30 OU.

Comment. The present study provides evidence that serous macular detachment occurred in patients with DP and minimal or no diabetic retinopathy, which spontaneously subsided along with resolution of optic disc swelling. In combination with fluorescein angiography findings, subretinal fluid accumulation was solely attributed to the capillary
leakage of the optic nerve head rather than to the disrupted blood-retinal barrier of retinal capillaries and the retinal pigment epithelium.\textsuperscript{1-3} The macula thickness and underlying fluid amount correlated roughly with the degree of visual acuity loss.

Hoye et al\textsuperscript{4} reported that 7 of 55 patients with papilledema had OCT evidence of subretinal fluid involving the macula. Hedges et al\textsuperscript{5} demonstrated similar findings in 8 of 56 patients with anterior ischemic optic neuropathy (AION). As postulated by these groups, severe optic disc swelling probably disrupted the intermediary glial tissue of Kuhnt, which constitutes a group of astrocytes that surround the prelaminar optic nerve and separate it from the retina. The disruption of this tissue led to fluid accumulation in the peripapillary subretinal space and eventually into the macular region. Ophthalmologists should keep in mind that a disrupted blood-retinal barrier at the optic nerve head can be a major potential source of macular edema, in addition to retinal capillary and retinal pigment epithelium disruption. Diabetes mellitus–induced glial dysfunction may have accelerated the transretinal fluid movement.

Some authors claim that AION and DP are different points on the spectrum of a single clinical entity.\textsuperscript{1} In some patients with AION, visual function recovers to some degree. The arcuate scotoma and severe vision loss in the left eye of patient 2 reported herein may be due to AION and further suggest a continuum of the clinical entities of AION and DP.

Makoto Nakamura, MD, PhD
Akiyasu Kanamori, MD, PhD
Azusa Nagai-Kusuhara, MD, PhD
Sentrao Kusuhara, MD, PhD
Yuko Yamada, MD, PhD
Akira Negi, MD, PhD

Correspondence: Dr Nakamura, Division of Ophthalmology, Department of Surgery, Kobe University Graduate School of Medicine, 7-5-1 Kusunoki-cho, Chuo-ku, Kobe 650-0017, Japan (manakamu@med.kobe-u.ac.jp).

Financial Disclosure: None reported.

Funding/Support: This study was supported in part by grants-in-aid 16390499 (Drs Nakamura and Negi) and 17591835 (Dr Nakamura) from the Ministry of Education, Culture, Sports, Science, and Technology of the Japanese government.