Published in final edited form as:

Ophthalmic Surg Lasers Imaging. ; 43 0: e99–e103. doi:10.3928/15428877-20120920-04.

Bilateral Simultaneous Stage 1 Macular Hole

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Abstract

The authors describe two cases of bilateral simultaneous stage 1 macular hole diagnosed via optical coherence tomography (OCT). Vitreomacular traction, foveal pseudo cysts, and outer retinal changes were present initially. Resolution of the foveal pseudo cysts and outer retinal changes occurred in cases where a complete posterior vitreous detachment was noted. The initial step in the pathogenesis of macular holes is “traction” from the detaching posterior hyaloid. However, there are missing links in the exact inciting events and in the progression of the disease. The development of bilateral stage 1 macular holes simultaneously is unique and interesting because an unknown common inciting factor might be at play in these cases.

Introduction

Stage 1 macular holes appear clinically as small central yellow spots that probably represents tissue swelling.¹ Gass first described stage 1 macular holes as loss of the normal foveal contour; he believed the etiology was vitreomacular traction (VMT).^{1–3} Since the advent of spectral-domain optical coherence tomography (SD-OCT), a finding of cystic changes in the center of the fovea with an attached overlying vitreous can be detected in stage 1 macular holes in addition to the loss of foveal contour.^{4–6} Stage 1 macular hole is usually a unilateral disease; bilateral cases occur less commonly (10%).^{5,6} In addition, when the disease occurs bilaterally, it is typically in a sequential manner. We report two cases of bilateral simultaneous stage 1 macular hole, which, to the best of our knowledge, has not been previously described.

Case Reports

Case 1

A 66-year-old man was referred to the retina service due to an unexplained decrease in visual acuity in both eyes and an abnormal visual field test in the left eye. His medical history included high blood pressure and aortic aneurysm repair 16 years ago. The patient's examination revealed mild nuclear sclerosis in both eyes and stable choroidal nevi, superiorly in the right eye and superior to the macula in the left eye. Retinal examination failed to account for the abnormal visual field examination.

On follow-up 3 weeks later, the patient complained of a central gray area in his central vision in both eyes. Best-corrected visual acuity was 20/40 in both eyes. Intraocular pressure was within normal limits. Dilated fundus examination showed new small yellow spots in the center of both maculae. Macular OCT examination showed loss of the normal foveal contour and foveal pseudo cysts (arrowheads), VMT, and outer retinal changes (arrows) in both eyes (Figure 1). The diagnosis of bilateral simultaneous stage 1 macular hole was made.

Follow-up OCT examinations were performed at 6 weeks, 2 months, and 6 months (Figure 1). The best-corrected visual acuity was 20/30 in both eyes at 6 weeks and 20/40 in the right eye and 20/50 in the left eye at 2 months. At 6 weeks, VMT and foveal pseudo cysts (arrowheads) were still visible on OCT in both eyes. The outer retinal changes resolved in the right eye but were still present and unchanged in the left eye (arrow). At the 2-month follow-up visit, a complete posterior vitreous detachment was noted in the right eye. The outer retina appeared normal in the right eye but still showed changes in the left eye (arrow). The foveal pseudo cysts were still evident in both eyes (arrowheads). At the 6-month follow up, OCT examination revealed a complete posterior vitreous detachment in both eyes; the foveal pseudo cysts were still present in both eyes.

Case 2

A 71-year-old asymptomatic woman with a history of mild nonproliferative diabetic retinopathy presented to the retina service for routine diabetic follow-up examination. Visual acuity was stable at 20/50 in both eyes. Retinal examination revealed mild nonproliferative diabetic retinopathy that was unchanged from prior visits. OCT examination revealed bilateral simultaneous stage 1 macular holes (Figure 2).

Discussion

The patients described developed bilateral simultaneous stage 1 macular hole, an occurrence that has not been previously reported. The patient in case 1 developed this disease within a short time frame of 3 weeks. The OCT findings in both cases were consistent with the characteristics of stage 1 macular holes previously reported.⁶ In our cases, macular OCT scan was performed using the Cirrus SD-OCT system (Carl Zeiss Meditec, Inc., Dublin, CA), which includes a high-definition one-line scan consisting of 4,096 A-scans. The macular cube scan, consisting of 512 A-scans $\times$ 128 B-scans over a 6 $\times$ 6 mm area, was also used. Images from the macular cube scan were presented in cases where the foveal pseudo cyst was off-center and therefore not visible in the one-line scan.

In the first case, on the 2-month follow-up OCT, the outer retinal architecture was normalized in the right eye and a complete posterior vitreous detachment was noted, which, given the pathogenesis of macular holes, should provide protection from further progression. The OCT findings in the left eye at the 2-month follow-up visit remained unchanged from prior examination. A complete posterior vitreous detachment was noted at the 6-month follow-up OCT examination, and the foveal pseudo cyst could still be appreciated in both eyes.

In the second case, the disease showed spontaneous resolution of the stage 1 hole in the right eye with restoration of the normal foveal contour, a complete posterior vitreous detachment, restoration of the outer retina architecture, and a decrease in the size of the foveal pseudo cysts. The disease in the left eye showed a different pattern of progression because the disease worsened with the enlargement of the foveal pseudo cyst and greater retinal tissue loss.

The initial step in the pathogenesis of macular holes is “traction” from the detaching posterior hyaloid. However, there are missing links—the exact inciting events in the progression of the disease. The development of bilateral stage 1 macular holes simultaneously is unique and interesting because an unknown common inciting factor might be at play.

Acknowledgments

Supported in part by an unrestricted grant from Research to Prevent Blindness, Inc., New York, New York, to the New England Eye Center/Department of Ophthalmology-Tufts University School of Medicine; NIH contracts RO1-EY11289-23, RO1-EY13178-07, RO1-EY013516-07; Air Force Office of Scientific Research FA9550-07-1-0101 and FA9550-07-1-0014; and the Massachusetts Lions Eye Research Fund.

Dr. Duker receives research support from Carl Zeiss Meditec, Inc., Optovue, Inc., and Topcon Medical Systems, Inc. The remaining authors have no financial or proprietary interest in the materials presented herein.

Dr. Duker did not participate in the editorial review of this manuscript.

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Figure 1. Serial optical coherence tomography examination from case 1 over a follow-up period of 6 months. Arrowheads point to the foveal pseudo cysts. Arrows highlight the outer retinal changes that occurred as a result of “traction” from the detaching posterior vitreous.

Figure 2.
Initial optical coherence tomography image from case 2. Foveal pseudo cysts (arrowheads) and outer retinal changes (arrows) are present in both eyes.

Figure 3.

Follow-up optical coherence tomography images from both eyes performed at 2, 4, and 8 months, and 1 year. A complete posterior vitreous detachment was noted in the right eye at the 8-month follow up. The foveal pseudo cyst and outer retinal changes resolved in the right eye by 1 year. The foveal pseudo cyst was enlarging in the left eye as a result of increased “traction” from the detaching posterior vitreous. The posterior vitreous was still attached at 1 year.